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REVISIONS OF NOMENCLATURE OF CERTAIN NORTH AMERICAN BIRDS.

By ROBERT RIDGWAY.

The following emendations of nomenclature apply both to species enumerated in the latest published list of North American birds—Coues's "Check List,"* and others not contained therein. These two series are therefore included in separate categories, the former having, for convenience of reference, the corresponding number of the "Check List" prefixed to each name.

It is deemed inexpedient to give here a list of the species to be added to the Smithsonian Catalogue of 1859,† for the reason that they are sufficiently distinguished by the absence of the concordant number following each name, in the revised list following this paper.

a. Species given in Coues's Check List.

4 *b.* *Turdus* AONALASCHKAE,‡ Gmel.—In my report on the ornithology of the fortieth parallel expedition I used the name "*guttata*, Pallas," as the earliest name certainly applicable to this species; but I now believe that Gmelin's name, *Turdus aonalaschkae*, based upon the *Unalascha Thrush* of Pennant (Arctic Zoology, II, p. 338) and *Aoonalashka Thrush* of Latham (Synopsis, II, i, p. 23), is the one which should be used. As in the case of *Muscicapa guttata*, Pall., there can be no doubt whatever that the western Dwarf Thrush (*Turdus nanus*, Auct., *nec* Aud.!) is the very species which these authors described under the above names. *Turdus aonalaschkae* being, therefore, the proper name for the Hermit Thrushes collectively, the Middle and Eastern Province forms should be called, respectively, *T. aonalaschkae auduboni* and *T. aonalaschkae pallasi*. With regard to the last, it is very evident that

* A Check List of North American Birds. By Elliot Coues. Salem. Naturalists' Agency. 1873. 8vo, pp. 137. (635 species.)

† Catalogue of North American Birds contained chiefly in the Museum of the Smithsonian Institution. By Spencer F. Baird. [First octavo edition.] Washington: Smithsonian Institution. 1859. ["Smithsonian Miscellaneous Collections, 108." Not paged; 738 species, including varieties, all consecutively numbered.]

‡ Small capitals indicate the name which is changed or emended.

Turdus nanus, Aud., was based upon a small specimen of the eastern Hermit Thrush, since Audubon distinctly says so in his account of the supposed species. The name *nanus* antedates *pallasi;* but the latter having been used, in a restricted sense, exclusively for the eastern race, while *nanus* has been almost wholly applied, of late years, to the small west-coast form now to be called *T. aonalaschkae*, it seems best to discard the name *nanus* altogether and adopt for the eastern birds that of *pallasi*, as next in order of date.

61. HELONÆA *swainsoni*, Aud.—According to Agassiz, the correct orthography of the generic name of this species (if to be separated from *Helmitherus*) is *Helonœa* and not "*Helinaia*," as spelled by Audubon. (*Cf.* Newton, P. Z. S., 1879, p. 552.)

144*a*. *Leucosticte griseinucha* (Brandt) Bp.—The present indications are that this form does not intergrade with *L. tephrocotis*, but, on the contrary, is a well-defined species of very constant characters confined strictly to that portion of the Alaskan coast west of the one hundred and thirty-fifth degree of west longitude.

146*a*. *Ægiothus linaria*, "var. *fuscescens*."—No examples referable to the so-called *fuscescens* having ever been taken in winter, while the particular stage originally so named is represented by birds in highly intensified midsummer dress from *various portions* of subarctic America (the interior of the continent and coast of Alaska, as well as Labrador), the inference is natural that "*fuscescens*" represents simply the midsummer plumage of the common species. (*Cf.* Coues, Birds of the Northwest, 1874, p. 115.)

146*b*. *Ægiothus* CANESCENS *exilipes* (Coues) Ridgw.—There is every probability that *Æ. canescens* is a quite distinct species, since it occurs in almost every district inhabited by *Æ. linaria* (especially in the Nearctic Region), and cannot therefore be a geographical race of the same species. *Æ. canescens* and *Æ. linaria holbölli* are the large boreal races breeding in Greenland; *Æ. canescens exilipes* and *Æ. linaria* proper are the smaller continental forms.

159*a*. *Passerculus* ANTHINUS, Bp.—This seems to be quite distinct from *P. sandwichensis*, and probably more nearly related to—

160*a*. *Passerculus* GUTTATUS, Lawr., which proves to be very distinct from *P. rostratus*.

165 *a* (Appendix). *Ammodromus nigrescens*, Ridgw.—As has already been insisted by Mr. Maynard (see Am. Sportsman, V. Jan. 16, 1875, p. 248), this bird is very probably distinct specifically from *A. maritimus*.

169. *Melospiza* FASCIATA (Gm.) Scott.—We can see no valid reason why Gmelin's name for this species should not be used instead of Wilson's, bestowed upon it nearly a quarter of a century later. (*Cf.* Scott,

Am. Nat., 1876, p. 17.) The recognizable forms of this species should therefore be known as (169*a*) *M.* FASCIATA *fallax*, (169*b*) *M.* FASCIATA *guttata*, (169*c*) *M.* FASCIATA *rufina*, (169*d*) *M.* FASCIATA *heermanni*, and (169*e*) *M.* FASCIATA SAMUELIS (*samuelis* antedating *gouldii*).

169*f*. *Melospiza* CINEREA (Gm.)Ridgw.—Through the explorations of Messrs. Dall, Turner, and Nelson, the fauna of Unalashka has of late years been very thoroughly investigated, and we are thus able to identify the "Cinereous Finch" of Pennant (Arct. Zoology, II, p. 68) upon which Gmelin based his *Fringilla cinerea* (S. N., I, ii, p. 922) with the species which Professor Baird afterward named *Melospiza insignis* (Trans. Chicago Acad., I, i, p. 319, pl. 29, fig. 2). Through the same means it becomes equally certain that the *Oonalaska Bunting* of Pennant and Latham (*Emberiza unalaschcensis*, Gm., S. N., I, ii, p. 875) is, as some authors have long maintained, the bird usually called *Passerella townsendi* (Aud.). The known forms of *Passerella* having been proven by Mr. Henshaw to intergrade, and therefore, to constitute mere geographical races of a single species, they should be known by the following names:—

188. *P. iliaca* (Merrem) Sw.

"189"*a*. *P.* ILIACA UNALASCHCENSIS (Gm.) Ridgw.

189*a*. *P.* ILIACA *schistacea* (Baird) Hensh.

—. *P.* ILIACA *megarhyncha* (Baird) Hensh.—

the latter—connecting *unalaschcensis* with *schistacea*, but peculiar in the extremely robust bill and other characters—not being given in the "Check List."

170*a* (Appendix). *Peucæa arizonæ*. Ridgw.—There is very strong probability of this being quite distinct, specifically, from *P. æstivalis*. (See Proc. U. S. Nat. Mus., I. 1878, p. 127, foot-note.)

177. *Spizella* MONTANA (Forst.) Ridgw.—Forster's name of *montana* applied to this species in 1772 antedates Gmelin's name *monticola* (1788), and, there being no objection to it otherwise, should be substituted for it.

180*a*. *Spizella* BREWERI, Cass.—Thus far there appears not the slightest evidence that this bird should be referred to *S. pallida*. The respective habitats of the two overlap quite considerably, and they may always be easily distinguished by the markings of the head.

191. SPIZA *americana* (Gm.) Bp.—In 1858 Professor Baird rejected the generic name *Spiza* for this species, for the reason that, although it "was first used in connection with *Emberiza americana*," it was "so mixed up with types of several other modern genera as to render it uncertain whether to apply it to one rather than to another"—at the same time remarking that "if *Spiza* pointed more unmistakably to the *E. americana* it might, perhaps, be necessary to adopt it." ("Birds N. Am.," p. 494.) Upon referring to the "Specchio Comparativo," where Bonaparte next, after its institution, mentions his genus *Spiza*, I find, in the

foot-note on p. 47, that he distinctly names *E. americana* as the type of the genus ("Reconoscemmo inoltre, che quest' uccello [*E. melanocephala*] è il perfetto analogo della *Fringilla americana* TIPO DI QUEL SOTTOGENRE"). Four years later, however, Bonaparte proposed the name *Euspiza* for the same type ("Saggio," p. 141), but according to recognized rules this later name becomes simply a synonym of *Spiza*, as does also Cabanis's name *Euspina*, the latter substitued for *Euspiza* (Mus. Hein., I, p. 133), under the misapprehension that the type of the latter was the *Emberiza melanocephala* of Scopoli (see M. H., p. 130)—a species not only generically distinct from *E. americana*, Gmel., but moreover hardly a member of the same subfamily.

201. *Phonipara* ZENA (Linn.) Bryant.—"*Fringilla bicolor*," Linn., S. N., ed. 12 (1766)=*F. zena*, Linn., S. N., ed. 10 (1758).

206. *Pipilo fuscus* MESOLEUCUS (Baird) B. B. & R.—The Arizona form of this species is very easily distinguishable from the true *fuscus* of Mexico, the latter being without the rufous cap of *mesoleucus*, the colors in general darker, etc.

212*b*. *Agelæus* TRICOLOR (Nutt.) Bp.—Totally distinct from *A. phœniceus*.

233. *Pica* RUSTICA *hudsonica* (Sab.) Baird.—The earliest available name for the European Magpie appears to be *Corvus rusticus*, Scopoli (1769), which considerably antedates "*melanoleuca*, Vieill." (1818), and is now adopted by European authorities. (*Cf.* Dresser, Birds of Europe, pt. xxii.) The American bird, therefore, if to be separated subspecifically from the European (for which there certainly seems sufficient reason), should be named as above.

239*a* (Appendix). *Perisoreus obscurus*, Ridgw.—Since the original description of this bird was published Mr. Henshaw has obtained additional specimens, and, by an examination of them, together with the types, has adopted Mr. Sharpe's conclusion (Cat. B. Brit. Mus., III, p. 105) that the form in question is a distinct species, an opinion in which I at present wholly agree. Not so, however, with *capitalis*, Baird, which Mr. Sharpe treats in the same manner; the latter unquestionably grades directly into *P. canadensis*, and consequently, notwithstanding it is a very strongly marked form, should be called *P. canadensis capitalis*.

The *Perisoreus obscurus* is of much more restricted range than was at first supposed, and probably does not extend much, if any, north of Sitka. The examples alluded to in Hist. N. Am. B. (Vol. II, p. 302), as coming from "north of Sitka and in the Yukon territory," and which were stated to "incline toward the var. *canadensis*," are in reality referable to *P. canadensis*, of which they constitute a separable race, distinguished by the less extent and dingy or smoky tinge of the frontal

white patch and generally darker colors. This new race may be characterized as follows:

PERISOREUS CANADENSIS FUMIFRONS, Ridgw.

CH.—Similar to *canadensis* proper, but colors darker and more dingy throughout, and the white of the forehead obscured, or even sometimes almost wholly obliterated, by a wash of smoky gray or brown.

Hab.—Coast of Alaska.

265. CAPRIMULGUS *vociferus*, Wils.—I can see no reason whatever for removing this bird from the genus *Caprimulgus*. The type of "*Antrostomus*" is the *C. carolinensis*, Gmel., which differs from all the other Caprimulgi (so far as I am aware) in possessing fine lateral filaments to the rictal bristles, so that, in case this character be deemed sufficient, the genus *Antrostomus* may stand, if restricted to the single species possessing this feature. (*Cf.* Proc. U. S. Nat. Mus., I, pp. 142, 143, pls. i, ii.)

266. PHALÆNOPTILUS *nuttalli* (Aud.) Ridgw.—This species is decidedly peculiar in the combination of its salient points of structure, having a lengthened, naked tarsus, like *Nyctidromus*, a characteristically velvety plumage, short, even tail, and unique wing-formula; features which, taken together, render it a very well-marked genus, which may be characterized as follows:—

PHALÆNOPTILUS, gen. nov.

CH.—Differing from *Caprimulgus* and "*Antrostomus*" in the short, even tail (much shorter than the wing), and lengthened, perfectly naked tarsus (longer than the middle toe), the first quill shorter than the fourth, and the plumage with a peculiar, velvety, moth-like surface.

Type, *Caprimulgus nuttalli*, Aud.

As stated on pages 142, 143, Proceedings of the United States National Museum, Vol. I (1878), the characters supposed to separate the American *Antrostomi* from the Old World species of *Caprimulgus*, particularly the type of the latter genus (*C. europæus*, L.), are wholly intangible, with the exception of *A. carolinensis*, which has minute lateral filaments to the rictal bristles, these being in all other species perfectly smooth, or simple. On the other hand, the *Caprimulgus nuttalli* of Audubon has so many decided peculiarities of structure that it is somewhat a matter of surprise that its place in the genus "*Antrostomus*" has not been questioned ere this. In fact, *P. nuttalli* is quite as distinct in its external structure from "*A.*" *vociferus* and its allies as is the *Nyctidromus albicollis*. The more prominent differences of structure in these forms may readily be seen by comparison of the birds themselves, or by examination of the outline drawings of plates I and II of the volume of the "Proceedings" referred to above.

268. *Chordeiles* ACUTIPENNIS *texensis* (Lawr.) B. B. & R.—The *Chordeiles texensis* of Lawrence is merely a slightly different northern form

of *C. acutipennis* (Bodd.) Cass., of South America. (See Sclater, P. Z. S. 1866, p. 134, and Hist. N. Am. B., II, pp. 400, 407.)

267. *Chordeiles* POPETUE (Vieill.) Baird.—Brisson's name *virginianus* was not restricted to this species until many years after the institution of Vieillot's name *popetue:* the latter, therefore, notwithstanding its barbarous character, is, by all the rules, entitled to retention.

269. CYPSELUS *saxatilis* (Woodh.) Ridgw.—This species agrees so very closely in details of structure with *C. melba*, Linn., that there seems to be no good reason for separating it generically from the genus *Cypselus*, unless *C. melba* also is removed to another genus. The type of *Panyptila* being the *Cypselus cayennensis*, Gmel., the elimination of *C. saxatilis* does not, of course, affect the validity of the latter genus, as properly restricted; still, there is not much more difference of form between "*Panyptila*" *cayennensis* and *C. saxatilis* than between *C. melba* and *C. apus*, the latter being the type of *Cypselus*. *C. apus* has the feet much weaker and the tarsus much more densely feathered than *C. melba; C. saxatilis* is nearly intermediate in this respect, though coming much nearer to *C. melba*.

273. BASILINNA *xantusi* (Lawr.) Elliot.—See Elliot's "Synopsis of the Trochilidæ*", p. 227.

284. *Trogon* AMBIGUUS, Gould.—The species described in "Birds of North America," and figured in the atlas to that work, is the present one, and not *T. mexicanus*. The latter is chiefly distinguished by the absence of white bars on the tail-feathers, which are uniform black underneath, except the broad white tip.

295. XENOPICUS *albolarvatus* (Cass.) Bd.—In addition to the very tangible external characters pointed out by Professor Baird in his characterization of a subgenus *Xenopicus* (B. N. Am., p. 83), may be mentioned the fact that the tongue is scarcely extensile, its tip, when fully protruded, reaching only $\frac{3}{4}$ of an inch beyond the tip of the bill, or just the same as in *Sphyropicus thyroideus*, while in *Picus villosus harrisi* the protrusion amounts to $2\frac{1}{2}$ inches, or $1\frac{3}{4}$ inches more! (See Orn. 40th Parallel, pp. 546, 548, and 552, under lists of specimens of the above species.)

301. *Picoides* TRIDACTYLUS *americanus* (Brehm) B. B. & R.—As pointed out in "History of North American Birds" (Vol. II, pp. 529–534), the differences between the American and European white-backed species of this genus are very slight, and by no means sufficient to warrant specific separation. The common form should therefore be known as above, and the Rocky Mountain race, if deemed sufficiently distinct, as—

*A Classification and Synopsis of the Trochilidæ. By Daniel Giraud Elliot, F. R. S. E., etc. Washington City: Published by the Smithsonian Institution ["Smithsonian Contributions to Knowledge," No. 317.] [March, 1879.]

301*a*. *Picoides* TRIDACTYLUS *dorsalis* (Baird) B. B. & R.

314. *Colaptes* AURATUS *mexicanus* (Sw.).

The above combination becomes absolutely necessary in view of the indisputable and wholesale intergradation of the *auratus* and *mexicanus* types of this species. In the present case is afforded an excellent example of the difficulties in the way of consistent nomenclature, whether binomial or trinomial.

316. ALUCO *flammeus* PRATINCOLA (Bonap.) Ridgw.—Professor Newton has, we think, clearly demonstrated* that the proper type of the Linnæan genus *Strix* is not *S. flammea*, but *S. stridula*, subsequently made the type of Savigny's genus *Syrnium;* and that *Aluco*, Fleming (1828), should stand as the generic name of the Barn Owls. Audubon's name, "*americana*" (1839), for the American Barn Owl is antedated by *pratincola*, Bonap. (1838), which should, in consequence, stand as the subspecific name for this form.

318*b*. *Scops asio* MACCALLI (Cass.) Coues.—In the "Proceedings of the U. S. Nat. Mus." for 1878 (Vol. I, pp. 109–111), I formally referred the "*Scops asio* var. *cnano*" of Lawrence to *S. maccalli*, Cassin, and in a foot-note on p. 111 refer Mr. Sennett's specimens to the latter. This fact, however, seems to have been overlooked by both Dr. Coues and Mr. Sennett, who, in their last paper, continue to call the variety "*S. asio enano*."†

320. ASIO *wilsonianus* (Less.).—Brisson's genus *Asio* appears to be unquestionably that which should be applied to the long-eared owls, and has long since been adopted by some authorities. Admitting that the short-eared species (*Strix accipitrina*, Pall.) cannot be separated generically, it would have to be called—

321. ASIO *accipitrinus* (Pall.) Newton.

323. STRIX *nebulosa*, Forst.—Professor Newton's very correct conclusion that the proper type of the Linnæan genus *Strix* is the *S. stridula*, necessitates the above change in the generic name of this American congener of that species.

The Floridan birds of *S. nebulosa* I find to be so different from northern examples as to well merit subspecific separation. In his memorable work on the birds of East Florida (Bull. Mus. Comp. Zool., I. p. 340) Mr. Allen refers to the much darker color of Floridan specimens, but apparently overlooks the naked toes. It is with pleasure that I dedicate this race to one who has done such eminent service not only to the ornithology of Florida, but to the science in general.

* *Cf.* Yarrell's Brit. Birds, ed. 4, vol. i, p. 150, and The Ibis, ser. iii, vol. vi, pp. 94–105.

† Since these pages were put in type, I have discovered that the name stands as above given in the "Check List." The notice of the species here was therefore an oversight.

STRIX NEBULOSA ALLENI, Ridgw.

CH.—Similar to typical *nebulosa*, but toes wholly destitute of feathers or bristles, being perfectly bare to the extreme base; colors darker than in *nebulosa*, with less ochraceous, the tail scarcely barred on the basal half, and the bars on the breast much more distinct, as well as narrower and more continuous.

Hab.—Florida (Clearwater).

The above characters I find to be constant in a series of three specimens (two ♂ and one ♀) sent to the National Museum by Col. S. T. Walker, of Clearwater, Florida. Not only are the toes perfectly bare, but the feathers clothing the tarsi are much shorter than in northern *nebulosa*, thus causing the legs to appear much more slender. The only feathering on the toes consists of a small pointed strip on the outer side of the first phalanx of the middle toe, reaching about to the second joint.

324. STRIX *occidentalis* (Xant.) Ridgw.

Assuming that the Great Grey Owls are sufficiently distinct generically from the foregoing, they should be known as—

322. SCOTIAPTEX *cinereum* (Gmel.) Swains., and
[322*a*.] SCOTIAPTEX *cinereum lapponicum* (Retz.) Ridgw

236. *Surnia ulula* FUNEREA (Linn.) Rich. & Sw.—In the 10th edition of "*Systema Naturæ*" Linnæus describes on the same page (93) *Strix funerea* and *S. ulula*, in the order here given; the former being based on "Fn. suec. 51," the "*ulula flammeata*, Frisch. av. t. 9" being doubtfully quoted; "Habitat in Europa." *S. ulula* is based upon "Fn. suec. 52—Ulula, Gesn. av. 773, Aldr. ornith, l. 8, c. 6; Will. ornith. 68, t. 13, Ray. av. 26, n. 4;" the habitat also "in Europa." In neither case would the diagnoses given determine the species independent of the references. In the 12th edition, however, *S. ulula* is mentioned first, with the same diagnosis and habitat, but with additional or more explicit references. *S. funerea* follows, with an additional diagnosis which renders the species unmistakable, and a reference to "*Strix* canadensis," *Briss.* av. I, p. 518, t. 37, f. 2, which we know to be the American Hawk Owl. Furthermore, there is added to the habitat "America *septentrionali*." It is therefore difficult to decide which of the two names has priority as the specific designation. If the *S. funerea* is to be regarded the same in both editions, then this name, as occurring first on the page, would be entitled to that claim; but there is nothing whatever in the account of *Strix funerea* of edition 10 to show that it is anything more than the European Hawk Owl; or, in other words, the same as the species called on the same page *S. ulula*. As the matter stands, we prefer to take *funerea* of 1766 as the earliest date of the name as applied to the American bird, and to call the *species S. ulula*, the latter name being of certain application in the 10th edition, while it precedes *funerea* in the 12th.

347. *Falco* FUSCO-CÆRULESCENS, Vieill.—See Sharpe, "Catalogue of the Accipitres in the British Museum," I, p. 400.

. 353. *Buteo* ABBREVIATUS, Cabau.—See Sharpe, as above, p. 163, who, however, refers it to the genus "*Tachytriorchis*." See, also, Sclater & Salvin's "Nomenclator Avium Neotropicalium," p. 118.

363. *Polyborus* CHERIWAY (Jacq.) Cabau.—See Sharpe, t. c., p. 33. This species appears to be quite distinct from *P. tharus*.

364. PSEUDOGRYPHUS *californianus* (Shaw) Ridgw.—Concerning the validity of this genus, see Bull. Nutt. Orn. Club., April, 1880, p. —.

366. CATHARISTA (*atrata*, Bartr.).—If the name *atrata*, as now almost universally applied to this species, is to be accredited to Bartram, it has priority over all the synonyms; but if we are to reject Bartram's names on account of his frequent "lapses" from binomialism, or his equally bad practice of omitting descriptions (which, however, is not the case with regard to his mention of the present species), then *urubu* of Vieillot (1809) takes precedence over *atrata* of Wilson (1812), which comes next in order of date.

368. *Columba* ERYTHRINA, Licht.—Although there is no law compelling the adoption of a museum name, I prefer to do so in this case rather than propose a new one, since Lichtenstein's name *erythrina* is a very appropriate one. The name by which this species has usually been known—*C.* "*flavirostris*, Wagler"—is "glaringly false," and, therefore, to be rejected, according to the rules of the British Association.* It is true that the bill sometimes appears yellowish in the dried skin, but in life it is always some shade of purple or pink, whitish at the extremity. Whatever it may be, it is impossible to identify McCall's *C. solitarius* with this species. If his description was really penned from a specimen, his bird has not yet been rediscovered, no known North American Pigeon corresponding at all closely with his description. In any event it cannot be the present species, which never has "brilliant reflections" on either neck or breast, nor the back or under wing-coverts "light-red color."

378. ORTALIS *vetula maccalli* (Baird) Ridgw.—In regard to this emendation of the generic name, see Wharton, "The Ibis," Oct., 1879, p. 450. I find the Texan birds easily distinguishable from Mexican examples (true *vetula*).

380. CANACE *canadensis* (Linn.) Reich.—None of the American grouse usually referred to *Tetrao* resemble at all closely the type of the latter genus, *T. urogallus*, Linn. They appear, in fact, nearly as distinct from *Tetrao* proper as are *Bonasa* or *Pediœcetes*, or other recognized American genera. It seems scarcely advisable, however, to admit a genus "*Dendragapus*" for the special accommodation of *C. obscura* in its various forms.

396. *Charadrius* DOMINICUS, Müll.—Müller's name for the American Golden Plover, dating 1776, should take precedence over *fulvus*, Gmel., bestowed twelve years later (1788), as the name of the *species*. The Asiatic form should therefore be called *C. dominicus fulvus* (Gmel.)

* *Cf.* Bull. Nutt. Orn. Club, Jan., 1880, p. 37.

400 *bis* (Appendix). *Ægialitis* CURONICA (Gm.) Gray.*—This supposed new species proves to be the Lesser Ringed Plover of the Old World, *Æ. curonica* (Gm.) Gray, the principal synonyms of which are the following. It may be considered doubtful whether the specimen really was obtained near San Francisco, as stated on the label.

Charadrius curonicus, GMEL., S. N., I, 1788, 692.
Ægialitis curonicus, GRAY, Cat. Brit. B, 1863, 141.—HARTING, Handb. Brit. B. 1872, 134.
Charadrius philippinus, LATH., Ind. Orn., II, 1790, 745.
Charadrius fluviatilis, BECHST., Naturg. Vög. Deutschl., 1809, 422.
Charadrius minor, MEYER & WOLF, Tasch. Vög. Deutschl., 1810, 324.
Charadrius intermedius, MÉNÉTR., Catal. ——, 53.
Charadrius zonatus, SWAINS., B. W. Afr., II, ——, 235, pl. 25.
Ægialitis microrhynchus, RIDGW., Am. Nat., VIII, Feb. 1874, 109 ("San Francisco, Cal.").

408. *Himantopus* MEXICANUS (Müller) Ord.—Müller's name dates 1776; thirty-one years earlier than *nigricollis*, Vieill.

413. *Scolopax* RUSTICULA (Linn.) Wharton.—See "The Ibis," Oct., 1879, p. 453.

442 *bis* (Appendix). *Numenius* TAHITIENSIS (Gm.).—The earliest name for the bird afterwards named *Numenius femoralis* by Mr. Peale is *Scolopax tahitiensis*, Gmel. (S. N., I, ii, 1788, p. 656, n. 22).

448. AJAJA ROSEA (Briss.) Ridgw.—The American Spoonbill being a very distinct generic type, for which Reichenbach proposed (in 1853) the name *Ajaja*, it becomes necessary to change the specific name also. There is not, unfortunately, any post-Linnæan synonym for this species, with the exception of "*Platea* '*mexicana*, Willoughby,'" as used by Gambel in 1849 (Jour. of Philad. Acad., 1, p. 222). Gambel, however, gives no description; and, moreover, since the name "*mexicana*" is simply quoted from Willoughby, it seems best to adopt Brisson's very appropriate name of *rosea*, in justice to the accurate and complete description of the species in the work of that author.

454. HYDRANASSA TRICOLOR (Müll.) Ridgw.—If the Herons are to be subdivided at all, it seems quite necessary to recognize the generic name which, in 1858, Professor Baird proposed for this species (B. N. Am., p. 660), the earliest designation of which is *Ardea tricolor*, Müller (1776).

455. DICHROMANASSA *rufa* (Bodd.) Ridgw.—See Bull. U. S. Geol. and Geog. Survey Terr., vol. iv, no. 1, p. 246.

460. *Botaurus* LENTIGINOSUS (Montag.) Stephens.—This appears to be the earliest designation of the species.

*Am. Nat., VIII, Feb., 1874, p. 109.

466 *a* (Appendix). *Rallus obsoletus*, Ridgw.—This proves to be quite distinct from *R. elegans*, being, in fact, more nearly related to *R. longirostris* (sive "*crepitans*").

472. *Gallinula galeata* (Licht.) Bp.—Quite distinct specifically from *G. chloropus*, Lath.

473. IONORNIS *martinica* (Linn.).—This species has usually been referred to either *Porphyrio*, Briss., or *Porphyrula*, Blyth, but it is exceedingly distinct generically from both these types, particularly the former. The generic name *Ionornis*, instituted for its special reception, by Reichenbach in 1853 (Nat. Syst., p. xxi), seems to be the earliest one available.

488. *Anas* BOSCAS, Linn.—See Wharton, "The Ibis," Oct., 1879, p. 453).

489 *a* (Appendix). *Anas fulvigula*, Ridgw.—This bird proves very distinct from *A. obscura*.

526. *Pelecanus* ERYTHRORHYNCHUS, Gmel.—This name antedates "*trachyrhynchus*, Lath.," by two years, and, being no less appropriate, there is no valid reason why it should not be retained. (*Cf.* Bull. Nutt. Orn. Club, Jan., 1880, p. 36.)

525. *Sula* LEUCOGASTRA (Bodd.) Salvin.—See Salvin, Trans. Zool. Soc. Lond., IX, ix, 1875, 496.

529. PHALACROCORAX DILOPHUS *cincinnatus* (Brandt) Ridgw.—This is simply the large northwestern form of *P. dilophus*, no more entitled to specific separation than var. *floridanus*, which represents the opposite extreme of size.

In regard to the generic name of the Cormorants, it appears that we will have to use *Phalacrocorax*, Briss., instead of *Graculus*, the latter, properly applied, having for its type the *Corvus graculus*, Linn., = *Gracula pyrrhocorax*, Scop. (*Conf.* Sharpe, Cat. Passerif. Brit. Mus., p. 146, foot-note.)

547 *b*. *Larus* OCCIDENTALIS, Aud.

548 *a*. *Larus* CALIFORNICUS, Lawr.

549. *Larus* BRACHYRHYNCHUS, Rich.

The above appear to be quite well-defined and distinct species; the first more nearly related to *L. affinis*, Reinh., than to *argentatus;* the second much nearer to *L. cachinnans*, Pall., than to *delawarensis*.

581. OSSIFRAGA *gigantea* (Gmel.) Homb. & Jacq.—A very distinct genus from *Fulmarus*.

580. PHÆBETRIA *fuliginosa* (Gmel.) Coues.—Appears to be sufficiently distinct generically from *Diomedea*.

583. PRIOCELLA *tenuirostris* (Aud.) ——. —This bird seems sufficiently distinct generically from *Fulmarus*, and has been made the type of *Priocella*, by Hombron & Jacquinot (Compt. Rend., XVIII, 1844, p. 357.)

595. PRIOFINUS *melanurus* (Bonn.) ——. —This species is the type of the genus *Priofinus*, Homb. & Jacq. (t. c. p. 355).

600. *Puffinus* AUDUBONI, Finsch.—The *Procellaria obscura* of Gmel. has been determined by Dr. Finsch (see P. Z. S. 1872, p. 111) to be a Pacific Ocean species, distinguished from the *Puffinus obscurus* of recent authors by its white underwing-coverts and other characters. Dr. Finsch therefore proposed for the Atlantic species the name *auduboni*, as above.

601. *Puffinis* GAVIA (Forst.) Finsch.—See Giglioli & Salvadori, Ibis, 1869, p. 66; Finsch, Jour. für Orn., 1872, p. 256.

603. *Puffinus* GRISEUS (Gmel.) Finsch.—*Cf.* Finsch, Jour. für. Orn., 1874, p. 209; Salvin, Rowley's Orn. Misc., iv, 1876, p. 236.

619. LUNDA *cirrhata*, Pall.—Sufficiently distinct generically from the species of *Fratercula*.

623. *Simorhynchus* PYGMÆUS (Gmel.) Ridgw.—The *Alca pygmæa* of Gmelin is unquestionably the young of this species, afterward named "*S. cassini*" by Dr. Coues. *Alca kamtschatica*, Lepechin, is the same species in adult (winter?) plumage.

b. SPECIES AND SUBSPECIES NOT IN COUES'S CHECK LIST.

SIURUS NÆVIUS NOTABILIS, Grinnell, MS.

CH.—Similar to *S. nævius*, but much larger. Wing, 3.25; tail, 2.50; bill, from nostril, .50; depth at base, .25; tarsus, .83; middle toe, .56. Above dark grayish brown, the feathers of the pileum with indistinctly darker centres. Beneath yellowish white, the throat thickly spotted, and the breast and sides heavily streaked with blackish dusky; a superciliary stripe of pale fulvous, hardly extending back to the end of the auriculars. Lores crossed by a distinct streak of black. Centre of the abdomen immaculate; lower tail-coverts with central streaks of grayish dusky; lining of the wing smoky gray. Bill brownish black, the mandible growing lighter brown basally. Feet horn-color.

Hab.—Black Hills, Wyoming (Mus. G. B. Grinnell).

The plumage of this bird is in all respects, so far as I can see, quite identical with that of ordinary darker plumaged specimens of *S. nævius*, except that the superciliary stripe does not extend so far back and the streaks on the breast are broader; the former character may be merely apparent, however, and owing to the manner of skinning.

Parus CINCTUS, Bodd.—In accrediting this species to the North American fauna, on the strength of specimens collected in Alaska by Mr. Lucien M. Turner*, I inadvertantly called it "*P. sibiricus*, Gmel.," at the time overlooking the priority of the name *cinctus*.

MYIARCHUS MEXICANUS (Kaup) Lawr.

Tyrannula mexicana, KAUP, P. Z. S., Feb. 11, 1851, 51.†
Myiarchus mexicanus, LAWR., Ann. Lyc. N. Y., IX., 1869, 202 (nec Baird, B. N. Am., 1858, p. 179).
??? Tyrannula cooperi, KAUP, l. c. (Mexico).‡
Myiarchus cooperi, BAIRD, B. N. Am., 1858, 180 (based on the above).
Myiarchus erythrocercus, SCL. & SALV., P. Z. S. 1868, 631, 632 (Tobago & Venezuela).
Myiarchus yucatanensis, LAWR., Pr. Philad. Acad. 1871, 235.
Myiarchus oberi, LAWR., Ann. N. Y. Acad. Sci., I, 1877, 48 (Dominica, W. I.).

Disclaiming any desire to prolong the discussion inaugurated by me in Vol. I of these Proceedings (p. 139), I however feel called upon, by Mr. Sennett's comments in his "Further Notes on the Ornithology of the Rio Grande" (Bull. U. S. Geol. & Geog. Survey, Vol. V, No. 3, pp. 402–404), to offer a few additional remarks on the subject.

The synonymy of *Myiarchus mexicanus* (Kaup) Lawr., as given above, includes all the binomial synonyms of the species in question, so far as I am aware; and in view of Mr. Sclater's positive declaration (P. Z. S. 1871, p. 84) that "*Tyrannula mexicana* of Kaup is identical with *Myiarchus cooperi* of Baird," I do not see how we can avoid using Kaup's name for the species. Mr. Sclater's opinion certainly cannot be set aside, for he made actual comparison of Kaup's type specimen with the very examples which Professor Baird called *M. cooperi*, and found them "identical."

The name *erythrocercus*, Scl., was proposed three years before Mr. Sclater made this discovery, and was, moreover, based on examples from Tobago, Venezuela, and Bahia, and was described as "similar to *M. cooperi* [*i. e.*, *mexicanus*, Kaup], but much smaller," etc.

In 1871, Mr. Lawrence, being apparently unaware of Dr. Sclater's identification of *T. mexicanus*, Kaup, with Professor Baird's *M. cooperi*, and accepting the latter's identification of *mexicanus* with his (L.'s) *cinerascens* of later date, redescribed the Mexican bird as *M. yucatanensis;* and in 1877, on the ground of certain differences of plumage and size, separated (from *M.* "*erythrocercus*") the specimens from the Lesser Antilles (Dominica) by naming them *M. oberi*.

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* *Cf.* Bull. Nutt. Orn. Club, Jan., 1878, p. 37.

† "I do not . . . hesitate to decide that *Tyrannula mexicana* of Kaup is identical with *Myiarchus cooperi* of Baird."—SCL., P. Z. S. 1871, p. 84."

‡ "What *Tyrannula cooperi*, Kaup, is . . . does not now much signify. . . But it is not to be supposed that Professor Kaup would make two species of the same bird in the same paper. Therefore, *Tyrannula cooperi* of Kaup is probably not *Myiarchus cooperi* of Baird."—SCL., l. c.

Such is, in brief, the history of the case. The point at issue, however, is whether specimens of this species from the Rio Grande Valley in Texas are to be referred to *mexicanus* proper or to an assumed race, "*erythrocercus*." The species was originally introduced to the United States fauna under the name "*M. crinitus erythrocercus* (Scl. & Salv.) Coues" (Bull. U. S. Geol. & Geog. Surv. Ter., Vol. IV, No. 1, p. 32), and was subsequently mentioned by the present writer as "*M. erythrocercus* var. *cooperi*" (Proc. U. S. Nat. Mus., I, 1878, p. 138), both of which I believe to be incorrect—the former on account of the reference of the species to *M. crinitus*, and, probably, in the use of the name *erythrocercus* instead of *mexicanus;* the latter, because *erythrocercus* is the subsequent name, and cannot, therefore, be used for the specific designation, while *cooperi* is also very doubtfully referable to this species. In order, however, to present the case as briefly and clearly as possible it will be necessary to discuss the several points separately.

First, as to the reference of this species to *crinitus:* I do not see how this can possibly be done without bringing in also *M. cinerascens* and *M. stolidus* (see Hist. N. Am. B., Vol. II, p. 331); and even then I much doubt whether *crinitus* and *mexicanus* ever intergrade, since I have examined many scores of specimens, but have yet to find a specimen that is truly intermediate.* There is, however, in Southwestern Mexico a very small race of *mexicanus*, which can be distinguished from *cinerascens* only by the extension of the rufous of the retrices to the extreme tip of the inner web, they being in every other respect apparently quite identical. There are several such examples in the national collection, obtained in Tehuantepec by Professor F. Sumichrast.

Second: It is much to be regretted that neither Dr. Kaup nor Dr. Sclater give measurements of the type specimens of *T. mexicanus*, since we might then readily determine whether this name belongs to the large or the small race of the species as occurring in Mexico. Since, however, Dr. Sclater remarks that "it (the said type) is certainly rather smaller in dimensions than two of my skins of this species (*i. e.*, "*M. cooperi*," Baird), and has the bill smaller"; and that "a third specimen in my collection, which I also refer to the (so-called) *M. cooperi* of Baird, agrees very well with it in general dimensions, and has the bill even slightly smaller," it appears very evident that Kaup's *T. mexicana* was not based on one of the very large individuals of this species, but one of medium size, corresponding to the Rio Grande specimens. Further than this, the individual variations among Mexican specimens of this species affect only the size and proportions, not colors—at least not to any especially noticeable extent.

Third: I find upon re-examination of all the material in the national

*In Hist. N. Am. Birds, Vol. II, p. 331, we predicated the intergradation of these two species on the characters of an individual from Nicaragua, which, however, Dr. Coues (Pr. Philad. Acad. 1872, p. 68) says, and which I also now believe, is not distinguishable from *M. crinitus*.

collection (embracing numerous specimens received since my last paper was written), that specimens from the *patria* of *erythrocercus* proper (Venezuela, Tobago, Bahia, and other parts of South America) are uniformly darker colored than the smaller Mexican examples, though they may fully equal them in size. This darkness of color is carried to an extreme degree in Antillean specimens, and constitutes, so far as I am able to see, the sole distinguishing character of Mr. Lawrence's "*M. oberi*," as compared with the continental forms of the species *en masse*.

Finally, I therefore conclude that, whatever may be the character of Central American specimens (of course they are intermediate), or whether the name *mexicana* is to be applied to the larger or smaller race of the Mexican bird (and the odds are strongly in favor of the latter), that (1) the name *erythrocercus* should, if to be used at all, be restricted to examples agreeing strictly with the South American "race," since it is subsequent in date to *mexicanus;* and (2) that the Rio Grande birds are probably exactly like the type of the latter.*

Nyctidromus ALBICOLLIS (Gmel.) Burm.—As explained some years since by Dr. Sclater (see P. Z. S. 1861, p. 10, and 1866, p. 144), the earliest name for this species is *Caprimulgus albicollis* Gmel. (S. N., I, ii, 1788, p. 1030), the *C. americanus* of Linnæus, quoted by Mr. Cassin (Proc. Philad. Acad. 1851, pp. 179, 180) and some other authors (see Mr. Sennett's two lists) being unquestionably a Jamaican species belonging to quite a different genus (*Siphonorhis americana*). All the synonyms and the more important references are given in my notes in Dr. Merrill's paper (Proc. U. S. Nat. Mus., I, pp. 143 and 144).

IACHE *latirostris* (Sw.) Elliot.—This species, introduced to the fauna of the United States by Mr. Henshaw (*cf.* American Sportsman, v, Feb. 20, 1875, p. 328; Zoology Wheeler's Exp., Orn., p. 389) under the name of *Circe latirostris*, should be hereafter known by the above name, the genus *Circe* being previously employed in another branch of zoology (see Elliott, Synopsis of the Trochilidæ, p. 234).

NOMONYX, gen. nov.

CH.—Similar to *Erismatura*, but differing from all the species of that genus in the form of the maxillary unguis, which is similar to that of *Fulix* and allied genera, the same being in *Erismatura* the most peculiar and important generic character.

Type, *Anas dominica*, Linn.

Altogether the most distinctive feature of the genus *Erismatura* consists in the remarkably peculiar conformation of the maxillary unguis,

* It seems proper to offer here a word of explanation in reference to the second paragraph on page 403 of Mr. Sennett's paper, which says (referring to my remarks on this species in Dr. Merrill's list): "There is no notice whatever of my specimen from Hidalgo, Tex., . . . which is in the National Museum, and which is the first record of its existence within our limits, and which Mr. Ridgway no doubt examined when he coincided with Dr. Coues as to its identification." The explanation I have to make is, that *at the time my paper was written and printed* the specimen in question was not in the National Museum collection, but, with other birds, had been returned to Mr. Sennett, at his request, for examination.

or nail of the upper mandible. This, viewed from above, is extremely small, narrow, and linear, the broader terminal half being bent very abruptly downward and backward, so as to be visible only from in front or below. With the sole exception of *Anas dominica*, Linn., all the species usually referred to this genus agree strictly with the type, *Anas leucocephala*, Scop., notwithstanding other characters are more or less variable. *Anas dominica*, Linn., has the nail of normal form, or very much like that prevailing among the ducks generally, and on this account should be separated generically from *Erismatura*.

DESCRIPTION OF A NEW SPECIES OF BIRD OF THE FAMILY TURDIDÆ, FROM THE ISLAND OF DOMINICA, W. I.

By GEO. N. LAWRENCE.

Margarops dominicensis.

Margarops herminieri, Lawr. nec Lafr., Proc. U. S. Nat. Mus., vol. I, p. 52.

Male.—The entire upper plumage is of a rich dark brown, the crown is darker and has the edges of the feathers of a lighter shade; tail and quill feathers of a darker brown than the back; axillars and under wing-coverts white; the lores are blackish brown; the feathers back of the eyes and the ear-coverts have narrow shaft streaks of pale rufous; the feathers of the neck and upper part of the breast are of a warm dark brown, those of the chin and middle of the throat with light rufous centres, those of the lower part of the neck and the upper part of the breast have also light rufous centres, but in addition each feather has a light terminal spot; on the lower part of the breast and on the sides the feathers have white centres, bordered strikingly with brown; the markings of the breast-feathers are squamiform in shape, those of the sides lanceolate; the abdomen is white, a few feathers on the upper part are very narrowly margined with brown; under tail-coverts brown, terminating with white; outer feathers of thighs brown, the inner whitish; "iris tea-color;" there is a naked space around the eye; bill yellow, with the basal half of the upper mandible dusky; tarsi and toes pale yellow.

Length (fresh), 9 inches; wing, 5; tail $3\frac{1}{2}$; tarsus, $1\frac{3}{4}$; bill from front, $\frac{15}{16}$, from gap, $1\frac{1}{8}$.

Type in United States National Museum.

Mr. Ober sent five specimens of this form from Dominica, all males and closely resembling each other. It is probable, as in the allied species, that the females do not differ in plumage materially from the males.

Mr. Ober's collection from Dominica contained three species of *Margarops* which I never had seen before. These were referred to known species, two of them, I think, correctly; but the one which is the subject of this article I now find was erroneously considered to be *M. herminieri*, Lafr. I supposed these species would be the same as those recorded

from the neighboring islands, as they agreed well with the descriptions given of them, and there were no available specimens to compare with.

As soon as I had finished the examination of the birds of each island collected by Mr. Ober, they were placed in a box by themselves, and not disturbed again except for an occasional comparison. The collection from Guadeloupe, containing specimens of the true *M. herminieri*, Lafr., was not received until more than a year after that from Dominica. These specimens I labelled *M. herminieri*, Lafr., as a matter of course, they being from the locality of the type. The difference between the birds from the two islands was not observed at that time, as no comparison was made.

This winter, having occasion to review the species of *Margarops*, I got the specimens from the different islands together for the first time, and at once saw that the species from Dominica was quite distinct from the Guadeloupe bird. It differs from *M. herminieri*, Lafr., in being less in length, of a more robust form, the bill stouter, and the tail shorter; the brown coloring throughout is much darker and of a ruddy cast, instead of olivaceous; the centres of the feathers on the throat and upper part of the breast are much more rufous, and have black spots at their ends; the abdomen is pure white, whereas in *M. herminieri* the lower part of the breast and the abdomen are covered with lanceolate-shaped markings, which are very striking, each feather being white, with a strongly defined brown border; only a very small space on the lower part of the abdomen is white; *M. herminieri* has the white ends of the under tail-coverts edged narrowly with pale brown; in the new species they are white without borders, and it has the tarsi and toes stronger and paler in color than those of *M. herminieri*.

FEBRUARY 1, 1880.

NOTES ON A COLLECTION OF FISHES FROM EAST FLORIDA, OBTAINED BY DR. J. A. HENSHALL.

By DAVID S. JORDAN, M. D.

During the past winter (1878–'79) a collection of fishes was made for the writer by Dr. J. A. Henshall, of Cynthiana, Ky., in the streams and inlets of Eastern Florida. The number of species obtained was not large, but the specimens were preserved in excellent condition, and among them are several of interest. Two species (*Gerres plumieri* and *Umbrina broussoneti*) had not been previously recorded from the coast of the United States. Three others were, at the time of collection, new to science. One of these has been lately described, under the name of *Jordanella floridæ*, by Messrs. Goode and Bean. The others have been already noticed by me in these proceedings as *Zygonectes rubrifrons* and *Zygonectes henshalli*.

April 26, 1880.

The marine species were obtained from Indian River and from the neighboring coast; the cyprinodonts, centrarchids, and other fresh or brackish water species chiefly from San Sebastian River and tributaries.

DIODONTIDÆ.

1. Chilomycterus geometricus (Schneid.) Kaup.

URANOSCOPIDÆ.

2. Astroscopus y-græcum (C. & V.) Gill.

A single fine specimen of this beautiful species. Dr. Henshall informs me that this specimen in life exhibited strong electrical powers, these powers apparently having their seat in the naked skin on the top of the head. So far as I know, such phenomena have not hitherto been ascribed to any fish of this family. I therefore put this statement on record, in hopes that subsequent observers of this rare fish may be able to verify it.

ECHENEIDIDÆ.

3. Echeneis naucrates L.

A single specimen, with 22 laminæ in the disk.

CARANGIDÆ.

4. Selene argentea Lac.

Numerous fine large specimens. Specimens lately described from the Pacific coast under the name of *Argyriosus pacificus*, Lockington, appear to belong to this species.

5. Carangus chrysus (Mitch.) Girard.

6. Chloroscombrus chrysurus (Linn.) Gill.

7. Oligoplites occidentalis (L.) Gill.

Several fine specimens of this highly interesting species. The character of five (instead of seven) dorsal spines, assumed to distinguish *Oligoplites* from *Scombroides* Lac. (*Chorinemus* C. & V.), is perhaps of insufficient value for generic distinction. Some of the species of *Scombroides* have, however, the dermal productions really scale-like, instead of the irregular linear imbedded ridges found in *Oligoplites*. This character may for the present, until all the species of the group are examined, be held to distinguish the latter genus.

SCIÆNIDÆ.

8. Umbrina broussoneti Cuv. & Val.

Two fine specimens of this West Indian species were obtained by Dr. Henshall. These are the first yet recorded from the United States. The species is not included in Goode's Catalogue of Bermudan Fishes, nor

in any of Poey's lists of the fishes of Cuba. It is, therefore, an important addition to our fauna. This specimen agrees very fully with Günther's description of *Umbrina broussoneti*, and with Cuvier and Valenciennes's description of *Umbrina coroides*. C. & V.'s description of *U. broussoneti* gives the number of rays in the dorsal fin as X. I, 25. My specimens have D. X. I, 28.

GERRIDÆ.

9. Gerres plumieri Cuv. & Val.

A single fine specimen of this beautiful species. It has not been previously recorded from the coasts of the United States.

SPARIDÆ.

10. Lagodon rhomboides (L.) Holbr.

PRISTIPOMATIDÆ.

11. Lutjanus caxis (Schneider) Poey.

A single fine specimen.

CENTRARCHIDÆ.

12. Micropterus pallidus (Raf.) Gill & Jordan.

Dr. Léon Vaillant (Mission Scientifique au Mexique: ined.) divides this species provisionally into two, adopting the name "*Micropterus salmoides*" for the ordinary form, and that of *Micropterus nuecensis* (Baird & Girard) for the southwestern form (Texas and Mexico). According to him the two are externally identical, but *M. nuecensis* is distinguished by the presence of a small patch of teeth on the tongue, the tongue being entirely smooth in the ordinary form.

I have examined a number of specimens in regard to this point.

I find lingual teeth in the following specimens:

(1.) Two specimens, one large one small, from the Falls of the Ohio.

(2.) One small specimen from a tributary of White River at Bloomington, Ind.

(3.) One specimen (in the museum at Paris) from Texas.

I find them absent in the following:

(1.) Several specimens in Henshall's collection from Indian River.

(2.) Specimen from Neuse River.

(3.) Specimens from White River at Indianapolis.

(4.) Specimens from Lake Erie.

The presence of these teeth evidently does not depend on age, and apparently not on sex. It may be a specific feature, but I am inclined at present to think it only a feature of individual variation. I have not seen such teeth in the small-mouthed black bass.

13. Chænobryttus viridis (C. & V.) Jor.

14. Lepomis pallidus (Mitch.) Gill & Jor.

The recent rejection of the name "*pallidus*" for this species by my friend Professor Goode (Proc. U. S. Nat. Mus. 1879, 139) is due to his having overlooked the fact that Mitchell has a *Labrus pallidus* as well as a *Bodianus pallidus* in his Memoir on the Fishes of New York. The latter, as Professor Goode observes, is *Bairdiella argyroleuca;* the former is *Lepomis pallidus.*

15. Lepomis punctatus (Cuv. & Val.) Jor.

(*Lepomis apiatus* Cope.)

Several fine specimens.

16. Enneacanthus obesus (Baird) Gill.

(*Bryttus fasciatus* Holbrook = *Bryttus obesus* Baird?).

"*Enneacanthus milnerianus* Cope" is included in Goode's list (Proc. U. S. Nat. Mus., II, 1879, 114) of the fishes of Florida. This species appears in my list of valid species of Centrarchidæ in Bulletin X of the National Museum. It is a nominal species, and came into the lists in this way: While my paper in Bulletin X was passing through the press, Professor Cope kindly sent me the proof-sheets of a paper on the fishes of the Saint John's, which has since appeared in the Proc. Am. Philos. Soc. In this paper a new species with the above name was described. This species, however, Professor Cope saw fit to suppress in the publication of the paper, he having identified it with *Enneacanthus fasciatus.*

MUGILIDÆ.

17. Mugil brasiliensis Agassiz. White Mullet.

Our other common species of *Mugil*, the striped mullet, *Mugil plumieri* and *Mugil lineatus* of authors, is doubtless the species for which the name of *Mugil albula* L. should be retained.

SCOMBERESOCIDÆ.

18. Hemirhamphus unifasciatus Ranz.

CYPRINODONTIDÆ.

19. Jordanella floridæ Goode & Bean.

Many specimens of this interesting species were obtained by Dr. Henshall. The females differ from the males chiefly in the lower vertical fins.

20. Zygonectes rubrifrons Jordan.

Numerous specimens.

21. Zygonectes henshalli Jordan.

Still more abundant. This species and the preceding are very closely related, and are both nearly intermediate between *Zygonectes* and *Fundulus*. The current genera related to *Fundulus* are separated by characters of very dubious value.

22. Fundulus sp.

A small specimen with pale cross-bars; not suitable for identification.

23. Gambusia patruelis B. & G.

Two specimens, agreeing with the descriptions of *Gambusia holbrooki* of Girard and Günther, and with Girard's figure of *Gambusia patruelis*. The two species are probably identical. The black bars on the caudal and the oblique suborbital blotch are characteristic color-marks.

CATOSTOMIDÆ.

24. Erimyzon goodei Jordan.

Many specimens.

SILURIDÆ.

25. Amiurus erebennus Jordan.

Many small specimens.

ANGUILLIDÆ.

26. Anguilla rostrata (Le Sueur) DeK.

A comparison of these Florida specimens with a series of eels from Venice renders it evident that our American eel is not identical with *Anguilla vulgaris* of Europe, as I with others have supposed.

In our species the beginning of the dorsal is notably more posterior than in the European one. In Venetian specimens the distance from the snout to the base of the dorsal is contained $3\frac{2}{5}$ times in the total length of the fish. In Florida specimens the same distance is contained barely 3 times in the total length.

The same difference is expressed differently but correctly by Dr. Günther (Cat. Fish Brit. Mus., VIII, 24). He ascribes to *A. vulgaris* the character of—

"The length of the head is nearly equal to the distance between the commencements of the dorsal and anal fins."

And to *A. bostoniensis* (*rostrata*)—

"The length of the head is conspicuously more than the distance between the commencements of the dorsal and anal fins."

The band of vomerine teeth also appears to extend farther back in *A. vulgaris* than in *A. rostrata*.

NOTES ON A COLLECTION OF FISHES FROM SAINT JOHN'S RIVER, FLORIDA, OBTAINED BY MR. A. H. CURTISS.

By DAVID S. JORDAN.

A small collection of fishes from Saint John's River was sent to Prof. H. E. Copeland and myself some years ago by Mr. A. H. Curtiss. As this collection contains some specimens of interest, a list is here given:

1. **Siphonostoma** sp. (*Synguathus* Auct.).

Two specimens of a variety or species of this genus, apparently undescribed, are in this collection. I have specimens of three types, subspecies, or species of *Siphonostoma* from our Atlantic coast, which may be thus compared:

	a. fuscum Storer. (Wood's Hole, Mass.)	*b. louisianæ* Gthr.? Beaufort, N. C.	*c.* ——. Saint John's River, Fla.
Dorsal rays	35; 38; 40	33; 37	30; 31.
Rings	18+37	18+33 (♂); 20+38 (♀).	15+33.
Dorsal fin	Longer than head.	Shorter than head.	Shorter than head.
Dorsal fin	Dark-spotted at base	Dusky at base or plain	Very high in females; black, with paler spots.
Base of dorsal fin	On 4+5 rings.	On 3+5 rings.	On 3+5 rings.
Muzzle	Shorter than rest of head.	Much longer than rest of head; longest in females.	Shorter than rest of head.
Distance from snout to front of dorsal.	3 times in total length	2⅓ in length	2½ in length.
Head contained	9 times in length	7 times in length	7 times in length.
Tail	⅓ longer than rest of body	⅓ longer than rest of body.	⅓ longer than rest.
Belly in females	Scarcely carinate	Scarcely carinate	With a sharp black carina. Color darker and body stouter than in the others.

These characters are all evidently subject to much variation. If these are true species, they differ from each other little more than the two sexes of the same form differ.

It seems to me that the specific names *fuscus*, *fasciatus*, *viridescens*, and *peckianus* are all based on individuals like those above noted from Wood's Hole.

2. **Aphoristia plagiusa** (L.) Jor. & Gill.
3. **Chloroscombrus chrysurus** (L.) Gill.
4. **Archosargus probatocephalus** (Walb.) Gill.
5. **Lagodon rhomboides** (L.) Holbr.
6. **Micropterus pallidus** (Raf.) Gill & Jor.
7. **Epinephelus** sp.? (One very young specimen.)
8. **Orthopristis fulvomaculatum** (Mitch.) Gill.
9. **Gobiosoma alepidotum** (Lac.) Grd.
10. **Chirostoma** sp.
11. **Hemirhamphus unifasciatus** Ranz.
12. **Fundulus** sp.
13. **Mollienesia latipinna** Le Sueur.
14. **Brevoortia tyrannus** (Latrobe) Goode.
15. **Megalops thrissoides** (Bloch) Günther (Scales).
16. **Lepidosteus osseus** (L.) Ag. (Scales).

NOTES ON A COLLECTION OF FISHES FROM SAN DIEGO, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The writers have spent the greater part of the month of January, 1880, in the collection and study of fishes at San Diego, Cal., in the interests of the United States Fish Commission. As some of the species obtained are new to science, and others new to the United States fauna, it is thought advisable to present an annotated list in advance of the publication of a more extended report.

HIPPOCAMPIDÆ.

1. **Hippocampus ingens** Girard.

One large specimen seen.

SYNGNATHIDÆ.

2. **Syngnathus leptorhynchus** Girard.

(*Syngnathus arundinaceus* Girard.)

Not uncommon.

PLEURONECTIDÆ.

3. **Paralichthys maculosus** Girard.

Very abundant. There seems to us no doubt of the correctness of Lockington's identification of the "*Uropsetta californica*" with this species. The caudal fin in the adult is somewhat double concave; in the young the middle rays are more produced. This species is both dextral and sinistral. Out of twenty-six examples examined in reference to this point fifteen were found to be sinistral and eleven dextral.

4. **Citharichthys sordidus** (Girard) Günther.

Not common; one specimen seen.

5. **Hypsopsetta guttulata** (Girard) Gill.

Common.

SOLEIDÆ.

6. **Aphoristia atricauda** sp. nov.

Body oblong-lanceolate, anteriorly somewhat blunt, regularly narrowed behind and ending in a point, the snout rather abruptly truncate, eyes and color on the left side. Eyes very small, nearly even behind, the upper eye the larger and extending farthest forward. A single nostril in front of the interorbital space and apparently a single smaller one below it. Mouth moderate, extending to opposite the eye, somewhat

turned toward the eyed side; lips large, not fringed, the upper with a small blackish papilla in advance of lower eye. This is apparently normal, but it may be a detached piece of skin, hardened by the alcohol. Upper jaw scarcely produced, not forming a hook. Teeth small, on the blind side only, the edge of the jaw on the eyed side forming a smooth ridge.

Gill-openings narrow, not extending up to the level of the mouth. Scales very small, etenoid, pretty regular over the body, much smaller on the head, the rows of scales rendered very distinct by black dots, the stripes converging towards the snout. Scales on the two sides of the body similar. No lateral line on either side. About 105 scales (100 to 110) in a longitudinal series from the head to the tail; 45 to 50 in a cross-series.

Dorsal fin beginning on the head, continuous with the anal around the tail. Ventral fin of the colored side only present, nearly on the ridge of the abdomen, and *separated from the anal* by an interval half longer than the cleft of the mouth. Rays of the middle parts of the dorsal and anal fins with a fleshy border at base on the blind side.

Dorsal rays about 100; anal rays 80; no distinct caudal fin.

Coloration brownish olive, with vertical dark half-bars, irregular in size and position, some of them coming down from the back and others up from the belly, these posteriorly nearly meeting, but anteriorly alternating. Streaks of dark points along the rows of scales, these forming very distinct longitudinal streaks. Posterior part of dorsal and anal broadly edged with black. Right side plain white.

Measurements.

	Inches.
Length	4.8
Depth (proportion of length)	.275
Length of head	.18
Diameter of eye	.02
Interorbital space	.01
Cleft of mouth	.06
Length of snout	.045
Distance from snout to dorsal	.085
Distance from snout to anal	.25
Height of dorsal	.08
Height of anal	.085
Length of caudal	.08
Length of ventral	.05
Interval between ventrals and anal	.085
Depth of gill-opening	.095

This species is known to us from a single specimen taken by a Chinese fisherman, Ah Sam, in the Bay of San Diego. This specimen is now in the collection of the United States National Museum, No. — —. In form and number of scales, fin-rays, etc., it resembles *Aphoristia ornata* from the West Indies, but the ventral fin is remote from the anal.

BATRACHIDÆ.

7. Porichthys porosissimus (C. & V.) Günther.

Very common.

BLENNIIDÆ.

8. Heterostichus rostratus Girard.

Found in the "kelp" outside the harbor.

9. Gibbonsea elegans Cooper.

A single specimen taken in the rock-pools on Point Loma.

10. Hypleurochilus gentilis (Grd.) Gill.

With the preceding, and more common.

GOBIIDÆ.

11. Gillichthys mirabilis Cooper.

Exceedingly abundant in the shallow waters of the bay. Only small specimens seen, the maxillary in these being much less developed than in the adult.

COTTIDÆ.

12. Leptocottus armatus Girard.

Common in the Bay of San Diego.

13. Oligocottus analis Grd.

Allied, but not closely, to *Artedius quadriseriatus* Lockington.

Body compressed, especially behind, not much depressed anteriorly; head comparatively small, scarcely depressed, narrowed and rather pointed anteriorly, its outline triangular as viewed from above; snout strongly decurved in profile; mouth moderate, horizontal, the lower jaw included; maxillary reaching to opposite posterior margin of pupil; premaxillary anteriorly below the level of the eye; eyes large, high up, close together, as long as the snout, 3½ in head, their diameter double the width of the deep interorbital space, which has a deep lengthwise groove; nasal spines prominent; a deep cross-furrow behind them, which forms with the interocular furrow a V-shaped figure; preopercle with a blunt process, on which is a spine directed upwards and outwards; no *scales on the head;* no other spines on the head.

Branchiostegals 6. Gill membranes broadly united, without isthmus.

First dorsal beginning in front of the posterior edge of the opercle, its first two spines set close together at base, diverging above, and shorter than the third.

Dorsal fins contiguous, but not united, neither of them specially elevated; pectoral fin reaching beyond front of anal, its lower rays with the skin thickened, and projecting much beyond the membranes; caudal fin slightly rounded; anal papilla very conspicuous.

Fin rays: D. IX 16; A. 13–14; V. I, 3; P. 16; C. 10 +.

Posterior part of body covered with minute, imbedded, non-imbricate, pectinate scales, which cover most of the posterior part of the body above and cease anteriorly behind the middle of the spinous dorsal in front and at the posterior third of the soft dorsal behind; some scales also along the region of the lateral line anteriorly; a series of somewhat larger but still minute scales at base of dorsal, one below each ray, and another along lateral line; anteriorly, cirri take the place of the pectinations on the scales.

No prickles on the skin. On the head and anterior parts of the body are very many long white, simple, bifid or trifid cirri, so that the living fish appears almost "woolly" with them. Some of these cirri on the nasal bones; a patch between and behind the eyes; the whole top of the head sparsely covered; two or three on the posterior edge of the maxillary; edge of the cheeks fringed with them as with a gray beard. A conspicuous row of them along the lateral line, which ceases somewhat behind the beginning of the scaly area. A row of cirri along the base of the spinous dorsal extending to about the seventh ray of the spinous dorsal. Many scattering cirri between the dorsal and lateral line. Skin of head with many mucous pores.

Body dark, clear olive-green, with about five irregular bars of darker greenish; much mottled and spotted, some of the spots above clear blue, some rusty red, and the most of them blackish. A dark bar at base of caudal; lower part of sides with round black spots posteriorly. Fins all with cross-bars made of dark spots and lighter areas.

Measurement of largest specimen—from Point of Rocks.

Total length		4 inches.
Length to base of caudal		3.45 inches.
Length of head (percentage of length to base of caudal)		.30
Depth of body	"	.25
Least depth of body	"	.095
Diameter of eye	"	.07
Width of head	"	.20
Depth of head	"	.17
Length of maxillary	"	.12
Distance from snout to dorsal	"	.27
Length of first dorsal	"	.27
Length of second dorsal	"	.37
Height of first dorsal	"	.12
Height of second dorsal	"	.15
Length of anal	"	.30
Height of anal	"	.13
Length of pectoral	"	.33
Length of ventral	"	.22
Length of caudal	"	.20
Length of longest cirri	"	.04
Length of anal papilla	"	.06

This description is drawn from two adult examples taken at Point of Rocks, near San Diego, just south of the line of Mexico, and from about

fifteen examples of various sizes taken at the "mussel beds" on Point Loma, near San Diego. These are numbered ——? in the museum collection. It inhabits cup-shaped pools in the rocks between tide-marks lurking in the *Corallina*, and may be caught at low tide. Its quick movements when alarmed render this, however, a matter of some difficulty.

14. Scorpænichthys marmoratus Grd.

Occasionally taken in the kelp.

SCORPÆNIDÆ.

15. Sebastapistes guttatus (Girard) Gill.

Not uncommon.

16. Sebastichthys atrovirens Jor. & Gilb. MSS.

Occasionally taken in the kelp.

LATILIDÆ.

17. Caulolatilus princeps (Jenyns) Gilb.

Common in the kelp.

SCOMBRIDÆ.

18. Sarda chilensis (C. & V.) J. & G.

Abundant off shore in the fall.

PERCIDÆ.

19. Paralabrax clathratus Grd.

Frequent.

20. Paralabrax maculofasciatus (Steindachner) Gill.

Common in the bay.

21. Stereolepis gigas Ayres.

Occasionally taken off the coast.

SPARIDÆ.

22. Girella nigricans (Ayres) Gill.

The young common in the rock-pools.

SCIÆNIDÆ.

23. Cynoscion magdalenæ (Steindachner) Jor. & Gilb.

Common in the bay of San Diego.

24. Menticirrus elongatus (Günther) Gill.

A large species of *Menticirrus*, probably *Umbrina elongata* of Günther, is taken occasionally in the bay. We have obtained one specimen.

25. Corvina saturna (Girard) Steindachner.

Not uncommon.

26. Roncador stearnsi (Steindachner) Jor. & Gilb. (gen. nov.).

Common. This species, having a serrated preopercle and only villiform teeth in either jaw, is not a *Corvina* as that genus is understood by many recent writers. Its relations are rather with *Sciænops ocellatus*, with which it is, however, hardly congeneric. We propose to consider it as the type of a distinct genus or subgenus, for which the name *Roncador*, applied to it by the Italian fishermen, may be adopted. This word appears also in the Latin name of a related species, *Umbrina ronchus*.

Roncador, gen. nov. Allied to *Corvina* and *Sciænops*.

Body moderately elongated, the head deep, the profile declivous, lower jaw included; both jaws with a broad band of villiform teeth only; no enlarged teeth or canines; pseudobranchiæ present; preopercle strongly and evenly dentate posteriorly, entire below; spines strong, the second of the anal very robust, but not very long; caudal fin lunate, air-bladder large.

This species, *Roncador stearnsi*, is as readily distinguished by the black pectoral spot as its relative, *Sciænops ocellatus*, is by the black spot on the caudal.

EMBIOTOCIDÆ.

27. Embiotoca jacksoni Ag.

Common.

28. Amphistichus argenteus Ag.

Occasional.

29. Ditrema furcatum (Grd.) Günther.

Common.

30. Hyperprosopon arcuatum Gibbons.

Not uncommon.

31. Cymatogaster aggregatus Gibbons.

Very abundant.

32. Abeona minima (Gibbons) Gill.

Occasional.

LABRIDÆ.

33. Pimelometopon pulcher (Ayres) Gill.

Very abundant in the kelp outside the bay.

SPHYRÆNIDÆ.

34. Sphyræna argentea Girard.

Very abundant outside the bay in the fall.

ATHERINIDÆ.

35. Chirostoma californiense (Girard) Gill.

Exceedingly abundant.

36. Atherinops affinis (Ayres) Steindachner.

Scarcely less common.

37. Leuresthes tenuis (Ayres) Jor. & Gilb. (gen. nov.)

Leuresthes, gen. nov., allied to *Atherinops* Steindachner, but with the teeth wanting or reduced to slight or deciduous asperities. In the specimens which we have obtained of this species no teeth whatever are observable.

The much greater width of the posterior portion of the premaxillary in *Chirostoma*, *Atherinops*, and *Leuresthes* serve to distinguish these genera from *Atherina*, in addition to the differences in the form of the mouth. *Labidesthes* Cope has, like *Atherina*, a slender premaxillary, but the mouth is curved and the jaws much produced forwards. The group called by Girard *Heterognathus* has likewise a broad premaxillary. It is probably not separable generically from *Chirostoma*, although the lower jaw is much stronger and some teeth are present on the vomer.

Leuresthes tenuis is occasionally taken in San Diego Bay, but it is much less abundant than the others and attains a smaller size.

MUGILIDÆ.

38. Mugil mexicanus Steindachner.

Very abundant in San Diego Bay. Our specimens have the anal III, 8, instead of III, 7, as stated by Dr. Steindachner.

SCOMBERESOCIDÆ.

39. Hemirhamphus sp. incert.

The young of a species of *Hemirhamphus* is very abundant in San Diego Bay. We are at present unable to identify it with any of the known species, but having seen no specimens over four inches long, we

do not think proper to describe it as new. The rays both in dorsal and anal are 14 or 15; the lower jaw is contained 4 times in the total length. It is allied to *H. pleii* and *H. unifasciatus*, but it is probably distinct from both.

40. Belone exilis Girard.

Occasionally taken. One specimen seen.

CYPRINODONTIDÆ.

41. Fundulus parvipinnis Girard.

Very common in the Bay of San Diego.

ALBULIDÆ.

42. Albula vulpes (L.) Goode.

This species visits the bay at intervals, in considerable schools. Several specimens were obtained.

CLUPEIDÆ.

43. Clupea sagax Jenyns.

Very abundant in San Diego Bay. The very largest are nearly plain in coloration. The ordinary specimens have a very distinct series of round, blackish spots along the sides of the back, with smaller ones above it, which form stripes along the rows of scales.

44. Clupea mirabilis Girard.

Very abundant in San Diego Bay. The vomerine teeth in this species are very few and often not to be found. It should not be generically separated from the preceding.

ENGRAULIDÆ.

45. Engraulis delicatissimus Girard.

Very common.

46. Engraulis ringens Jenyns.

Very common.

MURÆNIDÆ.

47. Gymnothorax mordax (Ayres) Jor. & Gilb.

Not rare in rock-pools. This species is extremely pugnacious, striking at a stick after the fashion of a snake. It is also very tenacious of life.

Length of tail almost exactly equal to that of the rest of the body, head forming one-seventh of the total length; snout short, narrow, and pointed, occipital region becoming fleshy and much elevated with age; dorsal fin beginning immediately in front of the gill openings.

Tube of the anterior nostril half as long as the eye; the posterior nostril with a slight membranous expansion, not forming a tube; diameter of eye contained $2\frac{1}{4}$ times in the length of the snout, being placed nearly above the middle of the gape; gill opening slightly longer than the eye.

Sides of the upper jaw with two series of teeth posteriorly; the outer series small, close-set, somewhat triangular in form, slightly recurved, immovable; the inner series similar in form, but much larger, depressible, the series not extending so far back as the outer and consisting of about five teeth; the two series separated by a well-defined groove; in front of these, and continuous with the outer series, are three nearly fixed knife-shaped teeth, the posterior the larger, next a movable tooth similar to the last fixed one but smaller, and three small fixed teeth in front. On the middle line of the vomer are three depressible, fang-like, arrow-shaped teeth, the first rather smaller than the largest lateral teeth, the other two subequal and considerably larger, the posterior one very freely movable. These teeth are subject to some variation in different individuals, and are seldom quite alike on both sides of the same fish.

In the lower jaw is a single series corresponding to the fixed series in the upper jaw. These are similarly enlarged in front, where the series is partly duplicated and some of the teeth are movable. The teeth in the lower jaw are broader and more directed backwards than those in the upper jaw.

MYLIOBATIDÆ.

48. Myliobatis californicus Gill.

(*Rhinoptera vespertilio* Girard.)

The commonest of the numerous sting-rays in San Diego Bay.

DASYBATIDÆ.

49. Pteroplatea marmorata Cooper.

Common in San Diego Bay. Probably distinct from *P. hirundo*, having a narrower disk and shorter tail, with distinct dermal fold above and below.

50. Urolophus halleri Cooper.

Common. This species is certainly not identical with *U. torpedinus*, in the synonymy of which species it is placed by Dr. Günther. Its skin is entirely smooth. It is probably a valid species, more nearly allied to *U. cruciatus* than to *U. torpedinus*.

51. Dasybatis dipterurus sp. nov.

Allied to *Dasybatis centrurus* and *D. pastinaca*.

Disk rhomboid, slightly broader than long; anterior margins nearly straight forwards, meeting in a very obtuse angle; posterior margins curved; lateral angles rounded. Tail nearly half longer than disk, with

a conspicuous cutaneous fold below and a smaller but evident one above. Upper jaw considerably curved, with a slight convex protuberance in front, which fits into a slight emargination in the lower jaw, which is convex, its outlines corresponding to the curves of the upper jaw. Bands of teeth wider in front than laterally. Inside of mouth behind the lower jaw with three fleshy processes. Teeth about $\frac{2-1}{2-3}$; about 8 in a cross-series in the upper jaw and 10 in the lower.

Color light brown, somewhat marbled with darker, but without distinct spots; tail blackish; belly white.

Skin *everywhere* perfectly smooth in all the specimens seen.

Measurements of two specimens.

		No. 1.	No. 2.		
Length of disk (in inches)		8.75	8.50		
Length of tail (in inches)		12.25	12.40		
Breadth of disk	Percentage of length of disk			1.04	1.10
Distance from disk to dorsal fold	"			.45	.53
Length of dorsal fold	"			.135	.155
Height of dorsal fold	"			.0175	.019
Distance from root of tail to anal fold	"			.38	.375
Length of anal fold	"			.30	.365
Height of anal fold	"			.0225	.0225
Length of snout from eye	"			.21	.18
Interorbital width	"			.13	.115
Snout to scapular ridge	"			.32	.335
Distance between nostrils	"			.155	.15
Width of mouth	"			.11	.11
Length of branchial area	"			.195	.18
Width of branchial area (in front)	"			.32	.31
Mouth to vent	"			.70	.70
Length of caudal spine	"			(lost)	.335
Distance of spine from disk	"			.35	.325

This species is known to us from four female specimens taken in San Diego Bay. These range in length from 18 to 24 inches, and are therefore but partially grown. Several other specimens, some of them larger, have been seen in a pile of refuse fish thrown away by the Chinese fishermen. These were, however, too far gone for preservation or description.

52. Platyrhina exasperata sp. nov.

Disk rhombic, about as broad as long, the snout prominent, but bluntish at the tip, the angle made by the anterior margins of the pectorals rather less than a right angle, but the snout itself rounded at the tip. Anterior margin of pectorals nearly straight.

Eyes rather large; nasal ridges well separated, little converging, not meeting anteriorly. Mouth rather narrow, slightly convex forward. Teeth about $\frac{3-2}{2-6}$. Nostrils with a large anterior flap, which projects backwards and covers a narrower posterior flap.

Ventral fins separate, entire, their outer margin slightly convex.

Tail depressed, with a broad lateral fold; dorsal fins comparatively

large; caudal fin well developed; under side of tail flattened with a blunt medial ridge.

Under side covered with a fine shagreen, like the skin of a shark, the roughnesses being triangular and closely set, depressible backwards; the skin below much as in *Rhinobatus*, but the prickles higher and sharper, the skin much rougher than in the latter genus.

The branchial region, from the nostrils to the pelvic bones, is entirely smooth, except the lower lip, which has a band of close-set prickles. A small tract in the middle of the pelvic area is prickly, and most of the abdomen proper, back to a point in front of the vent; the anterior and outer three-fourths of the pectorals below and about half the ventrals anteriorly and exteriorly also rough, as is the whole snout below, in front of the nostrils; whole lower surface of the tail and the surface of the fins rough with shagreen.

Above, the entire surface is covered with close-set stellated prickles of different sizes, largest on the base of the pectorals, and smallest about the eyes and on the outer edges of the fins.

Besides these are several stout, bluntish, slightly recurved spines, with stellate bases, placed as follows: One at the upper anterior angle of the eye and two behind it, the posterior the larger; a large spine on the back at the shoulder-girdle, in front of which are two or three on the median line, and a series on the middle line of the back of 10 to 12; two more on the tail between the dorsal fins; two series on the shoulder-girdle, the inner of two, the outer of two to four. No other large spines on the body. No claw-like spines are present on the pectorals in the male examples seen, all of which are, however, immature.

Measurements.

Total length	8.4 inches.	
Length of disk, to root of ventral	4.4 inches =	.51 of total.
Breadth of disk	.51	"
Length of tail	.49	"
Snout to scapular spine	.295	"
Eye	.05	"
Snout	.11	"
Interorbital space	.055	"
Scapular spine to first dorsal	.31	"
Length of first dorsal	.045	"
Height of first dorsal	.095	"
Distance between dorsals	.075	"
Length of caudal fin below	.15	"
Width between nostrils	.12	"
Width of mouth	095	"
Snout to vent	.46	"
Width of branchial area	.225	"
Length of branchial area	.085	"

This species is very abundant in the Bay of San Diego, where about twenty examples of both sexes, all very similar in size, were obtained.

This species of the Asiatic genus *Platyrhina* in the waters of the United States is a very interesting addition to our fauna.

RHINOBATIDÆ.

53. Rhinobatus productus Ayres.

Very common.

GALEORHINIDÆ.

54. Mustelus californicus Gill.

Abundant. This species appears to be identical with the Atlantic *Mustelus canis*, itself indistinguishable from *Mustelus hinnulus* Blainville, of the Mediterranean.

55. Triacis semifasciatus Grd.

Not uncommon.

56. Galeocerdo sp?

The jaws of a large shark, with the teeth similar in both jaws, triangular, oblique, deeply notched on the outer margin, and all strongly serrate, are preserved by Mr. Pitcher, of San Diego. The shark was taken near San Diego, but south of the Mexican line. The width of the mouth is about a foot. I suppose this to have been a species of *Galeocerdo*.

HETERODONTIDÆ.

57. Heterodontus francisci (Grd.) Jor. & Gilb.

Common.

DESCRIPTION OF A NEW FLOUNDER (XYSTREURYS LIOLEPIS), FROM SANTA CATILINA ISLAND, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

XYSTREURYS LIOLEPIS, gen. et sp. nov.

GENERIC CHARACTERS.—Subfamily *Hippoglossinæ*, allied to *Hippoglossina*, *Hippoglossoides*, and *Paralichthys* (*Pseudorhombus*). Eyes and color on the right side; mouth large, oblique, with the teeth developed on both sides, stout, unequal, bluntish, in a single series; gill-rakers few, short, thick, almost triangular; scales small, cycloid, membraneous, oblong in form; lateral line simple, arched over the pectorals; caudal fin double-truncate, the angles rounded; dorsal fin beginning over the eye; anal fin preceded by a feeble antrorse spine; ventrals lateral; body oblong, moderately deep, rather thin.

This genus differs from *Hippoglossoides* in the arched lateral line, and from *Hippoglossina* in the cycloid scales and in its dextral habit. From most of the related genera it is separated by the few stout short gill-rakers.

SPECIFIC CHARACTERS.—Form broadly elliptical, the profile continuous with the curve of the back; ventral outline from chin to past the ventrals nearly straight, the rest of the outline corresponding to the dorsal outline. Head moderate, shortish; mouth very oblique, not so large as in *Paralichthys maculosus;* the premaxillaries on the level of the pupil when the mouth is closed, the maxillary reaching to the posterior border of the eye; maxillary broad; teeth in a straight row, wide apart, unequal, conical, and blunt at tip, their number about $\frac{14+15}{13+12}$. Teeth in the lower jaw irregularly alternating large and small. In the upper jaw similar, but smaller and less obviously alternating. The middle tooth on the blind side in the upper jaw the largest.

Eyes large, close together, the lower slightly anterior; nostrils of right side above and in front of lower eye; upper nostrils turned over on the blind side; posterior nostrils largest, with a conspicuous flap. Interorbital space a narrow, elevated ridge, covered with very small scales; a few scales on the posterior part of the maxillary, none on the mandible.

Preopercle with its posterior margin free, little movable; cheeks and opercles densely covered with small, oblong, cycloid scales. Branchiostegals 7.

Gill-rakers short, blunt, triangular, scarcely one-fourth as long as the eye, their edges slightly dentate. There are about 7 of the large ones on the middle and lower part of the gill-arch, some rudiments above. (There are about 24 long and slender gill-rakers in *Paralichthys maculosus.*)

Lateral line without dorsal branch, with a broad curve above the pectorals. Scales quite small, oblong, cycloid, thin and membraneous; little imbricated except behind, and somewhat imbedded in the skin, with some smaller supernumerary scales, especially below; scales much smaller on the thoracic region than on the sides. Scales of right and left sides similar. A series of small scales extending up each ray of the vertical fins.

Lateral line with about 123 scales, pierced by tubes; number of rows of scales perhaps a little greater than the number of tubes.

Dorsal fin beginning just in advance of the middle of the pupil, its first ray slightly turned toward the blind side; some of the anterior rays furcate; most of the rays simple; the fin rather low in front, gradually becoming higher to a point near the middle of the body, thence regularly diminishing behind, the last ray being near to the base of the caudal; the caudal peduncle very short; anal fin similar, its highest ray opposite the highest of the dorsal; a weak antrorse spine at beginning of anal; ventrals shortish, reaching past front of anal; pectoral of right side about as long as head, that of left side half as long. Caudal fin somewhat double-truncate, with rounded angles, the middle rays being produced.

Fin-rays: Dorsal, 82; anal, 64; ventrals, 7.

Measurements of typical specimen.

(No. ——, United States National Museum.)

Extreme length	11.50 inches.
Length to base of caudal fin	9.90 inches = 1.00
Greatest depth	.41
Least depth	.105
Length of caudal peduncle	.065
Length of head	.23
Width of interorbital area	.017
Length of snout	.04
Length of maxillary	.10
Length of mandible	.11
Diameter of orbit	.065
Distance from snout to dorsal	.075
Length of base of dorsal	.77
Greatest height of dorsal	.10
Distance of anal from snout	.32
Length of base of anal	.69
Height of longest ray	.11
Length of caudal	.13
Length of pectoral (right side)	.24
Length of ventrals	.085

The typical example of this species was taken on a hook on the west side of the island of Santa Catilina, Los Angeles County, California.

DESCRIPTION OF A NEW RAY (PLATYRHINA TRISERIATA), FROM THE COAST OF CALIFORNIA.

BY DAVID S. JORDAN AND CHARLES H. GILBERT.

PLATYRHINA TRISERIATA.

Disk broad-ovate, broader than long; the snout very bluntly rounded, not projecting; the angle formed anteriorly by the pectorals very obtuse; anterior margins of the pectorals slightly convex; tail stout, in form intermediate between *Raia* and *Rhinobatus*, its width at base about equal to the length of the snout and a little more than the interorbital width; tail much longer than the disk, not much depressed, its sides vertical, its lower lateral edges with broad horizontal fold, a slight groove above on each side of the median series of spines.

Dorsal fins similar, higher than long, the anterior far behind the end of the claspers; the posterior free margin of both fins very convex, not forming an angle. Caudal fin large, well developed both above and below, its outline entire, elliptical. Ventral fins with their margins entire, the claspers well developed. Pectoral fins extending forward to a point but little short of the tip of the snout.

Rostral ridges wide apart at base, rapidly convergent, inclosing a triangular area; a slight translucent space separates this from the opaque pectorals; eyes small, wide apart, the broad spiracles close behind them.

Mouth broad, its width equal to the distance from its front margin to the tip of the snout; a deep crease passing around the mouth behind, in front of which the lower lip has three folds of skin. Upper lip not developed, a strong fold of skin passing from the angle of the mouth on either side to the inner angle of the nostrils, thence straight across, joining its fellow on the opposite side, these folds enclosing a depressed, subtriangular,  -shaped area, which is bounded behind by the curved outline of the upper jaw. In this depression are three transverse cross-folds of skin. Nostrils broader than the interval between them, with a free fold behind, which is prolonged forwards and inwards in the middle, the rest of the fold being turned backward. Anterior edge of nostrils with a broad flap, the outer edge of which is much prolonged, overlapping the posterior flap, the inner edge covering the inner angle of the nostril.

Both jaws strongly and somewhat regularly curved. Teeth numerous, rather sharp, about $\frac{60}{56}$, about twelve in a cross-series. Gill openings very narrow.

Skin everywhere covered with a rather fine shagreen, almost precisely as in *Rhinobatus productus*. The asperities are smaller below, and coarser on the outer anterior margin of the pectorals, where there are also two or three irregular rows of sharp, curved, backward-directed spines. Four strong spines on the tip of the snout, forming a rhombic figure; four or five strong, bluntish spines around each eye, above and in front, the one at the upper anterior angle the largest.

A series of 22 very strong spines along the median line of the back and tail, and two more on the tail between the dorsal fins. On each side of the tail above is a similar series of ten spines, the first opposite the end of the base of the ventrals, the last opposite the front of the first dorsal; a single strong spine on the outer edge of the shoulder-girdle and two between the spine and the dorsal series.

Color almost exactly as in *Rhinobatus productus*. Olive-brown above, whitish beneath, the vertical fins paler. Rostral area and edges of pectorals somewhat translucent. No sharp markings of any kind anywhere.

Measurements.

Extreme length	17.90 inches.	
Length of disk	7.25 inches	= 1.00
Width of disk		1.09
Width of tail at base		.20
Distance between outer humeral spines		.36
Length of branchial area		.15
Width of branchial area in front		.34
Width of branchial area behind		.28
Distance between outer edges of nostrils		.21
Width of mouth		.20
Width of interorbital area		.165
Length of eye		.06
Length of snout from eye		.225

Length of snout from mouth	.22
Length of nostrils	.07
Width of anterior nasal flap	.06
Length of nasal flap	.04
Distance from snout to first dorsal	1.565
Length of base of first dorsal	.095
Height of first dorsal	.18
Interval between dorsals	.155
Length of second dorsal	.10
Height of second dorsal	.19
Height of caudal	.175
Length of upper portion of caudal	.455
Distance from snout to end of base of pectoral	.83
Length of base of ventrals	.28
Width of ventrals	.20
Length of claspers	.36

The type of this species, an adult male, was taken at Santa Barbara, Cal., February 8, 1880, by A. Larco, an Italian fishermen. It is numbered ——— in the collection of the United States National Museum. Mr. Larco states that this species is not uncommon about Santa Barbara in spring and summer.

This species is probably related to *Platyrhina sinensis*, but it has little affinity with *Platyrhina exasperata*, already described by us, from San Diego. In color, form of tail, and character of the dermal covering it resembles the *Rhinobatidæ*, and its affinities with *Syrrhina*, of the latter "family," are evident.

DESCRIPTION OF A NEW SPECIES OF "ROCK COD" (SEBASTICHTHYS SERRICEPS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Body rather robust, heavy forwards, compressed behind, the caudal peduncle short and rather slender. Head large. Mouth large, rather oblique, the maxillary reaching to opposite the middle of the eye; the premaxillary anteriorly on the level of the orbit; jaws about equal, in the closed mouth; teeth, as usual, in villiform bands on the jaws, vomer, and palatines.

Top of head with the spinous ridges very thick and strong, their tips bluntish, turned upward and outward; the spines on each side placed nearly in a right line, so that the edge of the crown seems somewhat regularly serrated.

The following pairs of spines are present: nasal, preocular, supraocular, tympanic, occipital, and nuchal. The coronal spines (found in *S. auriculatus* and *S. ruber*) are wanting in this species, as are the postocular spines (usually present in *S. pinniger*). Interorbital space between the spines narrow, flat, and coarsely scaled (the elevated ridges found in *S. nigrocinctus* being wanting). The tympanic spines are

stronger than in related species. The nuchal spines are as usual placed close behind the occipital.

Preorbital bone rather broad, with a single obsolete spine directed downward. Preopercle with five rather short and bluntish spines, the second the larger, the three lower quite small. Opercle with two bluntish, diverging spines. A blunt spine on the shoulder girdle above the pectorals; two sharp suprascapular spines. Subopercle and lower edge of opercle each with a blunt point. Preorbital scaly below. Maxillary naked.

Eye rather large, its diameter about one-quarter the length of the head.

Gill-rakers clavate, short, stiff, compressed, armed with bristly teeth above and within. There are about thirty of them in all, those nearest the middle of the arch longest and most perfect, the others gradually growing smaller and incomplete. About half of them have the posterior edge free. The longest is about one-third the length of the eye ($\frac{1}{6}$ in *S. melanops*; $\frac{3}{5}$ in *S. pinniger*). In form they are midway between the tubercle-like gill-rakers of "*Sebastosomus*" (*S. melanops*) and the long and slender gill-rakers in "*Sebastomus*" (*S. pinniger*, *flavidus*, *auriculatus*, etc.).

Branchiostegals 7, the gill membranes, as in other species, little united, without isthmus.

Scales moderate, essentially as in *S. faseiatus* and related species. Lateral line with 55 scales.

Dorsal fin with strong spines, the fourth to seventh highest and subequal, the lowest more than half the height of the highest. Soft dorsal rather higher than any of the spines. Caudal fin broad, rounded. Anal fin with the second spine robust, about as long as the third and much stronger, the soft rays high.

Pectoral broad and rounded, its base deep, nearly one-third the length of the head, its lower rays thickened as in *S. melanops*, its tips reaching just past the vent. Ventrals falling just short of the front of anal.

Fin rays: D. XII, 1, 13; A. III, 5.

General color dark olive, blackish on the head and back, the sides somewhat yellowish; sides of body with black cross-bands which are somewhat oblique; these bands are usually distinct, but are sometimes nearly obsolete in dark-colored examples. The first band runs downward from front of dorsal across base of pectoral; the second from near the middle of spinous dorsal to behind the ventrals; the third from the posterior part of the dorsal to the vent; the fourth and fifth above the anal, and the sixth at base of caudal. Another black bar extends across the scapular region and the opercular spines, and two bands radiate from the eye, obliquely downward and backward. Belly dusky greenish; fins blackish, with a strong olive tinge.

Lips, mouth, *front and lower part of the head*, with a strong wash of

coppery *red*, this color fading out on the thoracic region. Base of fins and different parts of the body sometimes with obscure small whitish spots.

Measurements.

(No. ——, United States National Museum, from Santa Barbara.)

Extreme length	10.40 inches.
Length to base of caudal	8.70 inches = 1.00
Greatest depth	.38
Least depth	.11
Length of head	.35
Diameter of eye	.085
Length of snout	.10
Width of interorbital area	.055
Length of supraocular ridge	.05
Length of occipital ridge	.06
Length of maxillary	.18
Distance from snout to dorsal	.325
Length of base of dorsal	.57
Height of longest spine	.13
Height of longest ray	.155
Length of base of anal	.135
Height of second spine	.14
Height of longest ray	.22
Length of caudal	.205
Width of base of pectoral	.11
Length of pectoral	.265
Length of ventral	.24

This species is found in great abundance about the island of Santa Catalina, where eight examples were obtained by the writers. Another was taken at Santa Barbara, where the species is considered rare by the fishermen. It seems to be intermediate between the still rougher-headed *S. nigrocinctus*, on the one hand, and the smoother *S. fasciatus* and *S. melanops* on the other.

ON THE OCCURRENCE OF CEPHALOSCYLLIUM LATICEPS (DUMÉRIL) GILL, ON THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

While we were engaged in making collections on the coast of Los Angeles County, California, a shark was described to us by a Wilmington fisherman as having the habit when caught of filling himself with air "till he was big as a barrel," so that if thrown back in the water he would float away on the surface, belly upward, etc., exactly after the fashion of the species of *Tetrodon*. On cross-questioning, the fisherman assured us that the animal was a genuine shark, with the mouth underneath and many sharp teeth, and that he had frequently taken them near Wilmington.

At last one of these animals was brought in to us by a fisherman

named Vicente Leonardo, who took it in a gill-net off Santa Catalina Island. It proved to be a species of the genus *Cephaloscyllium* Gill, and apparently identical with the type of the genus (*Scyllium laticeps* Duméril). This species has been hitherto recorded, so far as we know, only from Tasmania.

The following is a description of our specimen (No. ———, United States National Museum):

Head short and broad, broader than long, and not half as deep as broad; snout very blunt, not projecting much beyond the mouth; eyes oblong, small, the spiracles behind them well developed; no nictitating membrane; nasal openings not confluent, their flaps separated by a broad space, the breadth of which is two-thirds the length of the snout; nasal flaps conspicuous, without cirrus; mouth very broad, not strongly curved, with only a trace of labial fold at the angle; skin at the angle of the mouth thin, smooth, pale, and raised into little cross-folds.

Teeth similar in both jaws, small, sharp, with a long central cusp and a small basal cusp on each side. About four series of teeth. Teeth $\frac{30+30}{27+27}$.

First dorsal beginning over middle of ventrals; second dorsal beginning behind front of anal and ending a little before end of anal; base of pectorals low and horizontal, the last two gill openings above them. Caudal fin short.

Color dark grayish-brown, with five pairs of dark bars across the back, their form irregular; the central pair bounded by straight lines and forming a cross-shaped figure; middle part of each fin blackish; entire surface of body and fins covered with round black spots of different sizes, these larger and less numerous on the belly; on the sides are also whitish spots, smaller and less numerous than the black ones.

This specimen was a female, with the ova nearly ripe. The stomach when received by us was much inflated. The intestines contained numerous specimens of a small gasteropod shell.

Other fishermen about Wilmington tell me that they take this shark occasionally, about two or three times a year, and that when fully inflated it is half as broad as long, a statement not hard to believe.

A fisherman at Santa Barbara, Mr. A. Larco, tells me that he also knows this shark. He has in his possession two egg-cases, with the eggs, which he says were taken from one of this species. These egg-cases are "wheel-barrow shaped," like the egg-cases of rays, and provided with long tendrils.

Measurements.

Length	37 inches = 1.00
Greatest depth (partly distended)	.22
Greatest width (partly distended)	.25
Length of head	.15
Greatest width of head	.18
Length of snout (from mouth)	.04
Length of branchial area	.08

Width of mouth	.14
Diameter of eye	.03
Distance from snout to first dorsal	.62
Length of base of first dorsal	.08
Distance between dorsals	.09
Length of base of second dorsal	.05
Height of second dorsal	.065
Length of base of anal	.065
Height of anal	.08
Length of caudal	.18
Length of pectoral	.21
Length of ventral	.11

ON THE OIL-SHARK OF SOUTHERN CALIFORNIA (GALEORHINUS GALEUS).

By DAVID S. JORDAN and CHARLES H. GILBERT.

Along the coast of Southern California a large species of shark appears in the spring in great schools. At certain places along the coast, especially about Newport Landing, in the southern part of Los Angeles County, the pursuit of this shark becomes a matter of considerable economic importance. They are taken easily with a hook, and sometimes great numbers of them may be surrounded and brought in with a seine. They are valued for their livers and fins. A single liver when the animals first arrive, in March, will yield a gallon of oil. As much as 4,000 gallons of this oil have been procured at Newport in a single season. The fins of this species are sold to the Chinamen, who find them a great delicacy, and pay for them 12½ cents a pound.

The present writers have succeeded in obtaining one of these "oil-sharks," and find the species to be the European tope, *Galeorhinus galeus* (*Galeus canis* and *vulgaris* of authors). It is singular that our only knowledge of the occurrence of this species on the west coast of America till now has been the indication by Dr. Günther of the presence in the British Museum of "*o.* Young. San Francisco. From Mr. Gruber's collection." Yet, in the waters of California south of Point Conception it is doubtless more numerous in individuals than all other species of sharks combined.

Measurements of an adult male oil-shark.

Length	63 inches = 1.00
Depth (greatest)	.14
Length of head	.18
Length of snout (below, from mouth)	.075
Length of snout (from eye)	.08
Width of mouth	.07
Length of spiracle	.0075
Diameter of eye	.025
Distance from snout to first dorsal	.33
Length of base of first dorsal	.073

Height of first dorsal	.075
Distance between dorsals	.25
Length of second dorsal	.045
Height of second dorsal	.04
Length of anal	.035
Length of caudal	.21
Distance from ventrals to pectorals	.25
Length of pectorals	.15
Length of ventrals	.045

THE SURF-SMELT OF THE NORTHWEST COAST, AND THE METHOD OF TAKING THEM BY THE QUILLEHUTE INDIANS, WEST COAST OF WASHINGTON TERRITORY.

By JAMES G. SWAN.

NEEAH BAY, WASH., *September* 22, 1879.

Thirty miles south of Cape Flattery, at the entrance to Fuca Strait, Washington Territory, is the Quillehute River, a small stream emptying into the Pacific Ocean near some rocky islets, the largest of which, named by the Indians "Alikistet," and by the whites "James Island," is a landmark for the entrance to the little bay or cove, on the shore of which is the principal village of the Quillehute Indians, who collect and dry for winter use a very choice variety of smelt (*Hypomesus olidus*), which I have named the surf-smelt, from its peculiar habit of depositing its spawn among the shingle of the beach, coming in with the surf in incredible numbers, and in this respect somewhat resembling the capelin (*Mallotus villosus*) of New Brunswick.

The surf-smelt closely resembles the common smelt in shape, size, and the peculiar cucumber-odor, but differs in having its belly covered with a coating of yellow fat, which imparts an oily appearance to water where the fish have been cleaned or washed, and makes them the very perfection of pan-fish.

During the month of August, 1879, I was at the Quillehute Indian village from the 17th to the 22d, with United States Indian Agent Charles Willoughby, and had an ample opportunity to witness the habits of the surf-smelt and their capture by the natives. These Indians take them by means of a peculiar-shaped hand-net of a parallelogram form at top, five feet long, twenty inches wide, and from four to five feet deep, with a curved handle.

The specimen net which I send is made of the fiber of the common stinging nettle (*Urtica dioica* L.), which grows in luxurious abundance on the northwest coast near Indian villages and deserted camps. A specimen of the prepared fiber is also sent with the net.

The method of preparing the nettle by the Quillehute Indians, after gathering a quantity and stripping off the leaves and twigs, is to dry the stalks in the sun or on a frame in the lodge, near, but not directly over, the fire.

When properly dried, each stalk is split open and the *shive* or woody part broken by the hand and peeled off from the outside skin or fiber. This fiber is then spun or twisted into threads or twine, by rolling between the palm of the hand and the bare leg, a process at which the women are very expert.

The Indians at present know nothing of the process of rotting the plant and breaking it to get rid of the *shive*, or of the process of hackling the fiber, and as their method is so slow and laborious, they are abandoning the use of the nettle as a textile plant, and use twine, which they either purchase ready made, or manufacture from cotton threads raveled out from flour-sacks and spun by hand, or from jute, which they procure from old gunny-bags which have been thrown away by the whites.

I think if they could be taught the process of rotting the nettle and preparing the fiber as the farmers of Kentucky prepare hemp or flax, that they would soon be able to furnish a valuable article of commerce which would pay them well for their labor.

The net I send will show the twine made by this most primitive of all methods, and indicate the many purposes for which it may be made available, but in order to be profitable it should be prepared in quantities like flax, or hemp, which it greatly resembles.

The net stitch or knot for making the mesh was not taught them by white men, but has been known by the coast Indians for ages.

Nearly thirty years ago I saw the salmon-nets of the Chinook Indians at the mouth of the Columbia River. The knowledge and use of nets antedates the advent of the first white man, but in the manufacture of the fiber and the twine they seem to have retained the most primitive ideas, and never have advanced. What little twine they now manufacture is made exclusively by the old women.

The peculiar shape of the net, and the curved handle, are to enable Indians to best use them in the surf. A straight handle could not be used.

The surf-smelt are usually most plentiful during the month of August, and come in such vast numbers that the water seems to be filled with them. Captain Carroll, of the steamer Alexander Duncan, plying between the Columbia River and Puget Sound, informed me that, on the 24th of August, while on his passage from Astoria to Neeah Bay, he ran through a school of smelts between Point Grenville and Quillehute which extended nearly forty miles, and at night their track was made visible by a bright phosphorescent light which emanated from them. I noticed the same luminous appearance in the surf in Quillehute Cove during each night that I remained there.

The smelts come in with the flood tide, and when a wave breaks on the beach they crowd up into the very foam, and as the surf recedes many will be seen flapping on the sand and shingle, but invariably returning with the undertow to deeper water.

An examination showed the pebbles to be incrusted with spawn, and as all the smelts I cooked were males, I concluded that the females had first come in and cast their spawn and were succeeded by the males, who deposited their milt. I handled and noticed a great many, and cooked several dozens on two successive days, but did not notice a single female. This might have been purely accidental, and perhaps at another time the catch would have proved all females.

On the first appearance of the fish, the Indians rush into the surf and press the outer edge of the net down firmly on the sand or shingle, the swash of the breaker forcing the smelts into the net. Then, as the water recedes, they turn round quickly and hold the net so that the undertow will force more smelts into it. In this way I saw them take at least a bushel at a single scoop.

In their immense numbers, these smelts resemble the eulachon. (*Osmerus pacificus*) or candle-fish, which are taken in such enormous quantities at Nass River, in British Columbia, near the southern boundary of Alaska.

After every scoop, the Indian, if successful, empties its contents on the beach, where the squaws and children quickly gather them into baskets, and carry them to the houses, where they are strung on strips of cedar bark and hung up to dry. The method of stringing them is to take each one separately and pass a half hitch with the bark around the head just back of the gills. This keeps each fish separate, and enables them to dry better.

The Quillehutes still retain the ancient superstition, formerly so prevalent among the coast tribes, relative to their fish, that the first ones must not be sold or given away to be taken to another place, nor must they be cut transversely, but split open with a muscle-shell.

I was fortunate in obtaining quarters in the house of an Indian who had a cooking-stove, where we cooked our rations as suited us. One of the Indians of our party obtained some smelts, which he boiled for supper, cooking them in the Quillehute style; he gave me some, which I fried. No sooner did the Quillehutes learn that I was cooking some of their fish than two of the head chiefs, Howeattl and Klakistokar, came to see what I was doing, as they feared I would cut the fish with a knife; but I fried them whole, and when they saw me take the nice crispy smelts with my hand and eat them entire, without aid of knife or fork, they grunted forth their satisfaction, and allowed me to purchase as many as I wished to take away. But of salmon they would neither give or sell. The fall run of the *Salmo canis* and *Salmo proteus* had just commenced to come, and while they gave us all we could eat of their own cooking, in their own houses, they refused to sell or give a single fish to be taken away. They fully believed that if we took any salmon into our canoe, all the salmon would desert the Quillehute River and follow us to Neeah Bay, and if we had cut the smelts or salmon with a knife, they all would immediately disappear in the ocean and never return.

I was unable to procure even a specimen of the salmon, but obtained enough smelts to forward some excellent specimens to Washington.

Very respectfully, your obedient servant,

JAMES G. SWAN.

Prof. SPENCER F. BAIRD,
United States Commissioner Fish and Fisheries,
Smithsonian Institution, Washington, D. C.

P. S.—I omitted to mention that the surf-smelt are common in all the salt water of Puget Sound, but I have not heard of an instance where they run up fresh-water streams to spawn, like the eastern smelt.

J. G. S.

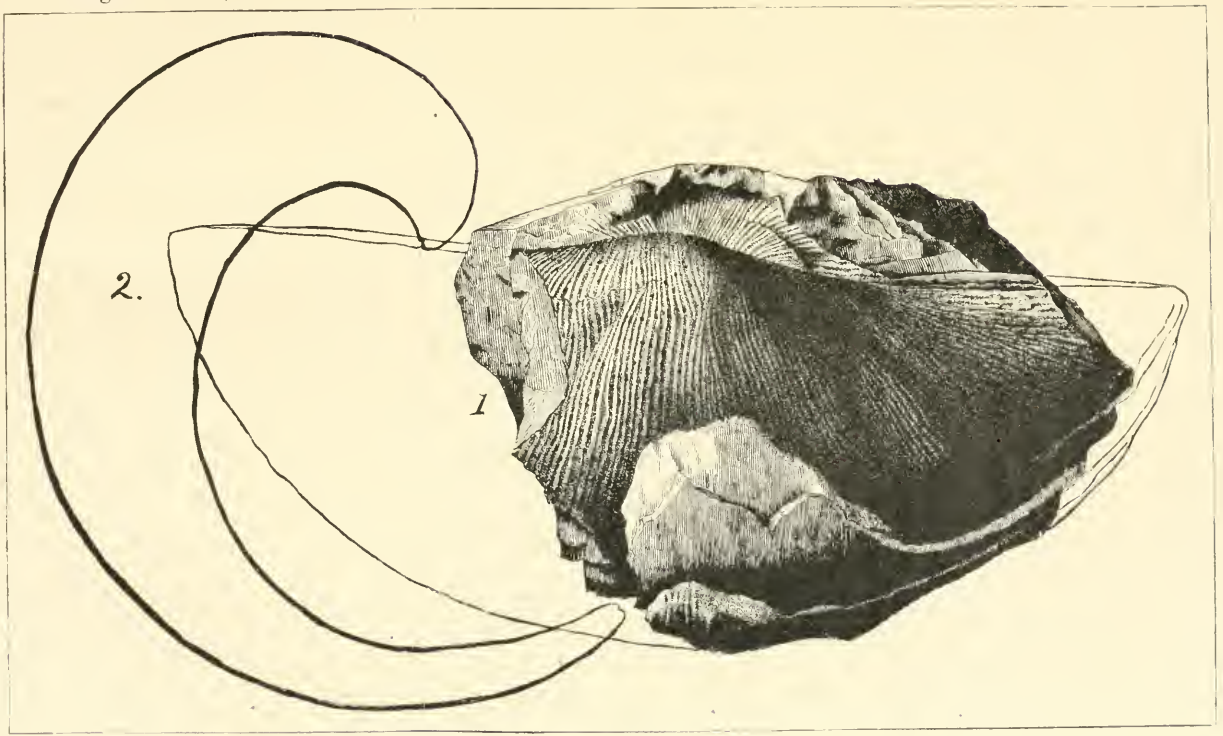
NOTE ON THE OCCURRENCE OF PRODUCTUS GIGANTEUS IN CALIFORNIA.

By C. A. WHITE.

Among a small collection of fossils sent to the National Museum by Mr. Ludwig Kumlien, of the United States Fish Commission, from the valley of McCloud River, Shasta County, California, are three or four large examples of *Productus*, which I am unable to distinguish from *P. giganteus* Martin sp., the well-known type species of the genus as it is extensively known in European strata. They are preserved in a hard, dark-colored, argillaceous rock, which is partly metamorphosed, and they are, therefore, somewhat imperfect; but portions of them show the characteristics of the species very plainly. The largest of these Californian examples was, when perfect, quite equal in size to the larger European examples of *P. giganteus*, having had a transverse diameter near the hinge of not less than 140 millimeters, or 5½ inches.

A small collection of fossils was sent by mail from the same locality in 1877 by Mr. Livingston Stone, the species of which were recognized as of Carboniferous age, but *P. giganteus* was not among them, although the later collections indicate that they occur in the same strata. These associated forms of both collections are too imperfectly preserved for specific determination, but the genera *Fenestella*, *Streptorhynchus*, *Spirigera Camarophoria*, *Allorisma*, and *Euomphalus* are more or less satisfactorily recognized. They all together plainly indicate the Carboniferous age of the strata from which they come, which fact was also previously known through the reports of Trask and Whitney.

This, so far as I am aware, is the first discovery of *P. giganteus* in American strata. It is not a little remarkable that it should be found in the western portion of the continent and not in the middle and eastern portions, where the Carboniferous system is so well developed, and where several European species of Carboniferous brachiopoda are recognized.



PRODUCTUS GIGANTEUS.

Fig. 1, on Plate ——, represents one of the examples referred to, the principal portion of the figure showing a natural cast of the dorsal valve, with the umbonal portion of the ventral valve. In this figure the full length of the shell from back to front is not shown, but it is represented in the accompanying diagram, Fig. 2.

WASHINGTON, D. C., *December* 3, 1879.

NOTE ON ACROTHELE.

By C. A. WHITE.

Among the fossils collected from Primordial strata at Antelope Spring, Southern Utah, by Mr. G. K. Gilbert and Mr. E. E. Howell, who were then connected with the explorations and surveys west of the 100th meridian, were a number of examples of a discinoid brachiopod. This form I described and figured* under the name of *Acrotreta? subsidua*, referring it to that genus provisionally. None of the examples were in a condition to show all the generic characters clearly, but certain features in these shells indicated their possession of important differences from any genus then established and led me to suggest that they probably represented a new generic type. In the same year, 1876, Prof. G. Linnarsson, of Stockholm, Sweden, published† a new generic form from the Primordial rocks of Sweden, under the name of *Acrothele*, which plainly includes *Acrotreta? subsidua* White. Professor Linnarsson described two Swedish species under this generic name (*A. coriacea* and *A. granulata*), and in 1879 he published a third species under the name of *A. intermedia*,‡ but *A. subsidua* is at present the only known American species. It is not unlikely, however, that some of the American species heretofore referred to *Discina* will be found to belong to *Acrothele*.

WASHINGTON, D. C., *February* 1, 1880.

DESCRIPTION OF A NEW CRETACEOUS PINNA FROM NEW MEXICO.

By C. A. WHITE.

Pinna stevensoni.

Shell large, elongate-triangular in marginal outline; valves moderately convex; the convexity being slight and nearly uniform posteriorly, but much greater toward the front, where it amounts to an obtuse median angularity upon each valve, and where a transverse section of the shell has an approximately regular rhombic outline; upper border

* Expl. and Sur. West of the 100th Merid., Vol. IV, p. 34, pl. I, fig. 3, *a*, *b*, *c*, and *d*.

† Bihang till k. Svenska Vet. Akad Handlingar, Band 3, No. 12, p. 20, pl. IV, figs. 44–52.

‡ Sveriges Geologiska Undersökning; Ser. C. Afhand. och Upps. No. 35, p. 25, pl. iii, figs. 40–44.

straight or nearly so; lower border slightly convex and longer than the upper border; posterior border nearly straight or slightly convex, truncating the shell obliquely downward and backward, meeting the upper border at a more or less distinct obtuse angle and the lower border by an abrupt curve. Surface marked by abundant coarse lines and imbrications of growth, which traverse the shell in slightly curved lines corresponding with the posterior border, and is apparently without trace of any radiating lines or ribs.

Entire length from beak to postero-basal extremity about 215 millimeters; breadth, from the postero-dorsal extremity to the base, measured at right angles with the upper border, 95 millimeters.

This shell is so unlike any described American species that no detailed comparison with any of them is necessary; but it is so closely related to *P. legeriensis* d'Orbigny, from the department of Sarthe, France, that it is not without some hesitation that I have decided to propose a separate specific name. I have never had an opportunity to examine any of the few examples of *P. legeriensis* that have been discovered, and my comparisons are therefore only with the description and figures of d'Orbigny, in Pal. Française, Vol. III, p. 257, pl. 334. From these it appears that our shell differs from *P. legeriensis* in the following particulars. The angle of divergence of the upper and lower margins is not so great, in consequence of which the breadth of the shell is not proportionally so great; the curve by which the posterior border meets the lower border is more abrupt, and the greatest transverse diameter of the shell is near the median line instead of being much below it, as it is represented to be in *P. legeriensis*. The internal median grooves upon each valve, and also the undulations of the lower border, mentioned by d'Orbigny, appear to be entirely wanting in our shell.

Position and locality.—Cretaceous strata; about 1½ miles southwestward from Fort Wingate, Northern New Mexico, where it was collected by Mr. James Stevenson, in whose honor the specific name is given.

WASHINGTON, D. C., *February* 15, 1880.

NOTE ON THE OCCURRENCE OF STRICKLANDINIA SALTERI AND S. DAVIDSONI IN GEORGIA.

By C. A. WHITE.

A few months ago Lieut. A. W. Vogdes, United States Army, gave me a few fragmentary fossils from a collection which he had then lately made at Taylor's Ridge, in the town of Ringgold, Catoosa County, Georgia. The other fossils of this collection and the geology of the region referred to were discussed by Lieutenant Vogdes in the December, 1879, number of the American Journal of Science and Arts, pp. 475–477. He there refers, and doubtless correctly, the horizon from which he obtained the fossils he gave me to that of the Clinton Group

of New York. They are in the condition of natural casts in fine-grained sandstone, but I have quite satisfactorily identified a dorsal valve of *Stricklandinia salteri* and one of *S. davidsoni* Billings. If these two species are correctly identified, as they appear to be, their discovery in Georgia is especially interesting, because they have hitherto been found only in strata of the island of Anticosti; and also of the indication which they and their associates in the two regions named afford as to the equivalency of the Georgia, Clinton, Anticosti strata in America; and Upper Llandovery strata of Great Britain.

WASHINGTON, D. C., *February* 15, 1880.

DESCRIPTION OF A NEW FLOUNDER (PLEURONICHTHYS VERTICALIS), FROM THE COAST OF CALIFORNIA, WITH NOTES ON OTHER SPECIES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Pleuronichthys verticalis sp. nov.

Form broad ovate, the outlines regular; head small, somewhat constricted behind the upper eye; eyes large, but smaller than in *P. quadritubereulatus*. Interorbital ridge narrow; a small tubercle or prominence in front of the upper eye; a large one in front of upper edge of lower; another larger and sharper at interior edge of the interocular space; another at the posterior edge of the interocular *spine* ridge. This latter is developed into a long, sharp, triangular spine, which is nearly as long as the pupil, and is directed backwards. A prominent tubercle at the posterior lower angle of the upper eye. Upper edge of opercle somewhat uneven, but no other tubercles present.

Mouth small, as in other species; the lips thick, with lengthwise plicæ.

Teeth in a broad band on the left (blind) side of each jaw; *no teeth on the right side in either jaw*. Gill-rakers very small, weak, and flexible, about ten in number. Scales essentially as in the other species, small, cycloid, imbedded, and scarcely imbricated. Lateral line nearly straight, with an accessory branch which extends to the middle of the dorsal fin.

Dorsal fin beginning on the blind side at the level of the premaxillary, there being but about four of its rays on the left side of the median line. Vertical fins less elevated than in the other species, the longest rays of the dorsal about half the length of the head. Anal fin preceded by a spine. Caudal peduncle short and deep. Caudal fin elongate, rounded behind. Pectoral short, nearly equal. Ventrals moderate, reaching anal spine.

Fin rays: D. 65; A. 45.

Color dark olive-brown, with round grayish spots, the body and fins mottled with blackish.

The type, No. ————, United States National Museum, was taken in a trawl-net outside of the Golden Gate, and was procured by us in the San Francisco market.

There are apparently three species of the genus *Pleuronichthys*, as restricted by Gill, in the waters of California.

One of these is the common species in the San Francisco markets at present, being taken in some abundance in the trawl-nets off Point Reyes and the Farallones. This species is the *Pleuronichthys cœnosus* of Lockington's Memoir (Proc. U. S. Nat. Mus. 1879, 97), and, as Lockington suggests, it is probably identical with the *Pleuronectes quadrituberculatus* of Pallas. For this form we accept provisionally the name *quadrituberculatus*.

A second species occurs farther south, two specimens having been procured by us at Santa Catilina Island, and one at San Luis Obispo. This form answers better than the preceding to Girard's description of his *Pleuronichthys cœnosus*, and it may for the present be identified with it. The specimen noticed by Lockington as "No. 4," "with the dorsal not continued downward nearly so far as the others," perhaps belongs to this species.

The third species is *P. verticalis*, described above.

The species may be readily separated, so far as we have observed, by the following characters:

* Dorsal fin beginning on the level of the lower lip, about ten of its anterior rays being on the left side; ocular region with four or more blunt prominences or tubercles, arranged as follows: one in front of upper eye, another at each end of the interorbital ridge, the posterior largest, but not spine-like, one behind the latter, and one or two more behind the upper eye; upper part of opercle uneven; lower jaws with a band of teeth on the right side similar to that on the left side, but narrower; fins high, D. 72, A. 46....QUADRITUBERCULATUS.

** Dorsal fins beginning on the level of the upper lip, only four or five of its rays being on the left side of the median line.

† Posterior prominence of interocular ridge developed as a strong backward-directed spine; tubercular prominences present about the upper eye; no teeth on right side of lower jaw; fins rather low, D. 65, A. 45.....VERTICALIS.

‡‡ Posterior prominence of interocular ridge scarcely elevated; other ocular tubercles obsolete; teeth ?; fins high, D. 68, A. 48 .....CŒNOSUS.

Measurements.

	Verticalis.	*Quadrituberculatus.*
Extreme length, in inches	9.20	11.85
Length to base of caudal, in inches = 1.00	7.50 = 1.00	9.20 = 1.00
Body, greatest depth	.54	.62
Body, least depth of tail	.14	.13
Head, length	.24	.23
Head, diameter of orbit	.07	.083
Dorsal, distance from first ray to median line	.055	.11
Dorsal, greatest height	.13	.19
Anal, greatest height	.13	.18
Caudal, length	.255	.28
Pectoral, length	.135	.18
Ventral, length	.11	.11

A second example of *Xystreurys liolepis*, taken at Santa Barbara, is sinistral. The species is, therefore, like *Paralichthys maculosus* and *Platichthys stellatus*, both dextral and sinistral. In the second example the small accessory scales are extremely numerous.

Two more examples of the species, noticed by us as *Platysomatichthys stomias*, have been obtained in trawl-nets from near the Farallones. This species is apparently not congeneric with *Platysomatichthys hippoglossoides*, differing in the long and slender gill-rakers and the ctenoid scales, as well as in the dentition, narrow interorbital space, and other minor details. The large teeth in both jaws, and the small teeth in the outer row in the upper jaw, are distinctly *arrow-shaped*, being abruptly widened toward the tip, thence acutely triangular.

We propose to consider this species as the type of a distinct genus, which may be termed *Atheresthes*, from the arrow-shaped teeth. It may be thus defined:

Atheresthes gen. nov.

Eyes and color on the right side. Body long and slender, closely compressed, tapering into a long and slender caudal peduncle. Mouth extremely large, oblique, the long and narrow maxillary extending beyond the eye. Both jaws with two irregular series of unequal, sharp teeth, which are anteriorly long and slender, posteriorly short. All the long teeth of both jaws, and the outer series of small teeth in the upper jaw, arrow-shaped. Some of the anterior teeth freely depressible. Interorbital space narrow. Gill-rakers long and strong, numerous. Scales comparatively large, ciliated, thin, and readily deciduous, those on the blind side similar, smooth. Lateral line without arch. Fins low and rather fragile, the dorsal beginning over the eye, its anterior rays low. Caudal lunate; no anal spine. Pectorals and ventrals small, the latter both lateral.

Type, *Platysomatichthys stomias* Jor. & Gilb.

NOTES ON SHARKS FROM THE COAST OF CALIFORNIA

By DAVID S. JORDAN and CHAS. H. GILBERT.

The following species of sharks, not hitherto recorded from the Pacific coast of the United States, have been observed by the writers during the present winter (1880):

1. **Isurus oxyrhynchus** Rafinesque. (?)

The jaws of a species of *Isurus* were obtained by us at San Pedro, the shark having been taken off Santa Catilina Island. The teeth agree essentially with those of *Isurus oxyrhynchus* (*Lamna spallanzani* of authors). *Isurus glaucus* has, however, also the same dentition, hence we are unable exactly to determine the species.

2. **Carcharodon rondeleti** Müller & Henle.—*Man-eater Shark.*

A large individual of this species was lately harpooned at the whaling station of Point Carmelo, near Monterey. Its jaws, now in the possession of Mr. A. C. Keating, a druggist at Monterey, are about two feet across.

Schools of this species are said to be occasionally noticed in the open sea from Monterey southward.

3. **Cetorhinus maximus** (Linnæus) Blainville.—*Basking Shark; Ground Shark.*

An individual of this species, 31 feet in length, was taken March 25 by the whalers at Monterey, and another somewhat larger on March 26. Several others were noticed, but only two were secured. We are told that eighteen or twenty years ago several of them were taken at Monterey, since which time few or none have been noticed in the bay.

4. **Carcharhinus glaucus** (L.) Blainville.—*Blue Shark.*

A young individual of this species, taken in San Francisco Bay, is in the museum of the California Academy of Sciences. A "Blue Shark" is found in the open sea along the southern coast of California, but I do not know whether it is this species.

5. **Galeorhinus galeus** (L.) Blainville.

As already noticed, this species is the most abundant shark of Southern California. It is common at Santa Barbara, and I am told is not unfrequently taken at Monterey.

6. **Galeocerdo tigrinus** Müller & Henle.—*Man-eater Shark.*

As already noticed by us, jaws of an individual of this species were seen by us at San Diego, near which place the animal was obtained.

7. **Cephaloscyllium laticeps** (Duméril) Gill.—*Ground Shark.*

The occurrence of this species at San Pedro has been already noticed by us. At Santa Barbara it is, next to *Triacis semifasciatus*, the most abundant of the sharks. It is there taken daily in the lobster-pots set for the "craw-fish" (*Palinurus interruptus*). Its habit of inflating itself, when caught, by swallowing air, is very remarkable.

8. **Pleuracromylon lævis** (Risso) Gill.

Two specimens of this species have been obtained by us at Monterey. One of them, a female, taken March 26, had the young about 8 inches long, each of them connected by a long umbilical cord to a placenta which is attached to the uterus. The occurrence of this shark, in connection with its relative, *Mustelus hinnulus* (*vulgaris*, *canis*, etc.), on the Pacific coast, is very interesting.

March 26, 1880.

ON THE GENERIC RELATIONS OF PLATYRHINA EXASPERATA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

A short time since a small ray was described by the present writers, from San Diego, under the name of *Platyrhina exasperata*. (Proc. U. S. Nat. Mus. 1880, ——.) Soon after a second species was described by us, from Santa Barbara, as *Platyrhina triseriata*. (Proc. U. S. Nat. Mus. 1880, ——.)

The two species are certainly not congeneric. The former species has the skin above covered with stellated prickles of different sizes, and resembles the genus *Raia*. The latter is covered over by a uniform fine shagreen, and resembles the species of *syrrhina* and *rhinobatus*. So far as we can ascertain from the description given by Duméril and Günther of *Platyrhina sinensis* and *Platyrhina schœnleini*, these two species agree with *Platyrhina triseriata* in the character of the dermal covering, as well as in form of body. We propose therefore to consider *Platyrhina exasperata* as the type of a distinct genus, *Zapteryx*, distinguished from *Platyrhina* by the presence of detached, unequal, stellated prickles on the skin above, instead of the uniform shagreen covering found in *Platyrhina*, and from *Raia* by the convex outline of the ventrals and by the greater development of the dorsal and caudal fins. In *Raia* the ventrals are always emarginate.

March 26, 1880.

REMARKS ON THE SPECIES OF THE GENUS CHIRUS FOUND IN SAN FRANCISCO MARKET, INCLUDING ONE HITHERTO UNDESCRIBED.

By W. N. LOCKINGTON.

Four species of the genus *Chirus* occur in the markets of this city. The two most abundant of these are *C. constellatus* and *C. guttatus* Grd. Of the others, one is *C. pictus* Grd., while the other has until now remained undescribed.

C. pictus is separated from the others by some sufficiently obvious external characters, beside those of color, as will be evident from the subsequent remarks, but the writer is unable to find any constant character except that of the coloration by which to distinguish the other three species.

As, however, he has now seen several hundred examples of *C. guttatus* and *C. constellatus*, and a large number of both the other species, and as, notwithstanding the considerable variation in the size, number, and position of the marking of each species, neither on any occasion shows the slightest tendency to approach the pattern of another, he submits that in this group the pattern of the coloration may be considered specific.

Difficult though it may be to prove upon paper the distinctness of these forms, there do not exist on this coast any other four species belonging to one group which can be so unerringly separated by the eye.

Diagnosis.

Suborbital stay scaleless; diameter of orbit about $\frac{4}{100}$ of total length.	Sides with purple blotches; pectorals barred.	*C. pictus.*
Suborbital stay scaly; diameter of orbit about $\frac{5}{100}$ of total length.	Sides with rings of small dark round spots surrounding areas of lighter color than the general ground; pectorals sharply spotted.	*C. constellatus.*
	Sides with irregularly scattered circular or subcircular spots; pectorals nearly plain.	*C. guttatus.*
	Sides with irregularly shaped blotches, disposed in five or six longitudinal series.	*C. maculo-scriatus*

C. pictus.

This form is more inconstant in the number of its fin-rays and in the coloration than any of the others.

Six specimens now before me vary as follows in the rays of the dorsal and anal:

No. 1. Locality, San Francisco market..... D. XX, $\frac{1}{22}$; A. 21
No. 2. Locality, San Francisco market..... D. XXI, $\frac{1}{21}$; A. 22
No. 3. Locality, San Francisco market..... D. XXI, $\frac{1}{22}$; A. 21
No. 4. Locality, Kadiak Island, Alaska..... D. XIX, $\frac{1}{21}$; A. 21
No. 5. Locality, San Francisco market..... D. XIX, $\frac{1}{23}$; A. 21
No. 6. Locality, Kadiak Island, Alaska..... D. XVIII, $\frac{1}{22}$; A. 24

The color of all the species changes rapidly on exposure to air or immersion in alcohol.

No. 2, when fresh, was of a brilliant green upon the belly and lower part of the flanks, deepening into brown above, and blotched with bright purple. After exposure, the ground tint becomes first reddish, and finally dull purplish brown, while the purple blotches gradually fade into dirty white.

The dorsal and anal are blotched like the body, and the pectorals barred with the same tints.

In all the examples examined, the ventrals are shorter than the pectorals, and fall considerably short of the vent; and the lowest pair of lateral lines unite much nearer to the ventrals than to the vent.

I can perceive no constant difference between specimens from Alaska and those found in our market. The most ordinary number of rays in the first dorsal appears to be nineteen.

No. 1 differs from all the others in the total absence of brighter blotches upon the sides, but the pectorals are barred, and all other characters coincide.

Chirus constellatus.

First dorsal, in all the individuals examined, with twenty-one rays,

and ventrals overpassing pectorals and reaching nearly or quite to the vent.

Lowest lateral line usually forking about midway between ventrals and vent.

Pectoral spotted all over with light and dark spots.

Common in the bay of San Francisco.

Chirus guttatus.

First dorsal with twenty or twenty-one rays, ventrals and pectorals usually about even posteriorly and scarcely reaching to the vent; position of the fork of the lowest lateral line somewhat variable.

Spots on sides bright orange when fresh, but becoming dark on exposure to air or alcohol.

Chirus maculo-seriatus nov. sp.

D. XXI, $\frac{1}{23}$; A. 22–23; P. 19; V. $\frac{1}{5}$; C. (principal rays) 15; L. lat. 110.

Body elongate, compressed, the greatest height about one-fifth of the length (caudal included); greatest thickness, at opercles, about three-fourths of the greatest height; depth of caudal peduncle about $\frac{1}{2\frac{0}{7}}$ of the greatest depth; head about one-fourth of total length.

Dorsal outline rising at an angle of about 20°, with a slight curve to the origin of the dorsal, or to about its fifth ray, whence it descends gradually in a straight line to the caudal peduncle, which is wedge-shaped, increasing in width towards base of tail.

Abdominal outline descending slowly to the scapular girdle, thence nearly level to anal; anal base sloping upwards with a slight curve.

Snout longer than orbit; interocular width slightly less than length of orbit; forehead slightly curved transversely, summit of ascending premaxillary processes rising slightly above the profile of the snout.

Anterior nostril with the edges raised into a short tube.

Eyes lateral, elliptical; a fimbriated flap over the orbit.

Jaws subequal, the upper slightly projecting; posterior extremity of maxillary reaching slightly beyond anterior margin of orbit, that of mandible below the center of the pupil.

Cardiform teeth in both jaws, in several rows in front, diminishing to a single series at the sides, the outer row larger than the others; a patch of similar teeth upon the vomer, and occasionally a few on the anterior part of the palatines, a character which certainly cannot be of generic value in this group. Branchiostegals six; gill-openings continuous below, no isthmus; gill-rakers obsolescent, transverse.

Dorsal arising above the flap of the opercle, slightly in front of the pectoral base, deeply notched; the first dorsal strongly arched on its upper margin; the first ray much shorter than the second; the other rays increasing in height to about the fourth, thence diminishing to the twentieth, which is considerably shorter than the unarticulated ray at the commencement of the second portion of the dorsal.

Second dorsal lower than the first, the rays increasing to about the

fourth; upper margin straight, slightly diminishing in height to the nineteenth ray, four last rays diminishing rapidly.

Anal commencing even with the second dorsal, and coterminous and similar to it; rays increasing to the third; last ray short.

Caudal slightly emarginate on posterior margin, with numerous accessory rays running some distance up the profile of the caudal peduncle; principal rays twice bifurcate. Vent somewhat in advance of the anal.

Pectorals rounded, central rays longest, their tips about even with the nineteenth dorsal spine; rays simple; base vertical.

Ventrals inserted well behind the pectorals, beneath the sixth dorsal spine; second ray longest, its tip slightly overpassing the vent; three longest rays overpassing the pectoral.

Lateral lines five on each side, two above and two below the principal line.

The uppermost on each side commence close together on the occiput, run along the dorsal base outside the first row of scales, and end at the fourteenth ray of the soft dorsal.

The second commences on the occiput, and is continued to the base of the uppermost principal caudal ray.

The third commences on the scapular region, runs parallel with the dorsal outline till it becomes median upon the caudal peduncle, and is continued some distance upon the caudal.

The fourth commences slightly in front of the pectoral base, and continues parallel to the abdominal outline to opposite the seventeenth anal ray.

The fifth pair are united into a median abdominal line at a point about half way between the vent and the axil of the ventrals; anterior to this point the single line runs forward to the pectoral girdle; posterior to it each division runs parallel with the anal base, and ends at the base of the lowest principal caudal ray.

Scales ctenoid, rather larger on the anterior portion of the body than on the posterior; the ciliation obsolete on the scales of the side of the head. Suborbital stay squamose. Snout, preorbital, and interoperculum scaleless. Membrane between caudal rays scaly.

Pectoral base scaly; some small scales at base of rays of first dorsal; second dorsal with small scales between the rays for about half its height. Anal scaleless.

Color, in alcohol, brown, blotched with yellowish blotches in longitudinal series.

This hitherto undescribed species is tolerably common in the markets of San Francisco at some seasons of the year.

When fresh, the series of blotches along the sides are bright orange and bright maroon.

A type specimen is in the National Museum.

Table of measurements.

Current number of specimen Locality	No. 1. San Francisco.		No. 2. San Francisco.	
	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length, including caudal.
Extreme length	13.35	.....	11.60	.....
Body:				
Greatest height	2.73	.208	2.90	.248
Greatest width	1.99	.15	1.70	.144
Height at ventrals	2.62	.197	2.90	.248
Least height of caudal peduncle	1.03	.078	1.03	.09
Head:				
Greatest length	3.28	.245	2.96	.26
Distance from snout to nape	2.2	.165	1.93	.165
Width of interorbital area	.62	.045	.66	.056
Length of snout	.95	.07	1.00	.86
Length of maxillary	1.20	.09	1.14	.100
Length of mandible	1.53	.115	1.36	.085
Diameter of orbit	.68	.051	.....	.....
Dorsal (*spinous*):				
Distance from snout	3.20	.24	3.06	.262
Length of base	3.32	.25	3.30	.285
Greatest height	1.64	.123	.....	.....
Height at first spine	1.00	.074	.....	.....
Dorsal (*soft*):				
Length of base	3.80	.285	3.50	.30
Height at longest ray	1.32	.10	.....	.....
Anal:				
Distance from tip of lower jaw	6.48	.485	5.55	.48
Length of base	3.67	.275	3.46	.296
Height at longest ray	1.22	.093	.....	.....
Caudal:				
Length of middle rays	1.78	.135	1.60	.138
Length of external rays	1.84	.14	1.80	.152
Pectoral:				
Distance from snout	3.43	.257	2.85	.245
Length	2.85	.215	2.36	.202
Ventral:				
Distance from tip of lower jaw	4.16	.314	3.25	.28
Length	2.15	.162	2.16	.185
Branchiostegals	6	.....	6	.....
Dorsal	XXI, $\frac{1}{23}$	.....	XXI, $\frac{1}{23}$	.....
Anal	23	.....	22	.....
Caudal, principal rays	15	.....	15	.....
Pectoral	19	.....	19	.....
Ventral	$\frac{1}{5}$	.....	$\frac{1}{5}$	.....
Number of scales in lateral line to base of caudal	110	.....	111	.....
Number of transverse rows above lateral line	15	.....	15	.....

The proportions of the two specimens measured differ considerably, No. 2 being much deeper in proportion to its length than No. 1, and having its greatest depth immediately over the ventrals, instead of at the origin of the dorsal.

In consequence of the more elongate form, the insertions of the ventrals and of the pectorals are relatively farther back in No. 1 than in No. 2.

Similar differences of proportion exist in *C. constellatus*, and it is evident that no weight can be attached to proportion in distinguishing these species.

Neither is it advisable, in view of individual differences observed, to attach much significance to the length of the ventrals, or to the position of the fork of the lowest lateral line.

C. maculo-seriatus is by no means scarce in our markets, but is less abundant than *guttatus* and *constellatus*.

An example of this form is in the National Museum at Washington, numbered ———.

DESCRIPTION OF A NEW FISH FROM ALASKA (URANIDEA MICROSTOMA).

By W. N. LOCKINGTON.

Uranidea microstoma.

Body long and low, little compressed.

Head depressed, rather small, wider than deep; anterior portion of body about equal in width and depth, somewhat flattened on back near head, and gradually becoming more and more compressed posteriorly.

Dorsal outline regularly arched, its highest point at origin of first dorsal; abdominal outline nearly straight in some examples.

Head about $4\frac{2}{5}$ to $4\frac{1}{6}$; breadth of same $5\frac{1}{3}$ to $4\frac{1}{2}$ times in the total length; orbit about 5, snout 4 to $3\frac{1}{2}$ times in the length of the head.

Eyes directed upwards, elliptical, the orbits not elevated above the general surface; interorbital width nearly equal to the transverse diameter of the orbit.

Mouth short, small compared with others of the genus; posterior extremity of maxillary a little beyond the front margin of the orbit; upper margin of maxillary hidden behind the preorbital in the closed mouth, except the short, broad, posterior extremity, which is free.

Lower jaw shorter than the upper, and closing within it.

A broad band of villiform teeth in front of both jaws.

Teeth on vomer, none on palatines.

Subopercular spine much developed, directed forwards; preoperculum ending in a single sharp, straight spine; branchiostegals 5.

First dorsal commencing a little behind the pectoral base, low, the upper margin nearly straight; height less than that of second dorsal, the rays nearly equal in length.

Second dorsal commencing above the vent, first ray shorter than the second; upper margin a straight line, the height of the fin diminishing regularly but slowly posteriorly.

Anal shorter than second dorsal, commencing opposite the third and ending opposite the seventeenth ray of that fin; anteriorly rounded, the rays increasing to the fourth, thence somewhat diminishing posteriorly; depth greater than the height of the second dorsal.

Pectoral wedge-shaped, seventh ray longest; rays fleshy, simple; tip of seventh ray reaching about to the vent.

Ventrals inserted a little behind insertion of pectorals, the tips not reaching the vent, consisting of one spine and four rays; second, third, and fourth rays longest.

Caudal slightly convex on its posterior margin when expanded; the rays twice bifurcate, first bifurcation at about a third of their length from the base.

Vent not separated from the anal fin by any considerable space; rays simple.

Lateral line deflected downwards suddenly at posterior extremity of second dorsal, thence posteriorly along center of caudal peduncle, and anteriorly parallel to dorsal outline; pores simple, 35–37.

Body scaleless, entirely smooth.

Color olivaceous above, lighter below; upper portion maculated with darker; fins with small dark spots on the membrane; a dark band across caudal.

Two specimens (Nos. 1 and 3) from fresh water, near Saint Paul's, Kodiak, collected by W. J. Fisher. In No. 1 the dorsals are separated by a considerable space; in No. 3 by a smaller space. One of these is in the United States National Museum, numbered —.

Numerous specimens from the Aleutian Islands, collected by Captain Greenebaum, present no difference except in the more or less complete union of the dorsals, and their smaller size. The latter are probably half grown.

As the fin-rays and other characters agree closely, I am inclined to think the separation of the dorsals either an individual character, or one due to greater age.

Mr. Fisher's examples were obtained in fresh-water lakes formed by the melting snows, and communicating with the ocean only by shallow outlets. This species differs from those of the genus found in the United States by its smaller mouth, lower fins, and the four soft rays in the ventrals. In all these respects it resembles the European *Uranidea gobio.*

Dimensions.

	No. 1.	No. 2.	No. 3.
Total length	4.87	3.38	4.30
Greatest depth	.85	.....	.75
Depth of caudal peduncle	.29	.18	.27
Length of head	1.06	.80	1.03
Width of head	.94	.75	.81
Longitudinal diameter of orbit	.21	.15	.22
Length of snout	.30	.21	.31
Tip of snout, along top of head, to origin of first dorsal	1.30	.....	1.25
Length of base of first dorsal	.75	.54	.73
Length of base of second dorsal	1.62	1.15	1.37
Tip of snout to insertion of ventrals	1.12	.....	.94
Length of ventrals	.73	.55	.70
Length of pectorals	1.00	.62	.94
Tip of lower jaw, along abdomen, to origin of anal	2.36	.....	2.10
Length of anal base	1.28	.95	1.25
Number of dorsal rays	8–19	9–19	8–19
Number of anal rays	14	14	12
Number of pectoral rays	14	14	14
Number of caudal rays	5–10–2	.....	.....

DESCRIPTION OF A NEW SPECIES OF AGONIDÆ (BRACHYOPSIS VERRUCOSUS), FROM THE COAST OF CALIFORNIA.

By W. N. LOCKINGTON.

Brachyopsis verrucosus.

D. VII–IX, 7–8. A. 10–11. P. 14–15. V. 1–3. C. 2–10, 2. Lateral scutes, 34–36.

Form elongated, slender, lateral dorsal outline rising very gradually from the snout to above the base of the pectoral; central part of the upper orbital margin elevated above the line of the forehead and occiput, as is also the tip of the lower jaw and front portion of the snout, so that there is a not very conspicuous depression in front of the eye.

From the highest point the dorsal outline descends gradually to the elongated and narrow caudal peduncle.

Abdominal outline from posterior extremity of mandible to caudal peduncle straight.

Greatest height about 11; greatest width 7–7½; length of head 4½–4$\frac{11}{14}$ times in total length to tip of caudal (mouth closed); greatest depth about 1½ in greatest width; depth of caudal peduncle about 3¾ times in the greatest depth.

Mouth oblique, the lower jaw projecting considerably beyond the upper, its tip entering into the dorsal outline, and its posterior extremity reaching to a vertical from the anterior margin of the pupil.

Mandible half or nearly half the length of the head.

Maxillary short, broad posteriorly, and set at a more oblique angle than the mandible, below which the lower angle of its posterior margin projects when the mouth is closed, while the entire length of its upper margin is hidden beneath the preorbital in the closed mouth; a short and slender barbel at its posterior extremity.

Entire length of upper jaw less than ⅓ that of head.

Teeth uniform in both jaws, villiform, very small, in a band which is widest in front, but divided in the center.

A patch of similar but even finer teeth (perceptible to the touch, but scarcely to the eye) on vomer, and another on each palatine.

Eyes directed laterally and somewhat upwards, oval, their longitudinal diameter a little less than the length of the snout, and about 4⅙–4⅓ in the length of the side of the head; interorbital area sunken, its width about 5 times in the length of the head.

Snout a little longer than the longitudinal diameter of the eye; two short backward-directed spines on its summit, slightly posterior to the line of the tubes of the nostrils.

Preorbital large, with several small spines on its lower margin.

Supraorbital margin set with small spines, and rising in its posterior portion to a spinulose crest.

Lower orbital margin prominent, a pair of spines at its posterior extremity, the hinder the larger.

Preopercnlum with a spinulose longitudinal ridge, ending in a backward-directed spine; a second smaller spine below this, at angle; lower limb with two flat angular projections.

Operculum striate, with a ridge, ending in a spine, on its upper part.

Occipital and lateral ridges of upper surface of head prominent, spinulose or denticulated above, but without spines; lateral ridges each formed of three shorter ridges; no pit on occiput.

Gill-membranes continuous below, without isthmus; branchiostegals five, large.

Pectoral very long, boldly rounded on its posterior and lower margins, broad; the upper rays slightly increasing to about the sixth, the five lowest decreasing rapidly. Tips of the longest rays reaching nearly to or beyond the sixth dorsal ray, or to the back of the thirteenth or fourteenth dorsal scute. Longest rays about equal in length to the head. Rays simple, base slightly oblique.

Ventrals inserted on the plane of the upper pectoral axil, longer than the pectorals, their greatest length about 4 times in the total length, and consisting of a spine and two rays, the spine attached to the first ray, which is of considerable length, but shorter than the second, the tip of which extends beyond the second anal ray. Membrane between the two rays broad; the second ray fringed with a membrane along its internal margin.

First dorsal commencing at about the eighth dorsal scute and terminating at the sixteenth. First spine shorter than the second, the next five about equal in length, the remainder diminishing rapidly. Height of the longest spines somewhat exceeeding the depth of the body below the fin.

Second dorsal about equal in height and similar in form to the first, arising at about the nineteenth dorsal scute, and terminating at or near the twenty-seventh. First ray shorter than the second, the next four nearly equal, the remainder falling rapidly.

Anal commencing directly below the last ray of the first dorsal, and coterminous with the second dorsal, its lower margin nearly straight, and its depth rather less than the height of the second dorsals.

The last rays of the dorsals and anal are joined to the body by membrane.

Posterior margin of caudal convex; accessory rays few.

Dorsal scutes 35–36, the two series approaching and uniting a little behind the second dorsal; about seven scutes between the point of junction and the caudal.

Each scute produced posteriorly into a large spine bent backwards, and frequently denticulated upon its anterior or outer edge. Behind the point of junction of the two dorsal rows the spines are in closely coupled pairs.

Lateral series of scutes each consisting of 34–36 plates, each armed with a spine similar to those above described.

Ventral series containing 29–31 plates, the last three or four single, the remainder forming a double series similar to the dorsal series, but with less conspicuous spines.

The ventral series commences at the axils of the ventral fins, and the lower surface between these fins and the gill-openings is occupied by several large, separate, subcircular, strongly striated scales or plates, those running along the margin of the gill-openings placed closer together, and forming a series of about seven.

About seven pairs of subcircular scales, not striated, or only slightly striated, are scattered along the acutely triangular space behind the ventrals, between the two ventral series of scutes, which do not fairly meet each other anterior to the anal fin. An elongate naked area behind the pectorals, separating the lower lateral from the ventral series.

Some small scales in the space between the mandibles, and a series of small, elevated, and sharp-pointed scales along the curve of the pectoral base.

Vent not far behind the base of the ventrals.

The center of the interocular space, the area between the occipital ridges, some spaces on the lateral aspect of the head between the more prominent parts of the bones, and the areas between the large scales in front of the ventral are set with numerous prickles, a few of which also occur in the intermandibular area.

Similar prickles are numerous on the anterior portion of the trunk, occupying the spaces between the parallel dorsal and upper lateral series of scutes; those of the upper surface end at the first dorsal, those of the upper lateral surfaces at the posterior extremity of the same fin. Behind these points the scuta of these surfaces closely interlock.

Lateral line continuous; a pore between each pair of scutes; pores simple.

Color.—After exposure to alcohol, the upper and lateral surfaces of the body are banded alternately with dull yellowish and olivaceous brown; pectorals whitish on their basal portion, a dark spot on the upper and another on the lower edge excepted, and dark on their terminal part, the margin of the dark color running obliquely from the center of the first to the tip of the eleventh ray.

Ventrals with a large black spot on the membrane inside the first ray, and two small spots near the tip of the membrane. Abdomen yellowish white.

When somewhat fresher, the dirty yellowish tint of the ventrals was bright orange yellow, and the black of that fin was more positive, so that it is probable that in life the colors of the whole body were much brighter than they are now.

The total length of the specimens examined, from tip of lower jaw (mouth closed) to tip of caudal, varied from 5.68 inches to 6.65 inches.

Actual measurements of the parts are not given, as the proportions vary but little.

Several examples were collected November 26, 1879, at a depth of ten fathoms, in Drake's Bay, 35 miles north of San Francisco, by Mr. Voy, who has presented them to the State University, Berkeley, Cal.

One of the types is in the United States National Museum, numbered ——.

This species is referred to the genus *Brachyopsis*, proposed by Dr. Gill for the reception of *Agonus rostratus*.

This genus is distinguished from *Agonus* by the projecting lower jaw and consequent comparatively large terminal mouth, and by the absence of an isthmus.

DESCRIPTION OF A NEW GENUS AND SOME NEW SPECIES OF CALIFORNIA FISHES (ICOSTEUS ÆNIGMATICUS AND OSMERUS ATTENUATUS).

By W. N. LOCKINGTON.

Fam. BLENNIDÆ(?).

ICOSTEUS.

Body much compressed. Teeth in a single row in both jaws, close-set, sharp. No teeth on vomer, palatines, or pharyngeals. Gill-openings continuous under the throat, composed of flexible rays, the anterior simple.

A single long dorsal fin; anal similar. Base of pectorals fleshy. Ventrals thoracic in position. Lateral line with groups of spines. Pseudo branchiæ.

Body scaleless throughout; fins beset with spinules along the rays.

Etymology: εἰκω, to yield; ὀστεον, bone.

Icosteus ænigmaticus.

Body much compressed throughout; head thicker than any portion of the body. Dorsal outline rising rapidly to the origin of the dorsal; thence more slowly in a regular curve to about the center of the length of the body; thence curving gradually downward to the caudal peduncle. Abdominal outline regularly curved.

Upper and lower outlines of caudal peduncle concave, the peduncle widening posteriorly to support the fin-shaped caudal.

Greatest depth about 3½ times in total length; length of head about 5 times in total length; eye 6; snout more than 3; interorbital width about 2½ times in the length of the head; caudal peduncle about 5½ times in the greatest depth.

Nostrils simple, elongate-elliptical; eyes lateral, their diameter less than the length of the snout; mouth-opening rather large, horizontal, or nearly so; tip of the intermaxillary below the lower margin of the eye; margin of upper jaw formed of the intermaxillaries only; maxilla-

ries narrow throughout, not hidden beneath the preorbital; posterior extremity of the maxillary extending to a little beyond a vertical from the center of the eye.

Teeth in jaws in a single row, numerous, fine, sharp-pointed, closely and regularly set, those in the upper jaw smaller than those in the lower. No teeth on vomer or palatines. No pharyngeal teeth present.

Gill-rakers flexible, few, about half as long as the diameter of the eye on the first branchial arch, diminishing on each successive arch.

Gill-openings continuous under the throat; branchiostegals six.

Dorsal commencing at a vertical above the pectoral axil, and consisting of 52–55 rays, all soft and flexible, but some of the anterior ones unbranched. Anterior portion of dorsal low, the rays gradually increasing in height posteriorly, the base of the fin terminating opposite to that of the anal, at about 1½ times the least width of the caudal peduncle from the origin of the caudal fin; but the longest rays (last but two or three) extending backwards almost to the origin of the central caudal rays. None of the dorsal rays bifurcate more than once.

Anal commencing opposite the 24th–27th dorsal ray; similar to and about equal in depth to the height of the posterior portion of the dorsal, consisting of 37–40 rays, most of them once bifurcate; its base terminating opposite to that of the dorsal, and its longest posterior rays extending backwards even with those of the latter; three last anal rays diminishing rapidly in length.

Some of the anterior anal rays appear to be unbranched.

Caudal elongate, fan-shaped, the central rays longest, and the posterior margin greatly rounded. Posterior part of caudal peduncle expanded, and forming the larger half of an ellipse, around which the rays are set; the central ones straight, the outer ones curving outward and backward. Accessory rays numerous; principal rays twice bifurcate.

Pectorals with a fleshy base, having a curved posterior border from which the rays radiate, forming a fan-shaped fin; the central rays longest, the others diminishing regularly on both sides. All the rays straight; the seven or eight central ones twice, the others once, bifurcate.

Ventrals inserted a little behind the base of the pectorals, narrow, consisting of a short (spinous?) and four long rays.

Lateral line conspicuous, curving downwards above the pectoral until, a little posterior to the origin of the anal, it reaches the median line of the trunk, along which it continues till it dies out upon the fleshy base of the caudal.

Groups of small spines along the entire length of the lateral line, the number of spines in each group variable. About 120 groups of spines in the smaller example. No scales upon any portion of the body or fins, but the latter rendered rough by asperities or small spinules; a single series along the base of each ray, and a series along each of its branches.

Color.—Purple spots and blotches of irregular shape upon a yellowish-brown ground; the spots largest upon the dorsal region, and becoming

smaller and more numerous near the lateral line. The region above and behind the pectorals beset with numerous purple spots, smaller than those above the lateral line. Beneath the lateral line, on the posterior part of the body, there are no spots, except along the line of the anal; but probably this is the result of exposure to alcohol, which has caused the disappearance of most of the spots from the smaller specimen, the color of which, when fresher, was like that of the larger.

Throat and greater portion of gill-membranes without blotches, but sown with dark points, which occur also over the whole of the body and the interior of the mouth. Fleshy bases of caudal and pectorals with several purple blotches. Fins darker than the body, and showing traces of blotches of a deeper tint, especially upon the caudal.

Vertebræ numerous; vertebral column highly flexible and soft.

Cranial bones tolerably firm, those of the face and opercles, &c., highly flexible.

Entire body characterized by a lack of firmness, as it can be doubled up as readily as a piece of soft, thick rag. Swim-bladder large.

I append measurements of the two specimens, but many of these must be regarded as approximate only, in consequence of the distortion arising from the softness of texture of the fish, together with that consequent upon cutting them open shortly after they were first procured.

In the larger specimen the ventrals are partly destroyed, and the tips of many of the dorsal and anal rays are wanting.

The shape of the head in the two examples is very different, doubtless owing to the flexibility of the bones. In the larger the snout is bluff, almost perpendicular, the dorsal outline rises rapidly to the origin of the dorsal, and the tip of the premaxillaries is far below the eye; while in the smaller the dorsal outline slopes regularly from the tip of the snout, which is almost level with the lower margin of the eye, to the origin of the dorsal.

Dimensions.

	No. 1.	No. 2.
Total length, to tip of caudal	10⅛	11½
Greatest depth (approximate)	2⅞	3⅜
Depth of peduncle of tail where narrowest	⅜	⅝
Length of head	2⅛	2¼
Diameter of eye	⅜	⅝
Interorbital width	1⅛	1⅜
Length of upper jaw	1⅝	1⅞
Length of snout	¾	⅞
Tip of snout to origin of dorsal	2⅜	3⅜
Length of base of snout	5⅛	6¼
Length of longest posterior dorsal rays	1⅛	1⅜
Interval between dorsal and caudal	¾	⅞
Tip of mandible to anal fin	5	5½
Length of anal base	3⅛	3⅝
Origin of dorsal to upper axil of pectoral	1⅝	2
Upper axil of pectoral to tip of snout	2⅜	2¾
Length of pectorals	1¾	1⅞
Length of ventrals	⅝	¾
Number of dorsal rays	55	52 or 53
Number of anal rays	40	37
Number of groups of spines in lateral line	Circa 110	Circa 120

These two individuals, together with a third of smaller size, and certainly of another species, were procured in the market of San Francisco by W. G. W. Harford, in 1876. The fishmonger called them "deep-sea fish," and said that he had never seen the kind before. No others have appeared in the market since. A smaller example is in the museum of the State University, Berkeley, and was procured in Washington Territory.

The relations of this fish are probably with the Blennioid fishes. It can, however, hardly be referred to any of the current families, and should perhaps form the type of a separate one.

Osmerus attenuatus.

Osmerus elongatus Lockington, Rep. Commissioners Fisheries State of Cal., 1879, p. 43; not *Osmerus elongatus* Ayers, Proc. Cal. Acad., Vol. I, p. 17.

D. 1–10. A. 17. P. 14. V. 1–8.

Form elongate, fusiform, dorsal outline rising gently to a point just behind the origin of the pectoral, thence almost straight to dorsal, thence tapering regularly to the caudal peduncle. Abdominal outline straight from the posterior extremity of the maxillary to the ventrals, thence inclining upwards slowly to the caudal peduncle.

Greatest depth $7\frac{2}{3}$–$8\frac{3}{4}$ times; head $4\frac{1}{3}$ to nearly 5 times in the total length; eye about 4 times in the length of the head; snout about the same length as the eye; caudal peduncle $2\frac{2}{5}$–$2\frac{3}{4}$ times in the greatest depth.

Viewed from above, the forehead and snout diminish in width anteriorly.

Nostrils conspicuous, divided by a thin partition, simple, situated on a line from the top of the pupil to the tip of the snout, and about halfway between the latter and the anterior margin of the orbit.

Eyes large, subcircular, entirely in the anterior half of the head; upper orbital margins raised, but the interorbital space between these margins flat transversely.

Mouth large, the commissure straight and ascending anteriorly at an angle of about 30°, the tip of the upper jaw horizontal with the center of the pupil, and the posterior extremity of the maxillary on a vertical line from the posterior margin of the pupil; mandible straight on its lower border, its tip projecting beyond that of the upper jaw.

Dentition tolerably strong, on jaws and palatines. Teeth of upper jaw in a single row, numerous, small, slender, those in front inclined forward, a large tooth at the symphysis.

Lower jaw with a double row of slightly recurved teeth in front, the outer extending only about one-fifth of the length of the sides of the mandible, the inner row extending along the sides, and consisting of larger teeth than the outer or than those of the upper jaw; the largest situated along the sides, and much wider apart than those of the upper jaw.

Inner palatine row of numerous small teeth; outer palatine series

very variable in its development, but usually consisting of few rather large teeth, increasing in size forwards, the anterior tooth sometimes quite a large canine. Teeth in front part of tongue in a single series on each side, with a single terminal tooth; all the teeth large and curved, the terminal tooth largest. A large patch of several rows of villiform teeth on the base of the tongue, marked off by a constriction from the terminal patch.

Gill-rakers long and slender, those of first pair of branchial arches half as long as the eye, the others diminishing gradually. Branchiostegals seven.

Angle of preoperculum a little more than a right angle, both the posterior and the inferior margins nearly straight. Posterior margin of gill-cover forming a bold and almost regular curve, its most posteriorly produced portion occupied by the suboperculum.

Pectoral of fourteen rays, the third or fourth longest, narrow, the rays bifurcate. Tips of the pectorals distant from the ventrals more than the length of the ventrals.

Ventrals not greatly shorter than the pectorals; the rays bifurcate, their tips not reaching to the anus; insertion of ventrals about one scale in advance of that of dorsal.

Dorsal of one spine and ten bifurcate rays, highest in front, the height about twice the length of the base; the second ray slightly longer than the first, the last longer than the spine. Anal commencing at about the posterior third of the total length, and consisting of seventeen branched rays, the first very short, the second nearly equal to the third and longest, the fourth nearly equal to the third, thence descending gradually.

Caudal deeply emarginate, almost forked; rays 11–10–9–$\frac{8}{10}$, principal rays several lines branched.

Lateral line not very distinct, running along the center of the silvery band of each side. Scales rather large, their exposed portion forming a diamond-shaped pattern, each diamond about twice as deep as long. Head scaleless.

No scales upon the fins.

Adipose fin falcate, rather large.

Color of the fresh fish.—Light greenish gray on the back, the pattern of the scales marked by a series of black dots around the edge of each; these die out upon the silvery lateral line. A very bright silvery line along the side, reaching one scale above lateral line; the upper boundary of this band distinct, the lower fading into the silvery-white of the belly. Operculum and suboperculum bright like the lateral band, except above, where they become greenish gray like the back; snout and cheeks darker greenish gray than the back. Lower jaw with black points below and on the sides, closer together toward the tip. Fins spotted with dark points. Forehead between eyes almost black; eyes silvery; pupil black.

Locality, San Francisco.

The whole fish is highly transparent when fresh, the outline of the brain being clearly visible through the occiput.

From *Osmerus thaleichthys*, which at first sight nearly resembles it, this species may be distinguished by the following characters: The slightly greater length and more tapering form of the snout, when viewed from above; the straight lower jaw, which in *O. thaleichthys* is considerably curved upwards toward the tip; the gradual declivity of the upper outline of the head, which in the latter species is straight with the line of the back; the larger eyes; the different arrangement of the teeth; the more elongated body, much less curvate along the abdominal outline; and the much greater distance between the tips of the pectorals and the base of the ventrals.

Dimensions.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*	*Inches.*
Total length	4.12	4.50	5.25	5.72	5.06	6.00
Greatest depth of body	.55	.58	.60	.72	.62	.75
Length of head, to tip of lower jaw	.96	1.00	1.13	1.25	1.12	1.22
Longitudinal diameter of eye	.23	.23	.30	.29	.25	.30
Interorbital width	.19	.20	.23	.31	.26	.245
Length of snout, to tip of upper jaw	.23	.25	.28	.30	.28	.31
Length without caudal	3.47	3.84	4.42	4.87	4.30	5.09
Tip of lower jaw, to adipose fin	2.97	3.00	3.62	4.14	3.60	4.31
Tip of lower jaw, to ventrals	1.97	2.10	2.56	2.68	2.35	2.78
Length of pectoral	.50	.58	.63	.72	.65	.81
Height of dorsal	.....	.56	.64	.75	.62	.69
Length of ventral	.45	.45	.56	.64	.53	.69
Tip of lower jaw to origin of dorsal	2.00	2.15	2.56	2.75	2.40	2.94
Length of lower jaw	.56	.60	.68	.70	.60	.....
Width of caudal peduncle	.20	.20	.24	.30	.26	.31

Nos. 1, 2, and 3 are alcoholic specimens; the others were measured while fresh.

The comparatively elongate form of this fish induced me to believe that this species must be *O. elongatus* Ayres (Proc. Cal. Acad. Sci., I, 17, 1854), but as the latter ichthyologist transmitted examples of his species to Washington, and these examples were examined by Girard, and found by him to be identical with his *Osmerus pretiosus* (= *Argentina prctiosa* Grd. = *Hypomesus olidtus* (Pallas) Gill), there is no doubt that the foregoing is an undescribed species.

There are thus four species of *Microstomatidæ* on the Pacific coast, United States, viz, *Thaleichthys pacificus*, *Hypomesus olictus*, *Osmerus thaleichthys*, and *O. attenuatus*. The first of these does not occur in the markets of San Francisco, but is sent down packed in salt from the Columbia River, also to some extent in oil, under the name of "Columbia River sardines." The other three are brought into the markets in a fresh state. *Hypomesus olictus* grows to the largest size, and is most highly esteemed of the three. *Osmerus attenuatus* is tolerably abundant in the markets during the spring and summer months.

DESCRIPTION OF A NEW HAKE (PHYCIS EARLLII), FROM SOUTH CAROLINA, AND A NOTE ON THE OCCURRENCE OF PHYCIS REGIUS IN NORTH CAROLINA.

By TARLETON H. BEAN.

1. Phycis earllii Bean.

The United States National Museum has just received from Mr. R. E. Earll three specimens of a species of *Phycis* which differ from all the other recognized eastern American species. It is quite unlike *P. tenuis*, *P. chuss*, and *P. chesteri*, since none of the rays of the first dorsal are produced. In the shape of the anterior dorsal and the general form of the body it resembles *P. regius*, from which, however, it may be at once distinguished by its much smaller scales. From *P. DeKayi* Kaup it is well separated by the structure of its anterior dorsal, and by having the ventrals shorter than the head. The species differs also from *P. rostratus* Gthr. in having a much greater number of scales between the anterior dorsal and the lateral line.

Mr. Earll secured these fish in the market of Charleston. They were numbered 131 in his collecting invoice, and are catalogued as numbers 25207, 25208, and 25209 of the Museum Register. The species is dedicated to its discoverer, who first collected it and called attention to its specific distinctness from the four known east coast forms.

DESCRIPTION.—The species is short and stout, resembling in this respect *P. regius*. The greatest height of the body equals twice the length of the longest ray of the anterior dorsal, and is contained 5 times in the total length, caudal included. The length of the head is contained $3\frac{2}{3}$ times in the length of the body, measured to the origin of the middle caudal rays. The length of the snout equals the distance between the eyes. The length of the upper jaw equals half that of the head. The length of the eye is contained nearly twice in length of snout, $6\frac{1}{2}$ times in length of head, and nearly 4 times in the length of the postorbital part of the head. The lower jaw is as long as the upper, but is received within it. The maxilla extends somewhat behind the vertical through the posterior margin of the eye. The barbel is $\frac{1}{3}$ as long as the upper jaw, or nearly so. Both jaws and the head of the vomer are armed with teeth in villiform bands, as in other species of the genus.

The pectorals are as long as the postorbital part of the head.

The ventrals extend nearly to the vent, and their length is contained 4 times in the distance from the tip of the snout to the end of the second dorsal.

The distance of the anal from the tip of the snout nearly equals the length of the anal base.

The origin of the anterior dorsal is directly over the axil of the pectoral; the dorsals are subcontinuous; none of the rays of the anterior

dorsal are produced, and none of them are longer than the longest rays of the second dorsal. The longest anal ray is not much more than half as long as the longest dorsal ray, and equals half the length of the pectorals. The length of the anterior dorsal base is about equal to that of the snout; the second dorsal base is about 2½ times as long as the ventral fin.

The length of the middle caudal rays is contained 8 times in the total length without caudal.

The typical specimens are 13 inches, 13½ inches, and 14 inches long, respectively.

Radial formula.—B. VII; D. 10, 60–63; A. 53–54; P. 15.

There are 21 or 22 rows of scales between the anterior dorsal and the lateral line, and about 155 along the lateral line.

Color.—Brown, with some light spots on the second dorsal and the sides; the anal fin and the two dorsals margined with darker brown.

2. Phycis regius (Walb.) Jor. & Gilb.

Col. Marshall McDonald, among numerous interesting forms of southern fishes, has recently secured 6 specimens of this species of *Phycis*, which were taken in a haul seine, March 26, 1880, at the mouth of the Cape Fear River, in North Carolina. These are numbered 90 in his collecting invoice. *Phycis regius* has not been recorded so far south before; specimens have been taken in York River, a tributary of Chesapeake Bay. The discovery of two gadoids as far south as the Cape Fear and Charleston is quite unexpected.

U. S. NATIONAL MUSEUM,
Washington, April 9, 1880.

DESCRIPTION OF A NEW SPECIES OF SEBASTICHTHYS (SEBASTICHTHYS MINIATUS), FROM MONTEREY BAY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sebastichthys miniatus sp. nov.

Allied to *Sebastichthys pinniger* Gill.

Body oblong, the form much as in *S. pinniger* and *S. atrovirens;* the caudal peduncle rather stouter than in *pinniger*. Head moderate, somewhat pointed, the profile not very steep. Mouth rather large, the maxillary reaching to opposite the middle of the pupil, the premaxillary in front on the level of the lower edge of the pupil. Lower jaw projecting somewhat beyond the upper, with a rather conspicuous symphyseal knob, which is larger than in *pinniger*. Middle of lower jaw elevated, so that the mesian teeth are much raised, and fit into an emargination

of the upper jaw. This elevation is much more marked in the present species than in *pinniger*.

Head more completely scaly than in related species, the scales also rougher, the scales on the mandible, snout, preorbital, and head generally being fully ctenoid. In *S. pinniger* the scales on nearly all parts of the head are cycloid. Mandible scaled even to the symphyseal knob. Interopercle fully scaled; most of the branchiostegals with series of scales. Maxillary, preorbital, and tip of snout fully scaled. Preorbital with a narrow neck, and two distinct spines, the neck less than one-fourth the diameter of the eye, which is of moderate size, about as in *pinniger*.

Spinous ridges on top of head low and small. The following pairs of spines are present: Nasal, preocular, supraocular, postocular, tympanic, and occipital, six pairs in all.

Interorbital space very broad and almost flat, a slight depression on each side of the supraocular ridge, between which depressions is a slight convexity.

In *S. pinniger* the interocular space is notably narrower, and both depressions and concavity are more marked. Space between occipital ridges slightly convex. In *S. pinniger* this is slightly concave.

Preopercular spines rather long and sharp, the second the longest and sharpest, the spines radiating and having less of a backward direction than in *S. pinniger*.

Opercular spines sharp. Spines on subopercle and interopercle moderate. Two suprascapular spines and a rudiment of a third.

Scales large, in about 47 transverse rows; the accessory scales few.

Dorsal fin low, rather deeply emarginate, essentially as in *S. pinniger*, but both spines and soft rays somewhat higher, the latter a little higher than the spines. Caudal fin lunate. Anal fin rather high, the second spine about as long as the third and rather stouter, little more than half the height of the soft rays. Pectoral fin moderate, as in *pinniger*, the tip reaching about to the vent, the base rather narrow, and the rays not fleshy. Ventrals, as in *pinniger*, very long, reaching past the vent almost to the beginning of the anal.

Dorsal rays XIII, 14; A. III, 7.

Gill-rakers, as in *pinniger*, very long and slender, about 10 + 22 in number, the longest about $\frac{2}{3}$ the diameter of the eye.

Color darker than in *pinniger*, deep red, strictly speckled with dusky. Above bright deep vermilion, mottled with flesh-color on the sides, the belly light red. Back and sides everywhere with clusters of black dots, so that the whole body has a dusky shade. Top of head and back with vaguely defined cross-blotches made of dark points on snout, interorbital space, occiput, under fourth dorsal spine, under eighth dorsal spine, one under first soft ray, last soft ray, and base of caudal. Three obscure orange stripes radiating from the eye. Maxillary with a red streak.

Lips red, mottled with blackish. Under side of head light red, mottled with darker. Inside of mouth red.

Fins all bright vermilion; spinous dorsal spotted with olive-gray below, the membrane posteriorly edged with blackish; soft dorsal spotted below with blackish, a vertical dark olive streak on each membrane; other fins tipped with blackish, the membranes more or less dotted. No *black* blotch on the spinous dorsal; no distinct pale streak along the lateral line.

The coloration of *Sebastichthys pinniger*, which has thus far never been described, is as follows:

Ground color light olive-gray, profusely blotched with bright clear orange-red, the red shades predominating above, the pale below. Belly nearly white. Top of head with cross-blotches and marblings of orange, alternating with pale. Sides of the head flesh-colored, with three bright orange bands radiating from the eye; maxillary with orange touches. Lips pale, tinged with blackish. Inside of mouth pale.

Dorsal fin with the membranes bright orange, a *large black blotch* occupying the membranes between the seventh and tenth dorsal spines; this spot is usually distinct, but in old examples it is sometimes obsolete. Pectorals light red, mottled with yellowish. Other fins all bright orange, without dusky tips, slightly mottled with paler at base. Lateral line running in a distinct continuous light-gray streak, which is not crossed by the red markings.

S. miniatus was first known to us from two specimens taken at Santa Barbara. These were provisionally considered as representing a variety of *pinniger*, but after the examination of an extensive series of specimens from Monterey Bay we were forced to the conclusion that the deep-red forms, although nearly allied to *S. pinniger*, belong to a distinct species. The difference in color is very marked and the two species may be separated at sight. In life any of the numerous species of this genus may be at once recognized by the color alone, a feature which, circumstances of age and surroundings being equal, is in this group remarkably constant.

This species reaches the same size as *S. pinniger*, and is brought with it to the San Francisco market, but in much less abundance.

In the description already published by us of *Sebastichthys proriger* the specimen measured as "*S. pinniger*" belongs to the present species.

Measurements.

	Miniatus. (Monterey.)	*Pinniger.* (Monterey.)
Extreme length, in inches	11.00	16.80
Length to base of caudal = 100	9.10	13.50
Body:		
Greatest depth	35.	37.5
Least depth of tail	12.3	11.8
Head:		
Length	36.	37.5
Length of snout	.085	.09
Diameter of eye	.095	.095
Width of interorbital area	.08	.085
Occipital spine	.07	.07
Supraocular spine	.025	.04
Least width of preorbital	.017	.023
Maxillary	17.5	17.
Longest gill-raker	.05	.063
Dorsal:		
Highest (fifth) spine	15.5	16.5
Longest soft ray	17.3	18.
Anal:		
Length of base	15.5	
Second spine	13.5	11.
Third spine	14.8	11.5
Longest ray	21.	21.5
Caudal, middle ray	17.	15.
Pectoral:		
Width of base	9.5	
Length	28.5	29.
Ventral, length	27.	26.
Dorsal rays	XIII, 14	XIII, 14
Anal rays	III, 7	III, 7
Scales in lateral line	42	48

DESCRIPTION OF A NEW SPECIES OF "ROCK-FISH" (SEBASTICHTHYS CARNATUS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sebastichthys carnatus sp. nov.

Allied to *Sebastichthys nebulosus* Ayres.

Body rather short and deep, tapering rapidly to a rather slender caudal peduncle. Head short, bluntish, the profile straight and steep. Mouth low and rather short, the maxillary extending to rather behind the posterior edge of the eye, which is rather small and elevated. Premaxillary entirely below the level of the eye, which is rather small and elevated. Mouth nearly horizontal, the jaws about equal, the lower jaw slightly shortest in the closed mouth. No prominent symphyseal knob.

Scales on the head rather rougher than in *S. nebulosus;* the lower jaw, maxillary, space in front of eye, and nasal region naked, as in *nebulosus.*

Top of head with the spinous ridges well developed, but somewhat lower than in *S. nebulosus;* otherwise very similar. The following pairs are present: Nasal, preocular, supraocular, tympanic, and occipital, five in all. The occipital spines especially are lower and narrower than in *nebulosus.*

Preopercular spines small and bluntish, the uppermost rather broader than the second, which is the longest. Opercular and suprascapular spines two each, rather short and broad. A slight spine on interopercle and subopercle.

Gill-rakers, as in *nebulosus*. short, compressed, somewhat clavate, the middle ones longer and somewhat crooked.

Spinous dorsal always higher than in *nebulosus*, the highest spines rather higher than the soft rays, the membranes more deeply incised than in *nebulosus*, but less than in *maliger*. Caudal fin truncate. Anal fin moderately high, the second spine stronger and slightly longer than the third, about two-thirds the height of the soft rays. Pectoral fins rather short, about reaching to the vent, their bases very broad, as in related species, and the lower rays thickened and fleshy. Ventrals reaching vent.

Scales in 53 transverse rows; the accessory scales rather numerous.

Dorsal, XIII, 12; anal III, 7; pylorie cœca 8; vertebræ 12 + 15.

Pattern of coloration almost exactly identical with that of *S. nebulosus*, but the shade of color very different.

In *S. carnatus* the light ground color is clear flesh color or pinkish, often tinged with grayish purple; the light shades on the head purplish. The dark shades are yellowish-brown, usually tinged with greenish.

In *S. nebulosus* the light ground color is more restricted, and its hue is usually a clear warm brownish-yellow with orange mottlings, varying to dusky orange-brown, below often tinged with olive. The dark shades are olive-black, varying to olive-brown. The *light* shades of *S. nebulosus* are often nearly identical with the *dark* shades of *S. carnatus*.

In both species the pattern is a light ground color, with dark blotches, the dark color predominating above. Membrane between third and fourth spines always pale, this color forming a blotch at the base of these spines, and then extending obliquely downwards and backwards, joining the ventral color. In front of this light area on the sides is a narrow oblique dark one, in front of which in turn is a light one, which begins at the angle of the opercle and divides, passing around the pectorals and uniting below them.

A light blotch under the eighth dorsal spine extending up on the fin; also another at the junction of the two dorsals, and still another under the last ray. Under each of these blotches irregular undulating light areas extend down the sides, either continuous or as detached blotches. The pale dorsal blotches correspond in position to the pink dorsal spots of *rosaceus*, *constellatus*, *oculatus*, and *chlorostictus*, and to pale areas found in *fasciolaris*, *vexillaris*, *maliger*, and other species.

Head above with cross-shades and bands radiating from the eye. Fins with the general pattern of color of neighboring parts of the body.

This species is very closely related to *S. nebulosus*, and from it cannot always be readily distinguished except by the color. Like *S. nebulosus*, it is one of the smaller species, seldom reaching a length of much over a foot. It is very abundant in the Bay of Monterey, forming a large proportion of the "rock-fish" shipped from Monterey to the San Francisco market. *S. nebulosus* occurs in the same waters, and the examination of great numbers of examples of both sexes and all ages has

convinced us that, although closely related, the two forms are permanently distinct. Whether hereafter to be regarded as a species or as a "subspecies," the form is a peculiar one, and as such worthy of a name.

Measurements.

	Carnatus. (Monterey.)	*Nebulosus.* (Monterey.)
Extreme length, in inches	10.50	11.50
Length to base caudal = 100	8.90	9.85
Body:		
Greatest depth	38.	36.5
Least depth	11.5	11.5
Head:		
Length	36.	36.
Diameter of eye	8.5	9.
Length of snout	9.5	10.
Length of preocular ridge	3.5	3.5
Length of supraocular ridge	5.	5.
Length of occipital ridge	6.	6.
Least width of preorbital	2.5	3.
Width of interorbital space	.....	6.3
Length of maxillary	18.	18.
Length of longest gill-raker	2.8	2.
Dorsal:		
Length of base	57.	63.
Height of fifth spine	20.	16.
Height of membrane between fourth and fifth spines	11.	11.2
Height of longest soft ray	15.8	15.5
Anal:		
Length of base	14.	13.7
Height of second spine	16.5	13.
Height of third spine	14.5	13.1
Height of longest ray	20.	17.5
Caudal, length of middle rays	20.5	16.3
Pectoral:		
Length	25.	26.8
Width of base	11.	10.5
Ventral, length	24.	21.
Dorsal rays	XIII, 13	XIII, 14
Anal rays	III, 7	III, 7
Number of transverse rows of scales	43	45

APRIL 2, 1880.

CHECK-LIST OF DUPLICATES OF NORTH AMERICAN FISHES DISTRIBUTED BY THE SMITHSONIAN INSTITUTION IN BEHALF OF THE UNITED STATES NATIONAL MUSEUM, 1877–1880.

Prepared by TARLETON H. BEAN.

LOPHIIDÆ.

1. Lophius piscatorius Linn.

Lophius americanus Storer, Hist. Fish. Mass., 1867, p. 101, pl. xviii, fig. 2.

22311. Gloucester, Massachusetts.

ANTENNARIIDÆ.

2. Pterophryne histrio Linn.

Pterophryne lævigata (Cuv.) Gill, Cat. Fish. E. Coast N. A., 1873, p. 14.

20662. Wood's Holl, Massachusetts (3).

DIODONTIDÆ.

3. Diodon hystrix Linn.

23779. Bermuda.

4. Chilomycterus geometricus (Linn.) Kaup.

9448. East coast of United States.
14752. Noank, Connecticut.
19460. Eastern shore of Virginia.
19674. Beaufort, North Carolina.
19719. Fort Macon, North Carolina.
19767. Eastern shore of Virginia.
20074. Coast of New England.
21634. Newport, Rhode Island.
22911. Eastern coast of United States.
22912. " "

TETRODONTIDÆ.

5. Tetrodon turgidus Mitch.

Chilichthys turgidus Gill, Cat. Fish. E. Coast N. A., 1873, p. 15.

10740. Wood's Holl, Massachusetts.
14037. Noank, Connecticut.
14746. " "
14747. " "
14748. " "
14749. " "
14750. " "
14828. " "
14972. Eastern coast of United States.
17596. Noank, Connecticut.
17597. " "
17598. " "
17599. " "
17600. " "
17601. Noank, Connecticut.
17602. " "
17603. " "
17604. " "
17605. " "
17606. " "
17607. " "
19461. Eastern shore of Virginia.
19765. " "
19829. Wood's Holl, Massachusetts.
20250. Eastern coast of United States.
21444. Cohasset Narrows, Massachusetts.
22718. Eastern coast of United States.
23147. " "

BALISTIDÆ.

6. Alutera Schoepfii (Walb.) Goode & Bean.

Alutera cuspicauda Gill, Cat. Fish. E. Coast N. A., 1873, p. 15.
Ceratacanthus aurantiacus Gill, op. cit., p. 15.

14745. Wood's Holl, Massachusetts.
16601. Menemsha Bight, Massachusetts.
16314. Wood's Holl, Massachusetts.
16567. " "
18715. " "
18716. " "
18717. " "
18718. " "
18719. " "
18734. " "
18735. " "
18736. " "
18737. " "
18738. " "
18739. " "
18740, " "
18741. " "
18742. " "
18743. " "
18744. " "
18745. Wood's Holl, Massachusetts.
18746. " "
18747. " "
18748. " "
18749. " "
18750. " "
18751. " "
18752. " "
18753. " "
18863. " "
19251. " "
19280. " "
19282. " "
19718. Fort Macon, North Carolina.
20691. Newport, Rhode Island.
21644. " "
21649. " "
22937. Eastern coast of United States.
22738. " "

7. Monacanthus setifer Bennett.

Stephanolepis setifer Gill, Cat. Fish. E. Coast N. A., 1873, p. 15.

18893. Wood's Holl, Massachusetts.
18894. " "
18895. " "
18896. " "
18897. " "
18898. " "
18899. " "
18900. " "
18901. " "
18902. " "
18903. " "
18904. " "
18905. " "
18906. " "
18907. " "
18908. Wood's Holl, Massachusetts.
18909. " "
18910. " "
18911. " "
18912. " "
18913. " "
18914. " "
18915. " "
18916. " "
18917. " "
18946. " "
21545. Charleston, South Carolina.
21631. Newport, Rhode Island.
23144. Wood's Holl, Massachusetts.

8. Balistes capriscus Linn.

21650. Newport, Rhode Island.
22739. Eastern coast of United States.

9. Balistes vetula Linn.

22731. Eastern coast of United States.

SYNGNATHIDÆ.

10. Syngnathus fuscus Storer.

18919. Wood's Holl, Massachusetts.
18920. " "
18921. " "
18922. " "
18923. " "
18924. " "
18925. " "
18926. " "
18927. " "
18928. " "
18929. " "
18930. " "
18931. " "
18932. Wood's Holl, Massachusetts.
18933. " "
18934. " "
18935. " "
18936. " "
18937. " "
18938. " "
18939. " "
18940. " "
18941. " "
18942. " "
18943. " "

GASTEROSTEIDÆ.

11. Gasterosteus aculeatus L.

13397. Wood's Holl, Massachusetts.
19831. " "
21455. " "
23162. Wood's Holl, Massachusetts.
24433. Wilmington, Delaware.

12. Gasterosteus pungitius L.

23161. Wood's Holl, Massachusetts.
24460. Wood's Holl, Massachusetts.

13. Gasterosteus pungitius L. sub. sp. *brachypoda* Bean.

21767. American Harbor, Cumberland Gulf.
21769. " "
21770. American Harbor, Cumberland Gulf.
21772. " "

14. Apeltes quadracus (Mitch.) Brevoort.

13404. Wood's Holl, Massachusetts.
13413. " "
13418. " "
14002. Noank, Connecticut.
16110. Wood's Holl, Massachusetts.
17753. " "
19832. " "
23160. " "

SOLEIDÆ.

15. Solea vulgaris Quensel.

22734. England.

16. Achirus lineatus (Linn.) Cuv.

7280. Washington, District of Columbia.
10365. Potomac River.
12984. New Bedford, Massachusetts.
15091. Tompkinsville, New York.
15350. Eastern coast of United States.
15628. New York Market.
19759. Eastern coast of the United States.
19876. Potomac River.
19877. Potomac River.
19878. "
19916. Eastern coast of the United States.
20199. Newport, Rhode Island.
20756. " "
22621. Potomac River.
23472. Chesapeake Bay.
24249. Providence, Rhode Island.

PLEURONECTIDÆ.

17. Pseudopleuronectes americanus (Walb.) Gill.

14691. Portland, Maine.
14692. " "
14693. " "
14694. " "
14695. " "
14696. " "
14697. " "
14699. " "
14700. " "
14701. " "
14702. " "
14704. Wood's Holl, Massachusetts.
14706. " "
14707. " "
14708. " "
14709. " "
14710. " "
14711. " "
14712. " "
14714. " "
14716. " "
14717. " "
14718. " "
14719. " "
14721. " "
14722. " "
14723. " "
14724. " "
14725. " "
14726. Wood's Holl, Massachusetts.
14727. " "
14728. " "
14729. " "
14730. " "
14731. " "
14732. " "
14733. " "
14734. " "
14735. " "
14738. " "
14739. " "
14740. " "
14741. " "
17231. " "
17232. " "
17233. " "
17234. " "
17235. " "
17236. " "
17237. " "
17238. " "
17239. " "
17240. " "
20868. New York Market.
20874. Washington Mk't, from Portland, Me.
20953. Bucksport, Maine.
22730. Eastern Coast of United States.
23179. Gloucester, Massachusetts.

18. Limanda ferruginea (Storer) Goode & Bean.

21020. Halifax, Nova Scotia.
21033. " "
21051. " "
21504. Salem, Massachusetts.
21902. Gloucester, Massachusetts.
22323. Gloucester, Massachusetts.
22691. Milk Island Trap, Gloucester, Mass.
24625. Halifax, Nova Scotia.
24626. Gulf of Maine.

19. Pleuronectes glaber (Storer) Gill.

14657. Portland, Maine.
14658. " "
14660. " "
14661. " "
14662. " "
14663. " "
14665. " "
14666. " "
14667. " "
14668. " "
14669. " "
14670. " "
14671. " "
14672. " "
14673. " "
14677. " "
14679. " "
14680. " "
14683. Portland, Maine.
14684. " "
14685. " "
17163. " "
17164. " "
17165. " "
17166. " "
17167. " "
17168. " "
17169. " "
17170. " "
17171. " "
17172. " "
17173. " "
20903. Washington Market.
20904. " "
20954. Bucksport, Maine.
22241. Washington Market, from Portland, Me.

20. Glyptocephalus cynoglossus (Linn.) Gill.

21000. Massachusetts Bay.
21001. Le Have Bank.
21005. Halifax, Nova Scotia.
21019. " "
21032. Mouth of Harbor, Halifax, N. S.
21047. Halifax, Nova Scotia.
21060. Le Have Bank.
21817. Gloucester, Massachusetts.
21821. " "
21908. " "
22694. Milk Island Trap, Gloucester, Mass.
23141. Massachusetts Bay.
24632. Chebucto Head, Nova Scotia.

21. Lophopsetta maculata (Mitch.) Gill.

14633. Wood's Holl, Massachusetts.
14634. " "
14636. " "
14638. Portland, Maine.
14639. Noank, Connecticut.
14640. " "
14641. " "
14642. " "
14643. " "
14644. " "
14647. " "
14648. " "
14649. " "
14652. " "
14653. " "
14654. " "
14655. " "
16002. Wood's Holl, Massachusetts.
17151. Eastport, Maine.
17152. Noank, Connecticut.
17153. " "
17154. Noank, Connecticut.
17155. " "
17156. " "
17157. " "
17158. " "
17159. " "
17160. Charleston, South Carolina.
17161. Noank, Connecticut.
17162. " "
19429. Wood's Holl, Massachusetts.
19753. Eastern coast of United States.
22313. Gloucester, Massachusetts.
22372. Wood's Holl, Massachusetts.
22693. Gloucester, Massachusetts.
22735. Eastern coast of United States.
22759. Wood's Holl, Massachusetts.
23763. Off Cape Cod, Massachusetts.
24221. Gloucester, Massachusetts.
24262. Vineyard Sound, Massachusetts.
24349. Provincetown, Massachusetts.

22. Citharichthys spilopterus Gthr.?

23529. Crisfield, Maryland.

23. Hippoglossoides platessoides (Fabr.) Gill.

21009. Halifax, Nova Scotia.
21021. " "
21023. " "
21037. " "
21045. " "
21046. Off Halifax, Nova Scotia.
21052. Halifax, Nova Scotia.
21064. " "
21065. " "
21785. Gloucester, Massachusetts.
21818. " "
22288. Lat. 42° 49′ N., Lon. 62° 55′ W.
22629. Gloucester, Massachusetts.
23142. Massachusetts Bay.
23920. Sable Island.
24602. Massachusetts Bay.
24606. Halifax, Nova Scotia.
24607. " "
24609. " "
24611. " "
24612. " "
24619. " "
24621. " "
24627. " "
24633. " "
24634. " "

24. Pseudorhombus dentatus (Linn.) Gthr.

Chænopsetta ocellaris (DeKay) Gill.
Chænopsetta dentata (Storer) Gill.

14628. Noank, Connecticut.
14629. " "
14630. " "
16029. Wood's Holl, Massachusetts.
16318. " "
17114. Charleston, South Carolina.
18442. Saint John's River, Florida.
18443. " "
18444. " "
18445. " "
18446. " "
18447. Saint John's River, Florida.
18531. Kinston, North Carolina.
18532. " "
19397. Wood's Holl, Massachusetts.
19398. " "
19501. Beaufort, North Carolina.
20982. Charleston, South Carolina.
21279. Saint John's River, Florida.
22717. Eastern coast of United States.
22908. " "
23528. Crisfield, Maryland.

25. Pseudorhombus oblongus (Mitch.) Gthr.

Chænopsetta oblonga (Mitch.) Gill.

10677. Wood's Holl, Massachusetts.
10678. " "
10679. " "
10682. " "
10683. " "
10716. " "
14624. Noank, Connecticut.
14625. " "
14626. " "
14627. " "
19299. Wood's Holl, Massachusetts.
24365. Provincetown, Massachusetts.

26. Hippoglossus vulgaris Flem.

23394. Jeffrey's Bank.
24242. Jeffrey's Bank.

MACRURIDÆ.

27. Macrurus Bairdii Goode & Bean.

23140. Grand Banks.
24313. Gloucester, Massachusetts.

28. Macrurus Fabricii Sundeval.

21615. Lat. 42° 46′ N., Lon. 63° 45′ W.
21783. Off coast of New England.
21806. Lat. 43° 53′ N., Lon. 59° 05′ W.
22280. Off coast of New England.
22646. " "
22747. Sable Island Bank.
22748. "
22872. Off coast of New England.
22873. " "
22875. " "
22876. " "
23054. Banquereau.
23055. Banquereau.
23057. Lat. 44° 20′ N., Lon. 57° 57′ W.
23058. " "
23059. " "
23060. " "
23061. " "
23909. Off coast of New England.
24285. " "
24286. " "
24702. " "
24703. " "

GADIDÆ.

29. Pollachius carbonarius (Linn.) Bonn.

14615. Eastport, Maine.
14616. " "
14617. " "
14618. " "
14621. " "
21794. Gloucester, Massachusetts.
22690. " "
22796. " "
24219. " "
24451. Wood's Holl, Massachusetts.

30. Gadus morrhua Linn.

22215. Noman's Land.
22770. Wood's Holl, Massachusetts.
22837. Gloucester, Massachusetts.
23156. " "
23166. " "
23764. Provincetown, Massachusetts.
24217. Provincetown, Massachusetts.
24218. " "
24347. " "
24380. " "
24419. Gloucester, Massachusetts.
25212. Wood's Holl, Massachusetts.

31. Microgadus tomcodus (Walb.) Gill.

10778. Wood's Holl, Massachusetts.
10779. " "
13015. " "
13019. " "
13835. " "
14009. Noank, Connecticut.
14590. Eastport, Maine.
14591. " "
14592. " "
14594. Portland, Maine.
14597. Wood's Holl, Massachusetts.
14598. " "
14599. " "
14600. " "
14601. " "
14602. " "
14603. " "
14604. Wood's Holl, Massachusetts.
14605. " "
14606. " "
14607. " "
14608. " "
14609. " "
14610. " "
17611. " "
17746. " "
20595. " "
21454. " "
22221. " "
23158. " "
24445. " "
24457. " "
24513. " "

32. Phycis chuss (Walb.) Gill.

22630. Gloucester, Massachusetts.

33. Phycis tenuis (Mitch.) DeKay.

10450. Eastport, Maine.
14568. Wood's Holl, Massachusetts.
14569. " "
14573. Eastport, Maine.
14575. Portland, Maine.
14576. " "
14577. " "
14578. " "
14582. " "
14583. " "
14584. " "
14585. " "
19164. Wood's Holl, Massachusetts.
19166. " "
19169. " "
19172. " "
19174. " "
19176. Wood's Holl, Massachusetts.
19756. Eastern coast of United States.
21018. Halifax, Nova Scotia.
21616. Lat. 42° 42′ N., Lon. 64° 20′ W.
21790. Gloucester, Massachusetts.
21796. " "
21816. " "
22321. " "
22631. " "
22653. " "
22701. " "
22722. New England.
24373. Provincetown, Massachusetts (14).
24443. Wood's Holl, Massachusetts.
24464. " "
24574. " "
24610. Halifax, Nova Scotia.

34. Phycis regius (Walb.) Jordan & Gilbert.

16845. New York Aquarium.
16847. East coast of United States.
20923. East coast of United States.

35. Onos (Rhinonemus) cimbrius (L.) Goode & Bean.

23149. Gloucester, Massachusetts.
23180. Halifax, Nova Scotia.
23761. Provincetown, Massachusetts.

36. Haloporphyrus viola Goode & Bean.

23062. Lat. 44° 20′ N., Lon. 57° 57′ W.
23063. " "
23918. Grand Banks.
24251. Lat. 43° 41′ N., Lon. 59° 15′ W.
24301. Lat. 44° 13′ N., Lon. 58° 02′ W.
24713. Lat. 43° 17′ N., Lon. 51° 25′ W.
24714. Grand Banks, western edge.
24746. Banquereau.
24747. Lat. 59° 04′ N., Lon. 43° 56′ W.

37. Lota maculosa (LeS.) Rich.

11019. Sandusky, Ohio.
11020. " "
11022. " "
11024. " "
11201. Alpena, Michigan.
11202. " "
11203. " "
12452. Apostle Island, Lake Superior.
12466. " "
15860. New York Market.
16637. "
16638. "
16639. "
16640. "
17782. Sandusky, Ohio.
17783. " "
19793. Alpena, Michigan.
22926. Lake Superior.

MERLUCIIDÆ.

38. Merlucius bilinearis (Mitch.) Gill.

13010. Wood's Holl, Massachusetts.
14560. Portland, Maine.
14561. Eastport, Maine.
14562. " "
14563. " "
14564. Wood's Holl, Massachusetts.
14565. " "
14566. " "
14952. Eastern coast of United States.
16797. New Bedford, Massachusetts.
18705. Wood's Holl, Massachusetts.
18706. " "
18707. " "
18708. " "
18709. " "
18710. " "
18711. " "
18730. " "
18731. Wood's Holl, Massachusetts.
18732. " "
18733. " "
19757. " "
19846. " "
19867. " "
20848. Noman's Land.
21055. Halifax, Nova Scotia.
21793. Gloucester, Massachusetts.
22649. " "
22698. " "
23154. Wood's Holl, Massachusetts.
24240. Lat. 42° 53′ N., Lon. 69° 14′ W.
24241. Jeffrey's Bank.
24268. Lat. 42° 53′ N., Lon. 69° 14′ W.
24525. Wood's Holl, Massachusetts.
24715. Lat. 42° 53′ N., Lon. 69° 14′ W.

LYCODIDÆ.

39. Lycodes Vahlii Reinh.

24239. East Banquereau.

40. Zoarces anguillaris (Peck) Storer.

14553. Eastport, Maine.
14554. " "
14556. " "
14557. Portland, Maine.
14558. " "
14559. " "
21784. Gloucester, Massachusetts.
22632. " "
22658. " "
22695. " "
22871. Gloucester, Massachusetts.
23084. " "
23193. Massachusetts Bay.
23760. Provincetown, Massachusetts.
23910. " "
24222. " "
24311. " "
24346. " "
24382. " "

CRYPTACANTHIDÆ.

41. Cryptacanthodes maculatus Storer.

21433. Eastern coast of United States.
21857. Gloucester, Massachusetts.
24254. Fishing Banks, off New England.
24255. Fishing Banks, off New England.
24710. " "
24737. " "

XIPHIDIONTIDÆ.

42. Murænoides gunnellus (L.) Goode & Bean.

Murœnoides mucronatus (Mitch.) Gill.

13429. Wood's Holl, Massachusetts.
13432. " "
13438. " "
13848. Eastport, Maine.
16503. Eastern coast of United States.
19827. Wood's Holl, Massachusetts.
19847. Wood's Holl, Massachusetts.
22842. " "
23164. New Bedford, Massachusetts.
23165. Wood's Holl, Massachusetts.
24926. " "

ANARRHICHADIDÆ.

43. Anarrhichas lupus L.

23906. East coast of United States.
23907. " "
24234. Lat. 42° 10′ N., Lon. 66° 30′ W.
24235. 8 miles S. E. Gloucester, Massachusetts.
24699. 5 miles S. S. E. Gloucester, Massachusetts.
24700. " "

44. Anarrhichas minor Olafsen.

24233. Lat. 44° 30′ N., Lon. 57° 10′ W., 250 fths.
24237. Lat. 43° 52′ N., Lon. 59° 09′ W., 200 fths.

45. Anarrhichas latifrons Steenstrup & Hallg.

21623. Lat. 42° 27′ N., Lon. 64° 20′ W., 280 fathoms.
21845. Banquereau, 300 fathoms.
22710. East coast of United States.
24238. Lat. 42° 53′ N., Lon. 59° 09′ W., 200 fths.
24698. Lat. 43° 33′ N., Lon. 52° 06′ W., 150 fths.
25109. Lat. 43° 33′ N., Lon. 52° 06′ W., 140 to 160 fathoms.

BLENNIIDÆ.

46. Blennius crinitus.

21939. Bermuda.

47. Labrosomus nuchipinnis (Q. & G.) Poey.

21240. Bermuda.
21946. Bermuda

BATRACHIDÆ.

48. Batrachus tau Linn.

6823. East coast of United States.
10711. Wood's Holl, Massachusetts.
10743. " "
10744. " "
14542. Noank, Connecticut.
14543. " "
14544. " "
14545. " "
14546. " "
14548. " "
14549. " "
14550. " "
14551. " "
14552. " "
16550. Wood's Holl, Massachusetts.
17210. Noank, Connecticut.
17211. " "
17212. " "
17213. " "
17214. " "
17215. " "
17216. " "
17217. " "
17218. " "
17219. " "
17609. Wood's Holl, Massachusetts.
19758. East coast of United States.
20632. Wood's Holl, Massachusetts.
22760. " "

49. Porichthys porosissimus.

6669. West coast of United States.
9316. San Diego, California.
17046. Santa Barbara, California.
20005. Santa Barbara, California.
22333. Monterey, California.
24814. San Diego, California.

URANOSCOPIDÆ.

50. Astroscopus anoplus (C. & V.) Brevoort.

7304. Eastern United States.

CYCLOPTERIDÆ.

51. Cyclopterus lumpus Linn.

20698. Newport, Rhode Island.
23051. Gloucester, Massachusetts.

GOBIIDÆ.

52. Gobius soporator.

21935. Bermuda.

53. Eleotris.

19880 ?
19882 ?

54. Dormitator.

19881 ?

TRIGLIDÆ.

55. Dactylopterus volitans (Linn.) Lac.

18579. Wood's Holl, Massachusetts.
18580. " "
18581. " "
18582. " "
18583. " "
18584. " "
18585. " "
18586. " "
18587. " "
18588. " "
18589. " "
18590. " "
18591. " "
18592. " "
18593. " "
18594. " "
18595. " "
18596. " "
18597. " "
18598. " "
18599. Wood's Holl, Massachusetts.
18600. " "
18601. " "
18602. " "
18603. " "
18605. " "
18606. " "
18607. " "
18608. " "
18609. " "
18610. " "
18611. " "
18612. " "
18613. " "
18614. " "
18615. " "
18616. " "
18617. " "
18618. " "
18619. " "

18620. Wood's Holl, Massachusetts.
18622. " "
18623. " "
18624. " "
18625. " "
18626. " "
18627. " "
18628. " "
18629. " "
18630. " "
18631. " "
18632. " "
18633. " "
18634. " "
18635. " "
18636. " "
18637. " "
18638. " "
18639. " "
18640. " "
18643. " "
18644. " "
18645. " "
18646. " "
18647. " "
18648. " "
18649. " "
18650. " "
18651. " "
18652. " "
18653. " "
18654. " "
18655. Wood's Holl, Massachusetts.
18656. " "
18657. " "
18658. " "
18659. " "
18660. " "
18661. " "
18662. " "
18663. " "
18664. " "
18665. " "
18666. " "
18667. " "
18668. " "
18669. " "
18670. " "
18671. " "
18672. " "
18673. " "
18674. " "
18676. " "
18677. " "
18678. " "
18679. " "
18680. " "
18681. " "
18682. " "
18683. " "
18684. " "
20835. " "
24481. " "
24497. " "

56. Prionotus evolans (L.) Gill.

13575. Wood's Holl, Massachusetts.
13581. " "
14534. " "
14535. Noank, Connecticut.
14536. " "
14537. " "
14538. " "
14539. " "
14540. " "
14935. Wood's Holl, Massachusetts.
16004. " "
16008. " "
16009. " "
16011. " "
16593. " "
18868. " "
18869. " "
18870. " "
18871. Wood's Holl, Massachusetts.
18872. " "
18873. " "
18874. " "
18875. " "
18876. " "
18877. " "
18878. " "
18879. " "
19307. " "
19308. " "
19310. " "
20703. Newport, Rhode Island.
21442. Wood's Holl, Massachusetts.
21652. Newport, Rhode Island.
22713. East coast of United States.
22750. Wood's Holl, Massachusetts.
22754. " "

57. Prionotus carolinus (Linn.) C. & V.

14528. Noank, Connecticut.
14529. " "
14530. " "
14531. " "
14532. " "
14533. " "
16032. Wood's Holl, Massachusetts.
16309. " "
17142. Noank, Connecticut.
17143. " "
17144. " "
17145. Noank, Connecticut.
17146. " "
17147. " "
17148. " "
17149. " "
17150. " "
19341. Wood's Holl, Massachusetts.
19342. " "
19343. " "
19344. " "
19345. " "

19346. Wood's Holl, Massachusetts.
19347. " "
19348. " "
19349. " "
19350. " "
19352. " "
19353. " "
19354. " "
19356. " "
19357. " "
19358. " "
19400. " "
19401. " "
19403. Wood's Holl, Massachusetts.
19404. " "
19405. " "
19406. " "
19407. " "
19408. " "
19409. " "
19410. " "
19415. " "
20664. " "
21443. Cohasset Narrows, Massachusetts.
23531. Crisfield, Maryland.

AGONIDÆ.

58. Aspidophoroides monopterygius (Bloch) Storer.

23174. Massachusetts Bay.
24336. Provincetown, Massachusetts.

COTTIDÆ.

59. Cottus octodecimspinosus Mitch.

14514. Portland, Maine.
14515. " "
14516. " "
14518. " "
14519. " "
14520. " "
14522. " "
14523. " "
14525. " "
14526. " "
19186. Wood's Holl, Massachusetts.
19187. " "
19188. Wood's Holl, Massachusetts.
19189. " "
19190. " "
19191. " "
19192. " "
19193. " "
19194. " "
19195. " "
19749. Coast of Massachusetts.
21036. Halifax, Nova Scotia.
21507. Salem, Massachusetts.
22266. Gloucester, Massachusetts.

60. Cottus æneus Mitch.

10365. Wood's Holl, Massachusetts.
10367. " "
13516. " "
13522. " "
13525. " "
13530. " "
13541. " "
15093. Tompkinsville, New York.
16185. Noank, Connecticut.
20883. Wood's Holl, Massachusetts.
20889. " "
21457. " "
22766. " "
23159. " "

61. Cottus scorpius L., subsp. grönlandicus C. & V.

Cottus grœnlandicus Cuv. & Val.

14507. Portland, Maine.
14509. " "
14510. " "
14511. Eastport, Maine.
21506. Salem, Massachusetts.
22314. Gloucester, Massachusetts.
22648. " "

62. Cottus scorpioides Fabr.

21744. Cumberland Gulf.
22331. Cumberland Gulf.

63. Centridermichthys uncinatus (Rhdt.) Günth.

24340. East coast of United States.

64. Gymnacanthus pistilliger (Pall.) Gill MSS.

21732. Disco Island, Greenland.
21735. " "
21741. Niantilic Harbor, Cumberland Gulf.

HEMITRIPTERIDÆ.

65. Hemitripterus americanus (Gmel.) Storer.

14497. Eastport, Maine.
14499. " "
14500. Portland, Maine.
14502. " "
14503. " "
14504. Noank, Connecticut.
14505. Wood's Holl, Massachusetts.
14959. Coast of Massachusetts.
16438. Boston, Massachusetts.
16514. Nantucket, Rhode Island.
16558. " "
16594. Wood's Holl, Massachusetts.
19412. " "
19413. " "
19414. " "
19748. " "
20696. Newport, Rhode Island.
20956. Bucksport, Maine.
21010. Halifax, Nova Scotia.
21026. " "
21035. " "
21508. Salem, Massachusetts.
21646. Newport, Rhode Island.
21795. Gloucester, Massachusetts.
22269. " "
22283. " "
22315. " "
22647. " "
22655. " "
22699. " "
22839. " "
22843. Wood's Holl, Massachusetts.
24368. Grand Banks.

SCORPÆNIDÆ.

66. Sebastes marinus Linn.

Sebastes viviparus Kröyer.

14472. Eastport, Maine.
14473. " "
14474. " "
14476. " "
14477. " "
14478. " "
14479. " "
14480. " "
14484. " "
14486. " "
14488. " "
14489. " "
14490. " "
14495. " "
14496. " "
21620. Lat. 42° 42′ N., Lon. 64° 20′ W., 270 to 300 fathoms.
21792. Gloucester, Massachusetts.
21811. " "
22267. " "
22298. East coast of United States.
22299. " "
22651. Gloucester, Massachusetts.
22700. " "
22882. East coast of United States.
23092. " "
23143. Massachusetts Bay.
23774. "
23775. "
23911. Banquereau.
24637. Halifax, Nova Scotia.

67. Sebastomus melanops (Grd.) Gill.

21582. Washington Territory.

SCARIDÆ.

68. Scarus radians Val.

21373. Bermuda.
21882. Bermuda.

69. Pseudoscarus vetula (Schn.) Gill.

21880. Bermuda.

LABRIDÆ.

70. Chœrojulis radiatus (L.) Goode.

21879. Bermuda.

71. Tautoga onitis (Linn.) Gthr.

10598. Wood's Holl, Massachusetts.
10599. " "
10643. " "
13630. " "
14446. " "
14453. Noank, Connecticut.
14454. " "
14455. " "
14456. " "
14457. " "
14458. " "
14459. " "
14460. " "
14461. Wood's Holl, Massachusetts.
14462. " "
14463. " "
14464. " "
14466. " "
14467. " "
17610. " "
17611. " "
17612. " "
17613. Wood's Holl, Massachusetts.
17614. " "
17615. " "
17616. " "
17618. " "
17619. " "
17620. " "
17621. " "
17622. " "
22725. " "
22769. " "
22914. Massachusetts Bay.
22915. "
22916. "
24438. Wood's Holl, Massachusetts.
24444. " "
24447. " "
24455. " "
24473. " "
24507. " "
24519. " "
24572. " "

72. Tautogolabrus adspersus (Walb.) Gill.

10745. Wood's Holl, Massachusetts.
10746. " "
14431. Portland, Maine.
14432. " "
14433. " "
14434. " "
14435. " "
14436. " "
14438. " "
14439. " "
14440. " "
14441. " "
14442. " "
14443. " "
14444. " "
14445. " "
14446. Noank, Connecticut.
14447. " "
14448. " "
14449. " "
14450. " "
14452. " "
16034. Wood's Holl, Massachusetts.
17555. Noank, Connecticut.
17556. " "
17557. " "
17558. " "
17559. " "
17560. " "
17561. " "
17562. " "
17563. " "
17564. " "
17617. Wood's Holl, Massachusetts.
17623. Noank, Connecticut.
17624. " "
17625. " "
17626. " "
17627. " "
17628. " "
17629. " "
22652. Gloucester, Massachusetts.
22742. " "
22767. Wood's Holl, Massachusetts.
23908. Provincetown, Massachusetts.

73. Oxyjulis modestus (Grd.) Gill.

17025. Santa Barbara, California.
17027. Santa Barbara, California.

POMACENTRIDÆ.

74. Glyphidodon saxatilis (L.) C. & V.

10333. Bermuda.
16856. "
18207. "
18208. "
18209. "
18210. "
18211. "
18212. "
18213. Bermuda.
18214. "
18215. "
18216. "
18217. "
18218. "
21984. "

CICHLIDÆ.

75. Heros.

19908. West coast of Central America.
19910. West coast of Central America.

EMBIOTOCIDÆ.

76. Embiotoca Jacksoni Ag.

17048. Santa Barbara, California.
17049. " "
22255. California.

77. Tænictoca lateralis (Ag.) A. Ag.

6216. Presidio, California.
22256. California.
22259. California.
22304. "

78. Holconotus rhodoterus Ag.

566. Presidio, California.
567. Humboldt Bay.
572. San Diego, California.
17028. Santa Barbara, California.
17029. Santa Cruz Island, California.
17030. Santa Barbara, California.
17031. " "
17032. " "
17033. " "
20340. California.

CHÆTODONTIDÆ.

79. Sarathrodus bimaculatus (Bloch) Poey.

18197. Bermuda.
18198. "
18199. "
18200. "
18201. "
18202. Bermuda.
18203. "
18204. "
18205. "
18206. "

80. Holacanthus ciliaris Lac.

18243. Bermuda.
18244. "
21876. Bermuda.
23782. "

TRICHIURIDÆ.

81. Trichiurus lepturus Linn.

19504. Beaufort, North Carolina.
19676. North Carolina.
19677. "
21541. Charleston, South Carolina.
22817. Pensacola, Florida.
23139. Southern coast United States.

SCOMBRIDÆ.

82. Scomber scombrus Linn.

10604. Washington Market, from New Eng.
10605. " "
10650. Wood's Holl, Massachusetts.
10651. " "
13593. " "
13594. " "
13595. " "
13597. " "
14429. Portland, Maine.
16224. Wood's Holl, Massachusetts.
16443. New York Market.
16494. Wood's Holl, Massachusetts.
18989. " "
18990. " "
18991. " "
18992. " "
18993. Wood's Holl, Massachusetts.
18994. " "
18995. " "
18996. " "
18997. " "
18998. " "
18999. " "
19000. " "
21808. Gloucester, Massachusetts.
23769. Provincetown, Massachusetts.
24463. Wood's Holl, Massachusetts.
24506. " "
24514. " "
24568. " "
24594. " "
25183. Gloucester, Massachusetts.

83. Scomber pneumatophorus De la Roche.

23754. Provincetown, Massachusetts.

84. Sarda pelamys (L.) Cuv.

8482. New York.
14423. Noank, Connecticut.
14424. " "
14425. " "
14426. Noank, Connecticut.
15455. Mouth Potomac River.
22728. East coast United States.
22778. " "

85. Orcynus pelamys (L.) Poey.

21556. Wood's Holl, Massachusetts.
21557. Wood's Holl, Massachusetts.

86. Cybium maculatum (Mitch.) Cuv.

23118. Washington Market.

CARANGIDÆ.

87. Vomer setipinnis (Mitch.) Ayres.

16838. New York Market.
19735. East coast United States.
21655. Newport, Rhode Island.
22753. Wood's Holl, Massachusetts.

88. Argyreiosus vomer (Linn.) C. & V.

19506. Beaufort, North Carolina.

89. Decapterus punctatus (Ag.) Gill.

18120. Bermudas.
18121. "
18122. "
18123. "
18124. "
18125. "
18126. "
18127. "
18128. "
18129. "
18130. "
18131. "
18951. Wood's Holl, Massachusetts,
18952. " "
18953. Wood's Holl, Massachusetts.
18954. " "
18955. " "
18956. " "
18957. " "
18958. " "
18959. " "
18960. " "
18961. " "
18962. " "
18963. " "
18964. " "
19143. " "

90. Trachurops crumenophthalmus (Bloch) Gill.

18685. Wood's Holl, Massachusetts.
18686. " "
18687. " "
18688. " "
18689. " "
18690. " "
18691. " "
18692. " "
18693. " "
18694. " "
18695. " "
18696. " "
18697. " "
18698. " "
18699. " "
18700. Wood's Holl, Massachusetts.
18701. " "
18702. " "
18703. " "
18704. " "
18725. " "
18726. " "
18727. " "
18728. " "
18729. " "
18982. " "
18983. " "
21638. Newport, Rhode Island.
22368. Wood's Holl, Massachusetts.
22784. " "

91. Carangus pisquetus (C. & V.) Grd.

Paratractus pisquetus (C. & V.) Gill.

5991. Florida.
13663. Wood's Holl, Massachusetts.
14401. " "
14402. " "
14403. " "
14404. " "
14406. " "
14407. Wood's Holl, Massachusetts.
14408. " "
14409. " "
14410. " "
14412. " "
14414. " "
14415. " "

14416. Wood's Holl, Massachusetts.
14417. " "
14418. " "
16568. " "
17199. " "
17200. " "
17201. " "
17202. " "
17203. " "
17204. " "
17205. " "
17206. " "
17207. " "
17208. " "
18867. " "
19020. " "
19255. " "
19296. Wood's Holl, Massachusetts.
19298. " "
19377. " "
19378. " "
19381. " "
19383. " "
19384. " "
19386. " "
19388. " "
19391. " "
19392. " "
19393. " "
19394. " "
20628. " "
20755. Newport, Rhode Island.
21637. " "
22781. Wood's Holl, Massachusetts.

92. Carangus hippos (L.) Gill.

14389. Wood's Holl, Massachusetts.
14390. " "
14391. " "
14392. " "
14393. " "
14394. " "
14395. " "
14396. " "
14398. " "
14400. " "
18779. " "
18780. " "
18781. " "
18782. " "
18783. " "
88784. " "
18785. " "
18786. " "
18787. " "
18788. " "
18789. Wood's Holl, Massachusetts.
18790. " "
18791. " "
18792. " "
18793. " "
18794. " "
18795. " "
18796. " "
18797. " "
18798. " "
18799. " "
18800. " "
18801. " "
18802. " "
18803. " "
19492. Beaufort, North Carolina.
20842. Newport, Rhode Island.
21654. " "
24922. Wood's Holl, Massachusetts.

93. Blepharichthys crinitus (Akerly) Gill.

13087. Wood's Holl, Massachusetts.
13088. " "
16413. " "
16520. " "
19984. Mauritius.
19985. "
19986. "
19987. "
19988. Mauritius.
20205. Newport, Rhode Island.
20682. Wood's Holl, Massachusetts.
20705. " "
20750. Newport, Rhode Island.
21640. " "
22752. Wood's Holl, Massachusetts.

94. Trachynotus carolinus (L.) Gill.

16249. New York Market.
18808. Wood's Holl, Massachusetts.
18809. " "
18810. " "
18811. " "
18812. " "
18813. " "
18814. " "
18815. " "
18816. " "
18817. " "
18818. " "
18819. " "
18820. " "
18821. " "
18822. Wood's Holl, Massachusetts.
18823. " "
18824. " "
18825. " "
18826. " "
18827. " "
18828. " "
18829. " "
18830. " "
18831. " "
18832. " "
22322. " "
22737. East coast of United States.
22768. Wood's Holl, Massachusetts.

95. Seriola zonata (Mitch.) C. & V.

Halatractus zonatus (Mitch.) Gill.

10402. Wood's Holl, Massachusetts.
12995. " "
12998. " "
12999. " "
14384. " "
14385. " "
14387. " "
14388. " "
14953. East coast of United States.
16282. Wood's Holl, Massachusetts.
16393. " "
16543. New Bedford, Massachusetts.
16569. Wood's Holl, Massachusetts.
18965. " "
18966. " "
18967. " "
18968. " "
19018. " "
19019. Wood's Holl, Massachusetts.
19274. " "
19365. " "
19366. " "
19367. " "
19368. " "
19369. " "
19370. " "
19371. " "
19372. " "
19374. " "
19395. " "
20197. Newport, Rhode Island.
20646. Wood's Holl, Massachusetts.
20650. " "
20743. Newport, Rhode Island.
21636. " "
22774. Wood's Holl, Massachusetts.

CORYPHÆNIDÆ.

96. Coryphæna Sueuri C. & V.

16485. New York Market.

STROMATEIDÆ.

97. Palinurichthys perciformis (Mitch.) Gill.

14055. Wood's Holl, Massachusetts.
16080. Off Noman's Land.
16081. "
16082. "
16083. "
16084. "
16085. "
16086. "
16087. "
16088. "
16089. "
16090. "
16337. Wood's Holl, Massachusetts.
16516. New York Market.
19285. Wood's Holl, Massachusetts.
19286. " "
19287. " "
19288. Wood's Holl, Massachusetts.
19289. " "
19290. " "
19291. " "
19292. " "
19305. " "
19750. East coast of United States.
20704. Newport, Rhode Island.
22650. Gloucester, Massachusetts.
22746. Fishing banks off coast of Maine.
22913. East coast of United States.
24252. Gloucester, Massachusetts.
24253. " "
24375. " "
24418. " "
24431. " "
24432. " "

98. Poronotus triacanthus (Peck) Gill.

10705. Wood's Holl, Massachusetts.
10706. " "
13249. " "
13267. " "
13270. " "
13271. " "
13275. " "
13276. " "
13278. " "
13279. " "
14358. " "
14360. " "
14361. " "
14362. " "
14364. Noank, Connecticut.
14367. " "
14368. " "
14369. Noank, Connecticut,
14370. " "
14371. Eastport, Maine.
14372. " "
14373. " "
14374. " "
14375. " "
14376. " "
14377. " "
14378. " "
14379. Portland, Maine.
14381. " "
14382. " "
14383. " "
14939. Norfolk, Virginia.
14944. Wood's Holl, Massachusetts.
14951. East coast of United States.

15082. Tompkinsville, New York.
16459. Wood's Holl, Massachusetts.
17188. " "
17189. Noank, Connecticut.
17190. " "
17191. " "
17192. " "
17193. " "
17194. " "
17195. " "
17196. Noank, Connecticut.
17197. " "
17198. " "
20651. Wood's Holl, Massachusetts.
21667. Banquereau.
23155. Wood's Holl, Massachusetts.
24259. Off coast of Maine.
24260. Vineyard Sound.
24927. Gloucester, Massachusetts.

99. Peprilus alepidotus (L.) Cuv.

Peprilus Gardenii (Bl. Schn.) Gill.

12871. Off coast of Florida.
15372. Washington Market.
15373. "
19499. Beaufort, North Carolina.
22924. Norfolk, Virginia.

LATILIDÆ.

100. Lopholatilus chamæleonticeps Goode & Bean.

24291. Lat. 40° 10′ N., Lon. 70° 56′ W., 75 fathoms.

BERYCIDÆ.

101. Holocentrum sogo Bloch.

18071. Bermuda.
18072. "
18073. "
18074. "
18075. "
18076. "
18077. "
18078. "
18079. "
18080. Bermuda.
18081. "
18082. "
18083. "
18084. "
18085. "
18086. "
18087. "
21891. "

SCIÆNIDÆ.

102. Cynoscion carolinensis (C. & V.) Gill.

8315. Saint John's River, Florida.
12807. Norfolk, Virginia.
19459. " "
19651. Fort Macon, North Carolina.
19652. Beaufort, North Carolina.
19653. Beaufort, North Carolina.
19654. " "
19713. Fort Macon, North Carolina.
22932. Off coast of North Carolina.
24684. Near Charleston, South Carolina.

103. Cynoscion regalis (Bloch) Gill.

12804. Norfolk, Virginia.
14356. Wood's Holl, Massachusetts.
16323. " "
16429. " "
16548. " "
18880. " "
18881. " "
18882. " "
18883. " "
18884. " "
18885. " "
18886. Wood's Holl, Massachusetts.
18887. " "
18888. " "
18889. " "
18890. " "
18891. " "
18892. " "
18948. " "
22367. " "
23195. " "
23508. Norfolk, Virginia.

104. Pogonias cromis Lac.

17904. Saint John's River, Florida.
17905. " "
17906. " "
17907. " "
17908. " "
17909. " "
17910. " "
17911. " "
17912. " "
18303. " "
18405. " "
18406. " "
18407. Saint John's River, Florida.
18408. " "
18409. " "
18410. " "
18411. " "
18484. " "
19040. Florida.
19041. "
19764. Southeast coast United States.
22779. " "
24690. Near Charleston, South Carolina.

105. Liostomus obliquus (Mitch.) De Kay.

16850. New York Market.
18047. Mouth of Saint John's River, Florida.
18333. Saint John's River, Florida.
18334. " "
18336. " "
18448. " "
18449. Saint John's River, Florida.
18450. " "
19055. " "
21283. " "
24484. Wood's Holl, Massachusetts.
24688. Near Charleston, South Carolina.

106. Bairdiella argyroleuca (Mitch.) Gill.

Bairdiella punctata (L.) Gill.

3370. Southeast coast of United States.
17755. Brunswick, Georgia.
18050. Mouth of Saint John's River, Florida.
18335. Saint John's River, Florida.
18498. " "
18499. " "
18500. " "
18501. " "
18502. " "
18503. " "
18504. " "
18505. Saint John's River, Florida.
18506. " "
18507. " "
18508. " "
18509. " "
18510. " "
18511. " "
18512. " "
19062. Florida.
22927. "
23169. South Carolina.

107. Sciænops ocellatus (Linn.) Gill.

18317. Saint John's River, Florida.
19498. Beaufort, North Carolina.
19655. " "
19714. Fort Macon, North Carolina.
22716. Southern coast of United States.

108. Menticirrus nebulosus (Mitch.) Gill.

10701. Wood's Holl, Massachusetts.
10709. " "
14353. Noank, Connecticut.
14354. Wood's Holl, Massachusetts.
15579. New York Market.
18712. Wood's Holl, Massachusetts.
18713. " "
18847. " "
18848. " "
18849. " "
18850. " "
18851. Wood's Holl, Massachusetts.
18852. " "
18853. " "
18854. " "
18855. " "
18856. " "
18857. " "
18858. " "
18859. " "
21441. Cohasset Narrows, Massachusetts.
22757. East coast of United States.

109. Menticirrus littoralis (Holbr.) Gill.

19081. Florida.
19082. "
19083. "
19084. "
19085. "
19086. "
19087. Florida.
19088. "
19089. "
19090. "
19091. "

110. Micropogon undulatus (L.) C. & V.

18332. Saint John's River, Florida.
18493. " "
18494. " "
18495. Saint John's River, Florida.
22740. East coast of United States.
22933. " "

85. Orcynus pelamys (L.) Poey.

27364. Bermuda.
21881. Bermuda.

112. Haploidonotus grunniens Raf.

9504. Mississippi Valley.
11037. Sandusky, Ohio.
11040. " "
11041. " "
11089. Ausable River, Michigan.
12279. Cincinnati, Ohio.
12285. " "
12286. " "
12287. " "
12288. " "
17768. Detroit, Michigan.
17769. Sandusky, Ohio.
17770. Sandusky, Ohio.
17771. " "
17772. " "
17773. " "
17774. " "
17775. " "
17776. " "
17777. " "
17778. " "
17779. " "
17780. " "
17781. " "

GERRIDÆ.

113. Diapterus gula.

21896. Bermuda.
23557. "
23562. "
23564. "
23567. "
23568. "
23569. "
23570. "
23571. "
23576. "
23579. "
23580. Bermuda.
23581. "
23582. "
23583. "
23584. "
23586. "
23587. "
23588. "
23590. "
23591. "
23592. "

114. Diapterus Lefroyi Goode.

Eucinostomus Lefroyi Goode.

18157. Bermuda.
18158. "
18159. "
18160. "
18161. "
18162. "
18163, "
18164. "
18165. Bermuda.
18166. "
18167. "
18168. "
18169. "
18170. "
18171. "
18172. "

PIMELEPTERIDÆ.

115. Pimelepterus Boscii Lac.

10338. Bermuda.
18173. "
18174. "
18175. "
18176. "
18177. "
18178. "
18179. "
18180. "
18181. "
18182. "
18183. "
18184. "
18185. "
18186. "
18187. Bermuda.
18188. "
18189. "
18190. "
18191. "
18192. "
18193. "
18194. "
18195. "
18196. "
20177. "
21900. "
23547. "
23548. "

SPARIDÆ.

116. Lagodon rhomboides (L.) Holbrook.

17899. Saint John's River, Florida.
17900. " "
17901. " "
18343. " "
18344. " "
18345. " "
18346. " "
18451. " "
18452. " "
18453. " "
18454. " "
18455. " "
18456. " "
18457. Saint John's River, Florida.
18458. " "
18459. " "
18460. " "
18461. " "
18462. " "
19134. Florida.
19687. Fort Macon, North Carolina.
19716. " "
21280. Saint John's River, Florida.
21569. Charleston, South Carolina.
21570. " "
24284. East coast of United States.

117. Archosargus probatocephalus (Walb.) Gill.

15578. New York Market.
18309. Saint John's River, Florida.
18389. " "
18390. " "
18391. " "
18392. " "
18393. " "
18394. " "
18395. " "
18396. " "
18397. " "
18398. " "
18399. Saint John's River, Florida.
18400. " "
18401. " "
18402. " "
18403. " "
18404. " "
18413. " "
18414. " "
18415. " "
18416. " "
21546. Charleston, South Carolina.
22729. East coast of United States.

118. Stenotomus argyrops (L.) Gill.

5940. East coast of United States.
10652. Wood's Holl, Massachusetts.
10668. " "
10702. " "
12922. " "
12923. " "
14326. " "
14327. " "
14328. " "
14329. " "
14330. " "
14331. " "
14332. " "
14333. " "
14335. " "
14336. " "
14337. " "
14338. " "
14339. " "
14340. " "
14341. " "
14342. " "
14344. " "
14345. Wood's Holl, Massachusetts.
14347. " "
14348. " "
14349. " "
14350. " "
14351. " "
14352. " "
14964. " "
14965. " "
16007. " "
16030. " "
16042. " "
16049. " "
17186. " "
17187. " "
21436. Cohasset Narrows, Massachusetts.
22758. Wood's Holl, Massachusetts.
22925. East coast of United States.
24468. Wood's Holl, Massachusetts.
24491. " "
24508. " "
24512. " "
24545. " "

119. Sargus Holbrookii Bean.

20979. Charleston, South Carolina.
22870. New York Market.
24691. Charleston, South Carolina.

120. Calamus megacephalus (Sw.) Poey.

21893. Bermuda.

121. Pagrus argenteus Schn.?

24695. Off Charleston, South Carolina.

PRISTIPOMATIDÆ.

122. Pristipoma fulvomaculatum (Mitch.) Gthr.

22923. East coast of United States.
23507. Norfolk, Virginia.

123. Hæmylum xanthopterum C. & V.

18219. Bermuda.
18220. "
18221. "
18222. "
18223. "
18224. "
18225. "
18226. "
18227. "
18228. "
18229. "
18230. "
18231. "
18232. Bermuda.
18233. "
18234. "
18235. "
18236. "
18237. "
18238. "
18239. "
18240. "
18241. "
18242. "
20179. "
21372. "

124. Hæmylum flaviguttatus Gill.

19632. Colima.

125. Hæmylum.

19639. Florida.

126. Lutjanus caxis (Schn.) Poey.

18101. Bermuda.
18102. "
18103. "
18104. "
18105. "
18106. "
18107. "
18108. "
18109. "
18110. Bermuda.
18111. "
18112. "
18113. "
18114. "
18115. "
18116. "
18117. "
22798. "

127. Lutjanus Blackfordii Goode & Bean.

22795. Southern coast of United States.

128. Rhomboplites aurorubens (C. & V.) Gill.

21224. Charleston, South Carolina.
21571. Charleston, South Carolina.

CENTRARCHIDÆ.

129. Micropterus salmoides (Lac.) Gill.

10715. Potomac River.
11100. Bay City, Michigan.
11208. Alpena, Michigan.
12308. Charlestown, New Hampshire.
12309. " "
12310. " "
12809. Norfolk, Virginia.
15517. Potomac River.
16844. New York Market.
17791. Holyoke, Massachusetts.
19614. Sandusky, Ohio.
19615. " "
19616. " "
19617. Bay City, Michigan.
22727. Potomac River.

130. Micropterus pallidus (Raf.) Gill & Jordan.

10380. Norfolk, Virginia.
10381. " "
11072. Sandusky, Ohio.
12297. Cincinnati, Ohio.
12298. " "
12472. Sandusky, Ohio.
15664. New York Market.
16910. Tangipahoa River, Mississippi.
16911. " "
16912. " "
16913. " "
16914. " "

17925. Saint John's River, Florida.
17968. Wilmington, North Carolina.
18438. Saint John's River, Florida.
18439. " "
18440. " "
19032. " "
19033. " "
19034. " "
19035. Saint John's River, Florida.
19036. " "
19037. " "
19038. " "
19039. " "
20555. Jacksonville, Florida.
21278. Saint John's River, Florida.
24812. North Carolina.

131. Ambloplites rupestris (Raf.) Gill.

4173. Rochester, Wisconsin.
5707. Lake Champlain.
7667. "
7673. Yellow Creek, Ohio.
7686. Racine, Wisconsin.
7705. Cleveland, Ohio.
7708. " "
7734. Yellow Creek, Ohio.
8469. Red River, British America.
8926. Sandusky, Ohio.
11013. Sandusky, Ohio.
11014. " "
11016. " "
11218. Alpena, Michigan.
12415. Sandusky, Ohio.
16919. Tangipahoa River, Mississippi.
19622. Sandusky, Ohio.
23183. " "
24666. Aux Plaines, Illinois.

132. Acantharcus pomotis (Bd.) Gill.

17844. New Jersey.
20353. Trenton, New Jersey.
24654. Watson's Creek, New Jersey.

133. Chænobryttus gulosus (C. & V.) Gill.

Chænobryttus viridis (C. & V.) Jordan.

18384. Saint John's River, Florida.
18385. " "
18387. " "
18514. " "
18515. " "
18516. " "
18517. " "
18519. " "
18520. " "
18521. " "
19096. " "
19097. " "
19098. " "
19099. Saint John's River, Florida.
19100. " "
24753. Washington Market (from N. C.).
24754. " "
24755. " "
24756. " "
24757. " "
24758. " "
24759. " "
24760. " "
24761. " "
24769. " "
24809. " "

134. Apomotis cyanellus (Raf.) Jordan.

20052. Cumberland River, Tennessee.

135. Lepomis auritus (L.) Gill.

4220. Florida.
6246. Sing Sing, New York.
7757. " "
7775. " "
8099. Rivers of east coast of United States.
15351. Susquehanna River, Pennsylvania.
18017. " "
20305. Havre de Grace, Maryland.
21453. Potomac River.
22230. "

136. Lepomis pallidus (Mitch.) Gill & Jordan.

11066. Sandusky, Ohio.
11069. " "
11070. " "
11217. " "
12469. " "
19109. Saint John's River, Florida.
19113. " "
19114. " "
19116. " "
19118. " "
19119. " "
19123. Saint John's River, Florida.
19125. " "
19126. " "
19127. " "
19128. " "
19129. " "
19131. " "
19132. " "
19133. " "
24762. North Carolina.
24763. "

137. Lepomis punctatus.

17948. Saint John's River, Florida.
18361. " "
18363. " "
18365. " "
18366. " "
18375. " "
18377. Saint John's River, Florida.
18464. " "
18473. " "
18477. " "
18480. " "
23170. Florida.

138. Xenotis sanguinolentus (Ag.) Jordan.

16922. Tangipahoa River, Mississippi.

139. Xenotis peltastes (Cope) Jordan.

3274. Racine, Wisconsin.
9266. Michigan,

140. Xystroplites heros (B. & G.) Jordan.

4158. Saint Louis, Missouri.

141. Eupomotis aureus (Walb.) Gill & Jordan.

11063. Sandusky, Ohio.
11064. " "
11065. " "
12952. South Hadley Falls, Massachusetts.
14941. Washington Market.
14942. "
14962. "
18260. "
18261. "
18262. "
18263. "
18264. "
18265. "
18266. "
18267. "
18268. "
18269. Washington Market.
18270. "
18271. "
18272. "
18273. "
18274. "
18275. "
18276. "
18277. "
19631. "
20304. Havre de Grace, Maryland.
22863. Potomac River, Washington, D. C.
24668. Aux Plaines, Illinois.
24768. Washington Market, from North Carolina.
24810. " "
24877. " "

142. Eupomotis speciosus (Holbr.) Gill.

18364. Saint John's River, Florida.
18369. " "
18371. " "
18373. " "
18383. " "
18469. " "
18478. " "
19103. " "
19106. Saint John's River, Florida.
19107. " "
19108. " "
19110. " "
19115. " "
19117. " "
19120. " "

143. Enneacanthus margarotis Gill & Jordan.

20494. Watson's Creek, Mercer County, New Jersey.

144. Enneacanthus obesus (Baird) Gill.

24659. San Francisco Market, California.

145. Centrarchus irideus (Bosc.) C. & V.

7747. Tarborough, North Carolina.
24601. Washington Market, from N. Carolina.
24662. North Carolina.
24676. "
24677. "
24748. Washington Market, from N. Carolina.
24749. Washington Market, from North Carolina.
24750. " "
24751. " "
24752. " "
24766. " "
24808. " "

146. Pomoxys nigromaculatus (LeS.) Girard.

10382. Norfolk, Virginia.
10386. " "
11007. Sandusky, Ohio.
11011. " "
11160. " "
12805. Norfolk, Virginia.
17903. Saint John's River, Florida.
17964. Wilmington, North Carolina.
17965. " "
17967. " "
17969. " "
17970. " "
18350. Saint John's River, Florida.
18351. " "
18524. Kinston, North Carolina.
18525. " "
18526. " "
19312. Licking River, Ohio.
19313. " "
19314. " "
19315. " "
19317. " "
19318. " "
19319. " "
19320. " "
23181 Sandusky, Ohio.
24767 Washington Market.
24891. "

147. Pomoxys annularis Raf.

23182. Mississippi Valley.

SERRANIDÆ.

148. Epinephelus striatus (Bloch) Gill.

18088. Bermuda.
18089. "
18090. "
18091. "
18092. "
18093. "
18094. "
18095. Bermuda.
18096. "
18097. "
18098. "
18099. "
18100. "

149. Epinephelus guttatus (Gmelin) Goode.

12709. Bermuda.
18113. "
18119. "
19644. Florida.
20182. Bermuda.
21883. "

150. Epinephelus morio (Cuv.) Gill.

22775. Bermuda.

151. Centropristis atrarius (Linn.) Barn.

10642. Wood's Holl, Massachusetts.
10667. " "
14321. Noank, Connecticut.
14322. " "
14323. " "
14324. Wood's Holl, Massachusetts.
14325. " "
16026. " "
16574. " "
17174. Noank, Connecticut.
17175. " "
17176. " "
17177. " "
17178. " "
17179. " "
17180. " "
17181. Noank, Connecticut.
17182. " "
17183. " "
17184. " "
17241. Wood's Holl, Massachusetts.
19300. " "
19417. " "
19511. Beaufort, North Carolina.
19641. Florida.
19828. Wood's Holl, Massachusetts.
21440. Cohasset Narrows, Massachusetts.
22378. Wood's Holl, Massachusetts.
22800. " "
22959. East coast of United States.
24584. Wood's Holl, Massachusetts.

152. Diplectrum fasiculare (C. & V.) Holbrook.

24692. Off Charleston, South Carolina.

ETHEOSTOMATIDÆ.

153. Percina caprodes (Raf.) Girard.

1152. Meadville, Pennsylvania.
1201. Racine, Wisconsin.
1202. " "
1223. Wisconsin.
1246. Columbus, Ohio.
1264. Westport, New York.
1306. Poland, Ohio.
1317. Poland, Ohio.
1369. Yellow Creek, Ohio.
1394. Madrid, New York.
8145. Ohio.
9662. "
9731. Potomac River.
20407. Pennsylvania.

154. Diplesium blennioides (Raf.) Jordan.

1307. Black River, Ohio.

PERCIDÆ.

155. Perca fluviatilis.

Perca americana Schrank.

7118. Sandusky, Ohio.
7259. " "
7281. Ohio.
7344. Sandusky, Ohio.
7345. " "
7430. " "
7441. Ohio.
7478. "
7878. "
8094. "
8713. Ecorse, Michigan.
8831. " "
8832. " "
8883. Sandusky, Ohio.
10327. " "
10330. Deep Lake, Illinois.
11001. Sandusky, Ohio.
11003. " "
11004. " "
11005. " "
11149. " "
11150. " "
11176. Van Hutton Lake, Michigan.
12321. Washington Market.
12324. "
12325. "
12947. South Hadley Falls, Massachusetts.
14976. Washington Market.
15333. "
15334. "
15335. "
15336. "
15337. "
15338. "
15339. "
15340. "
15341. "
15342. "
15343. "
15344. "
15345. "
15346. "
15347. "
15348. "
15402. Chapman's Landing, Maryland.
18527. Kinston, North Carolina.
18528. " "
19450. Potomac River.
19491. "
19779. "
19781. Sandusky, Ohio.
19782. " "
19783. " "
20550. Illinois.

156. Stizostethium vitreum (Mitch.) Jordan & Copeland.

Stizostethium americanum (Cuv.) Grd.

10811. Sandusky, Ohio.
11181. Ausable, Michigan.
11182. " "
11183. " "
11184. " "
11186. " "
12391. Ecorse, Michigan.
12392. " "
12396. " "
19769. Ecorse, Michigan.
19776. " "
22704. East coast of United States.
22705. " "
22706. " "
22707. " "
22715. " "
22741. " "

157. Stizostethium canadense (Smith) Jordan.

22238. Memphis, Tennessee.

LABRACIDÆ.

158. Morone americana (Gmel.) Gill.

1750. Sing Sing, New York.
10633. Potomac River.
10634. "
10690. "
10729. Wood's Holl, Massachusetts.
10730. " "
13354. " "
14319. " "
15323. Washington Market.
15324. "
15325. "
15326. "
15327. "
15328. "
15329. "
15330. "
15331. "
15332. "
15471. Chapman's Landing, Maryland.
15472. " "
17127. Noank, Connecticut.
17128. " "
17129. " "
17130. " "
17242. Potomac River.
17243. "
17244. "
17245. "
17246. "
17247. "
17248. "
17249. "
17250. "
22308. New York Market.
24925. Wood's Holl, Massachusetts.

159. Roccus lineatus (Bl. Schn.) Gill.

10693. Wood's Holl, Massachusetts.
12808. Norfolk, Virginia.
19321. Washington Market.
19322. "
19323. "
19324. "
19325. "
19326. "
19327. "
19328. "
19329. "
19330. "
19331. "
19332. "
19333. "
19334. Washington Market.
19335. "
19336. "
19337. "
19338. "
19339. "
19447. Potomac River.
19613. Holyoke, Massachusetts.
22714. East coast of United States.
22726. " "
22960. " "
23117. Washington Market.
24807. North Carolina.
24846. Washington Market.

160. Roccus chrysops (Raf.) Gill.

9142. Sandusky, Ohio.
11006. " "
11051. " "
12468. Sandusky, Ohio.
19620. " "

161. Paralabrax clathrata Girard.

17037. Santa Cruz Island, California.
17038. Santa Barbara, California.

EPHIPPIIDÆ.

162. Parephippus quadratus (Gün.) Gill.

19493. Beaufort, North Carolina.

POMATOMIDÆ.

163. Pomatomus saltatrix (Linn.) Gill.

10768. Wood's Holl, Massachusetts.
14097. Noank, Connecticut.
14312. " "
14313. " "
14314. " "
14315. " "
14316. Wood's Holl, Massachusetts.
14318. " "
15554. New York Market.
16124. Wood's Holl, Massachusetts.
16125. " "
16139. Menemsha Bight, Massachusetts.
16371. Wood's Holl, Massachusetts.
17585. Noank, Connecticut.
17586. " "
17587. Noank, Connecticut.
17588. " "
17589. " "
17590. " "
17591. " "
17592. " "
17593. " "
17594. " "
17595. " "
18491. Saint John's River, Florida.
18492. " "
19054. " "
19301. Wood's Holl, Massachusetts.
22719. East coast of United States.
22762. Wood's Holl, Massachusetts.

AMMODYTIDÆ.

164. Ammodytes americanus De Kay.

13095. Wood's Holl, Massachusetts.
16193. " "
16359. Nantucket, Rhode Island.
19830. Wood's Holl, Massachusetts.
19842. " "
22841. " "

ECHENEIDIDÆ.

165. Echeneis naucrateoides (Zuciew).

20702. Newport, Rhode Island.
20843. " "
22776. East coast of United States.
22917. East coast of United States.
22918. " "

SPHYRÆNIDÆ.

166. Sphyræna borealis De Kay.

18754. Wood's Holl, Massachusetts.
18755. " "
18756. " "
18757. " "
18758. " "
18759. " "
18760. " "
18761. " "
18762. " "
18763. " "
18764. " "
18765. " "
18766. " "
18767. Wood's Holl, Massachusetts.
18768. " "
18769. " "
18770. " "
18771. " "
18772. " "
18773. " "
18774. " "
18775. " "
18776. " "
18777. " "
18778. " "

MUGILIDÆ.

167. Mugil albula Linn.

Mugil lineatus Mitch.

14930. North Carolina.
15307. Washington Market.
15308. "
15309. "
15310. "
15311. "
15312. "
15313. "
15315. "
15316. "
15317. "
15318. "
15319. "
15320. "
15321. "
15322. Washington Market.
18568. Wood's Holl, Massachusetts.
18569. " "
18570. " "
18571. " "
18572. " "
18804. " "
18805. " "
18806. " "
18807. " "
21635. Newport, Rhode Island.
22387. Wood's Holl, Massachusetts.
22777. " "
24510. " "
24697. Near Charleston, South Carolina.

168. Mugil brasiliensis Ag.

24505. Wood's Holl, Massachusetts.

169. Mugil cephalotus Cuv. & Val.

18003. Honolulu, Hawaii.

ATHERINIDÆ.

170. Chirostoma menidium (L.) Gill.

Christoma notata (Mitch.) Gill.

13318. Wood's Holl, Massachusetts.
17630. " "
17631. " "
17632. " "
17633. " "
17634. " "
17635. " "
17636. " "
17638. " "
17639. " "
17640. " "
17641. " "
17642. " "
17643. " "
17644. " "
17645. Wood's Holl, Massachusetts.
17646. " "
17647. " "
17648. " "
17649. " "
17650. " "
17651. " "
17652. " "
17653. " "
17654. " "
17655. " "
22858. Orland, Maine.
23157. Wood's Holl, Massachusetts.
24541. " "
24923. " "

BELONIDÆ.

171. Belone longirostris (Mitch.) Gill.

14018. Noank, Connecticut.
17574. " "
17575. " "
17576. " "
17577. " "
17578. " "
17579. " "
17580. " "
17581. " "
17582. " "
17583. " "
17584. " "
18833. Wood's Holl, Massachusetts.
18834. " "
18835. " "
18836. Wood's Holl, Massachusetts.
18837. " "
18838. " "
18839. " "
18840. " "
18841. " "
18842. " "
18843. " "
18844. " "
18845. " "
18846. " "
20629. " "
21451. " "
22371. " "
22773. " "

172. Belone hians.

21424. New York Market.

173. Belone latimanus Poey.

18721. Wood's Holl, Massachusetts.
21421. New York Market.

SCOMBRESOCIDÆ.

174. Hemirhamphus Pleii Val.

18132. Bermuda.
18133. "
18134. "
18135. "
18136. "
18137. "
18138. Bermuda.
18139. "
18140. "
18141. "
18142. "
18143. "

175. Scombresox saurus (Walb.) Flem.

Scomberesox scutellatus LeS.

19196. Wood's Holl, Massachusetts.
19197. " "
19203. Cape Cod, Massachusetts.
19204. " "
19205. " "
19206. Cape Cod, Massachusetts.
19207. " "
19208. " "
19845. Wood's Holl, Massachusetts.

ESOCIDÆ.

176. Esox lucius Linn.

11025. Sandusky, Ohio.
11027. " "
11143. " "
12942. South Hadley Falls, Massachusetts.
15659. New York Market.
17784. Sandusky, Ohio.

177. Esox nobilior Thompson.

11028. Sandusky, Ohio.
11029. Sandusky, Ohio.

178. Esox americanus Gmelin.

1587. Piermont, New York.
6814. New York.
15711. New York Market.
15716. New York Market.
20359. Trenton, New Jersey.
24771. Long Island, New York.

179. Esox reticulatus LeS.

10388. Norfolk, Virginia.
12453. " "
12943. South Hadley Falls, Massachusetts.
15012. Washington Market.
17785. Norfolk, Virginia.
17786. Norfolk, Virginia.
24848. Washington Market.
24892. "
24896. "

UMBRIDÆ.

180. Umbra limi (Kirt.) Günth.

Melanura limi (Kirt.) Ag.

8807. Northfield, Illinois.
9288. Racine, Wisconsin.

181. Dallia pectoralis Bean.

6661. Saint Michael's, Alaska.

CYPRINODONTIDÆ.

182. Cyprinodon variegatus Lac.

17706. Noank, Connecticut.
17707. " "
17708. " "
17709. " "
17710. " "
17711. " "
17712. " "
17713. " "
17714. " "
17715. " "
17716. " "
17717. " "
17718. " "
17719. Noank, Connecticut.
17720. " "
17721. " "
17722. " "
17724. " "
17725. " "
17726. " "
17727. " "
17728. " "
17729. " "
17730. " "
24581. Wood's Holl, Massachusetts.

183. Fundulus pisculentus (Mitch.) Val.

13762. Wood's Holl, Massachusetts.
13901. Casco Bay, Maine.
13903. " "
17681. Wood's Holl, Massachusetts.
17682. " "
17683. " "
17684. " "
17685. " "
17686. " "
17687. " "
17688. " "
17689. " "
17690. " "
17691. " "
17692. " "
17693. Wood's Holl, Massachusetts.
17694. " "
17695. " "
17696. " "
17697. " "
17698. " "
17699. " "
17700. " "
17701. " "
17702. " "
17703. " "
17704. " "
17705. " "
20888. " "

184. Fundulus parvipinnis.

24883. San Diego, California.

185. Hydrargyra majalis (Walb.) Val.

17656. Wood's Holl, Massachusetts.
17657. " "
17658. " "
17659. " "
17660. " "
17661. " "
17662. " "
17663. " "
17664. " "
17665. " "
17666. " "
17667. " "
17668. " "
17669. Wood's Holl, Massachusetts.
17670. " "
17671. " "
17672. " "
17673. " "
17674. " "
17675. " "
17676. " "
17677. " "
17678. " "
17679. " "
17680. " "

PERCOPSIDÆ.

186. Percopsis guttatus Ag.

6901. Lake Superior.
8746. " "
24772. Lake Superior.

SYNODONTIDÆ.

187. Synodus fœtens (Linn.) Gill.

19507. Beaufort, North Carolina.

MICROSTOMIDÆ.

188. Mallotus villosus (Müller) Cuv.

12698. Halifax, Nova Scotia.
24924. Wood's Holl, Massachusetts.

189. Osmerus mordax (Mitch.) Gill.

13330. Wood's Holl, Massachusetts.
13339. " "
13866. " "
13936. Noank, Connecticut.
16113. Wood's Holl, Massachusetts.
16186. Noank, Connecticut.
18971. Wood's Holl, Massachusetts.
18972. " "
18973. " "
18974. " "
18975. " "
18976. Wood's Holl, Massachusetts.
18977. " "
18978. " "
18979. " "
18980. " "
19838. " "
20959. Bucksport, Maine.
20964. " "
23173. Wood's Holl, Massachusetts.
24441. " "
24476. " "

190. Osmerus pacificus.

23184. Naas River, Oregon.
23185. Fraser River, British Columbia.

COREGONIDÆ.

191. Thymallus tricolor Cope.

11080. Ausable River, Michigan.
11083. " "
11084. " "
11088. " "
11091. " "
11092. " "
11093. " "
11094. Ausable River, Michigan.
11095. " "
11096. " "
11097. " "
11098. " "
19547. " "
19548. " "

192. Argyrosomus Artedi (LeS.) Hoy.

A. clupeiformis (Mitch.) Ag.

6813. Great Lakes.
10801. Sandusky, Ohio.
11162. Sandusky, Ohio.
11195. Ausable River, Michigan.

193. Argyrosomus Artedi (LeS.) Hoy var. **sisco** Jor.

21501. Geneva Lake, Wisconsin.

SALMONIDÆ.

194. Salmo salar Linn. var. **sebago** Girard.

10543. Grand Lake, Maine.
12370. Sebes Pond, Maine.
20764. Schoodic Lake, Maine.

195. Salmo irideus Gibbons.

22336. McCloud River, California.
22338. " "
22353. " "
22354. " "
22356. " "
22359. " "
22361. " "
22402. California.
22404. "
22405. "
22406. "
22419. McCloud River, California.
22420. " "
22421. " "
22422. " "
22423. " "
22424. " "
22425. " "
22426. " "
22427. " "
22428. " "
22429. " "
22430. McCloud River, California.
22431. " "
22432. " "
22454. " "
22455. " "
22456. " "
22457. " "
22458. " "
22459. " "
22460. " "
22462. " "
22463. " "
22464. " "
22465. " "
22470. " "
22471. " "
22473. Clackamas River, Oregon.
22474. McCloud River, California.
22475. " "
22476. " "
22484. Clackamas River, Oregon.
22485. " "

196. Oncorhynchus quinnat (Rich.) Gthr.

22335. McCloud River, California.
22340. " "
22345. " "
22393. " "
22394. " "
22395. " "
22396. " "
22410. " "
22411. " "
22412. " "
22413. " "
22414. " "
22415. " "
22416. " "
22417. " "
22418. " "
22433. " "
22434. McCloud River, California.
22435. " "
22436. " "
22437. " "
22438. " "
22440. " "
22441. " "
22444. " "
22445. " "
22447. " "
22448. " "
22449. " "
22481. " "
22482. " "
22483. " "
23153. California.

197. Salvelinus fontinalis (Mitch.) Gill & Jor.

3613. Madrid, New York.
6820. Sing Sing, New York.
7064. " "
7988. Madrid, New York,
16098. Luzerne County, Pennsylvania.
16099. " "
21581. New York Market.

198. Salvelinus oquassa (Girard) Gill & Jor.

19521. New York Market.

199. Salvelinus Bairdii (Suckley) Gill & Jor.

15533. McCloud River, California.
22337. " "
22355. Clackamas River, Oregon.
22357. Clackamas River, Oregon.
22469. McCloud River, California.

ALEPIDOSAURIDÆ.

200. Alepidosaurus ferox Lowe.

22294. Off Gloucester, Massachusetts.
22640. " "
22641. Le Have Bank, 200–250 fathoms.
24243. Lat. 43° 06′ N., Lon. 61° 18′ W., 200 fths.
24244. Western part Le Have Bank, 120 fathoms.
24296. Lat. 42° 37′ N., Lon. 62° 55′ W., 200 fathoms.
24297. " " "

HYODONTIDÆ.

201. Hyodon tergisus LeS.

11058. Sandusky, Ohio.
11170. " "
11221. Cincinnati, Ohio.
12255. " "
12256. " "
12257. " "
12258. " "
12259. " "
12261. " "
12262. " "
12263. " "
12450. Ecorse, Michigan.
12451. " "
12474. Yellowstone River.
12475. "
12476. "
12478. Pompey's Pillar.
12480. Yellowstone River.
18564. Sandusky, Ohio.
18566. Ecorse, Michigan.
18567. " "
22961. " "

ALBULIDÆ.

202. Albula vulpes.

Albula conorhynchus Bl. Schn.

18144. Bermuda.
18145. "
18146. "
18147. "
18148. "
18149. "
18150. "
18151. "
18152. "
18153. Bermuda.
18154. "
18155. "
18156. "
19788. "
21560. New York Market.
21648. Newport, Rhode Island.
21859. New Bedford, Massachusetts.
21863. New London, Connecticut.

ELOPIDÆ.

203. Elops saurus Linn.

15573. New York Market.
15574. "
15580. "
16852. New Bedford, Massachusetts.
18573. Wood's Holl, Massachusetts.
18574. " "
18575. " "
18576. " "
19637. Florida.
19649. Fort Macon, North Carolina.
19851. Wood's Holl, Massachusetts.
19874. " "
21559. New York Market.
22955. "
24802. "
24803. "

DUSSUMIERIDÆ.

204. Etrumeus teres (DeKay) Brevoort.

19517. Wood's Holl, Massachusetts.

CLUPEIDÆ.

205. Brevoortia tyrannus (Latrobe) Goode.

Brevoortia menhaden (Mitch.) Gill.

10698. Wood's Holl, Massachusetts.
14302. " "
14303. " "
14304. " "
14305. " "
14306. Noank, Connecticut.
14307. " "
14308. " "
14309. " "
14948. " "
16012. Wood's Holl, Massachusetts.
16014. " "
16016. " "
18417. Saint John's River, Florida.
18418. " "
18419. " "
18420. Saint John's River, Florida.
18421. " "
18422. " "
18423. " "
18424. " "
18425. " "
18426. " "
18427. " "
18428. " "
18429. " "
18431. " "
19043. " "
19045. " "
22801. Wood's Holl, Massachusetts.
24434. Yorktown, Virginia,
24465. Wood's Holl, Massachusetts.

206. Brevoortia patronus Goode.

21341. Pensacola, Florida.
22809. " "
22810. Pensacola, Florida.
22825. " "

207. Alosa sapidissima (Wils.) Linsly.

5472. New Bedford, Massachusetts.
10626. Potomac River.
10627. "
10629. "
12944. South Hadley Falls, Massachusetts.
12945. " "
12946. " "
14292. Noank, Connecticut.
14293. " "
14294. " "
14295. Portland, Maine.
14296. " "
14297. " "
14298. " "
14299. " "
14500. Portland, Maine.
14301. " "
14847. Noank, Connecticut.
14931. Neuse River, North Carolina.
14934. Washington Market.
18513. "
19209. "
20469. South Hadley Falls, Massachusetts.
20472. " "
20970. Avoca, North Carolina.
21225. Gravesend Bay, New York.
21414. Avoca, North Carolina.
22953. East coast of United States.
23107. Avoca, North Carolina.

208. Opisthonema thrissa Gill.

19463. Eastern shore of Virginia.

209. Pomolobus æstivalis (Mitch.) Goode & Bean.

P. pseudoharengus (Wils.) Gill (in part).

22370. Wood's Holl, Massachusetts.
23175. Wood's Holl, Massachusetts.

210. Pomolobus vernalis (Mitch.) Goode & Bean.

P. pseudoharengus (Wils.) Gill (in part).

14848. Noank, Connecticut.
21439. Cohasset Narrows, Massachusetts.
22369. Wood's Holl, Massachusetts.
22786. " "
23176. Wood's Holl, Massachusetts.
23177. " "
23178. " "

211. Pomolobus pseudoharengus (Wilson) Gill.

Under this name, which is now known to have been bestowed upon the two distinct species immediately preceding it in this list, a number of specimens were distributed in 1877. *Pomolobus vernalis* may be at

once separated from *P. æstivalis* by its larger eye and higher fins. The catalogue numbers of the mixed lot follow.

10644. Wood's Holl, Massachusetts,
10645. " "
10659. " "
10699. " "
10700. " "
10732. " "
10753. " "
14268. " "
14276. Portland, Maine.
14279. Portland, Maine.
14280. " "
14281. " "
14283. " "
14285. " "
14286. " "
14945. East coast of United States.
14946. " "

212. Pomolobus mediocris (Mitch.) Gill.

5470. New Bedford, Massachusetts.
10624. Potomac River.
10646. Wood's Holl, Massachusetts.
10647. " "
10671. " "
10688. Potomac River.
12500. Norfolk, Virginia.
12802. " "
15237. Potomac River.
16753. Potomac River.
18432. Saint John's River, Florida.
18433. " "
19456. Potomac River.
19715. Fort Macon, North Carolina.
19751. East coast of United States.
19785. " "
19871. New Bedford, Massachusetts.

213. Clupea harengus Linnæus.

14217. Eastport, Maine.
14218. " "
14220. " "
14230. " "
14232. " "
14235. " "
14238. Portland, Maine.
14241. " "
14242. " "
14245. " "
14248. " "
14251. " "
14256. Wood's Holl, Massachusetts.
14257. " "
14259. Wood's Holl, Massachusetts.
14757. Eastport, Maine.
14758. " "
17567. " "
17568. " "
17569. " "
17570. " "
17571. " "
17572. " "
17573. " "
21687. Ipswich Bay, Massachusetts.
22366. Wood's Holl, Massachusetts.
24526. " "

DOROSOMIDÆ.

214. Dorosoma cepedianum (Lac.) Gill.

12314. Washington Market.
12315. "
12803. Norfolk, Virginia.
14991. Potomac River.
15073. New York Market.
17131. Potomac River.
17132. "
17133. "
17134. "
17135. "
17136. "
17137. "
17138. Potomac River.
17139. "
17140. "
17141. "
18435. Saint John's River, Florida.
18436. " "
18437. " "
18529. Kinston, North Carolina.
18530. " "
19873. East coast of United States.
24678. Washington Market.
24975. "

ENGRAULIDÆ.

215. Engraulis vittatus (Mitch.) Bd. & Girard.

19003. Wood's Holl, Massachusetts.
19004. " "
19005. " "
19006. " "
19007. " "
19008. " "
19009. " "
19010. " "
19011. Wood's Holl, Massachusetts.
19012. " "
19013. " "
19014. " "
19015. " "
19016. " "
19017. " "

CATOSTOMIDÆ.

216. Myxostoma macrolepidota (LeS.) Jor.

24850. Washington Market.
24895. "
24898. Washington Market.

217. Erimyzon sucetta (Lac.) Jor.

18245. Potomac River.
18246. "
18247. "
18248. "
18249. Potomac River.
18250. "
18251. "
24897. Washington Market.

218. Hypentelium nigricans (LeS.) Jordan.

Catostomus nigricans LeSueur.

7679. Yellow Creek, Ohio.
8303. Aux Plaines, Illinois.
8762. " "
9152. Illinois.
15357. Susquehanna River, Pennsylvania.
19868. Yellow Creek, Ohio.
19870. " "

219. Catostomus commersonii (Lac.) Jordan.

6853. Port Huron, Wisconsin.
7677. Cleveland, Ohio.
7706. " "
7777. Wisconsin.
7781. "
8409. Yellow Creek, Ohio.
8440. Racine, Wisconsin.
8457. Port Huron, Wisconsin.
8501. Detroit River, Michigan.
8728. Huron River, Wisconsin.
8870. Alabama.
8984. Cleveland, Ohio.
9054. Racine, Wisconsin.
9059. Ohio.
9170. Western States.
9207. Lake Champlain.
9393. Ecorse, Michigan.
9646. " "
20097. Sing Sing, New York.
20241. Near Richmond, Indiana.
20268. Root River, Wisconsin.
24849. Washington Market.

220. Catostomus longirostrum LeS.

8437. Essex County, New York.

CYPRINIDÆ.

221. Hybopsis amarus (Grd.) Cope.

15379. Chapman's Point, Maryland.

222. Luxilus cornutus (Mitch.) Jordon.

7377. Yellow Creek, Ohio.
8556. " "
9431. Aux Plaines River, Illinois.
15358. Susquehanna River, Pennsylvania.
19850. Aux Plaines River, Illinois.

223. Semotilus corporalis (Mitch.) Putnam.

7435. Westport, New York.
8308. Root River, Wisconsin.
8336. Westport, Lake Champlain.
8741. Black River, Ohio.
8833. Black Warrior River, Alabama.
8956. Racine, Wisconsin.
8965. Quebec, Canada.

224. Semotilus bullaris (Raf.) Jordon.

Semotilus rhotheus Cope.
Semotilus argenteus (Storer) Putnam.

7823. New England, and New York.
8775. " "
8979. " "
8985. " "
9107. " "
9645. " "
12933. South Hadley Falls, Massachusetts.
15404. " "
19848. New England and New York.
19869. Sing Sing, New York.
22857. Schoodic Lake, Maine.

225. Ceratichthys biguttatus (Kirt.) Girard.

6816. Black River, Ohio.
15361. Bainbridge, Pennsylvania.
18019. Bainbridge, Pennsylvania.

226. Rhinichthys cataractæ (C. & V.) Jordan.

Rhinichthys nasutus (Ayres) Ag.

8505. Carlisle, Pennsylvania.

227. Notemigonus americanus (L.) Jordon.

9247. Washington Market.
11074. Sandusky, Ohio.
11152. " "
11153. " "
11154. " "
17792. " "
17793. " "
17794. " "
17795. " "
18323. Saint John's River, Florida.
18324. " "
18325. " "
18326. " "
18327. " "
18329. Saint John's River, Florida.
18330. " "
18331. " "
19063. " "
19064. " "
19065. " "
19066. " "
19067. " "
19068. " "
19069. " "
23109. Avoca, North Carolina.
23110. " "
23111. " "

228. Exoglossum maxillingua (LeS.) Haldeman.

7760. New York to Ohio and Maryland.
9044. " " "
15360. Bainbridge, Pennsylvania.

229. Idus melanotus Heckel.

22973. Druid Hill Ponds, Baltimore, Maryland.

230. Carassius auratus (Linn.) Bleeker.

18290. Washington Market.
18291. "
18292. "
18293. "
18294. Washington Market.
18297. "
20965. New York Market.

231. Cyprinus carpio Linn.

22964. Druid Hill Ponds, Baltimore, Md.
22966. " " "
22968. Druid Hill Ponds, Baltimore, Md.
22969. " " "

SILURIDÆ.

232. Ichthælurus punctatus (Raf.) Jordan.

1540. Cincinnati, Ohio.
8882. Michigan.
11118. Sandusky, Ohio.
11123. " "
12247. Cincinnati, Ohio.
12248. " "
12249. " "
12250. Cincinnati, Ohio.
12251. " "
12252. " "
12282. " "
12283. " "
21268. Saint John's River, Florida.

233. Amiurus nigricans (LeS.) Gill.

21269. Saint John's River, Florida.
21270. Saint John's River, Florida.

234. Amiurus albidus (LeS.) Gill.

1486. Potomac River.
15352. Bainbridge, Pennsylvania.
19930. Washington Market.
20299. Havre de Grace, Maryland.
23188. Philadelphia, Pennsylvania.
23190. Washington Market.
23191. "
24851. "
24893. "

235. Amiurus lophius Cope.

15829. Huntington, Maryland.
15830. Huntington, Maryland.

236. Amiurus natalis (LeS.) Gill var. **lividus** (Raf.).

8847. Western and Southern United States.
9220. Western and Southern United States. (7).

237. Amiurus vulgaris (Thomp.) Nelson var. **ælurus** (Grd.).

1507. North Red River, Minnesota.

238. Amiurus catus (L.) Gill.

Amiurus nebulosus (LeS.) Gill.

1433. Sing Sing, New York.
1479. Chesapeake Bay.
8444. Washington Market.
8695. "
9085. "
9730. Philadelphia, Pennsylvania.
9732. Washington Market.
12949. South Hadley Falls, Massachusetts.
15353. Bainbridge, Pennsylvania.
18278. Washington Market.
18279. "
18280. "
18281. "
18282. "
18283. Washington Market.
18284. "
18285. "
18286. "
18287. "
18288. "
18289. "
19453. Potomac River.
20378. South Hadley Falls, Massachusetts.
20454. Wilkes Barre, Pennsylvania.
22108. Washington Market.
23186. Potomac River.
23189. "
24852. Washington Market.

239. Amiurus melas (Raf.) Jordan & Copeland.

1497. Northfield, Illinois.
1514. Racine, Wisconsin.
1525. Patapsco River.
7597. Cook County, Illinois.

240. Noturus insignis (Rich.) Gill & Jordan.

Noturus marginatus Baird.

1470. James River, Virginia.
15354. Bainbridge, Pennsylvania.
18012. " "
18016. " "
19454. Potomac River.
23187. "
23196. "

241. Noturus exilis Nelson.

1438. South Grand River, Missouri.

242. Noturus gyrinus (Mitch.) Raf.

1430. Near Piermont, New York.

243. Ariopsis felis (L.) Gill & Jordan.

22751. ?

CONGRIDÆ.

244. Conger oceanica (Mitch.) Gill.

19495. Beaufort, North Carolina.
22797. East coast of United States.

ANGUILLIDÆ.

245. Anguilla rostrata (LeS.) De Kay.

Anguilla bostoniensis (LeS.) De Kay.

13583. Wood's Holl, Massachusetts.
13584. " "
13586. " "
13589. " "
13590. " "
14051. Noank, Connecticut.
14183. " "
14184. " "
14185. " "
14186. " "
14188. " "
14191. " "
14194. " "
14195. " "
14196. " "
14200. " "
14202. " "
14203. " "
14211. Wood's Holl, Massachusetts.
14216. Eastport, Maine.
16115. Wood's Holl, Massachusetts.
16146. " "
17220. Noank, Connecticut.
17221. " "
17222. " "
17223. " "
17224. " "
17225. " "
17226. " "
17227. " "
17228. " "
17229. " "
17230. " "
20766. Grand Lake Stream, Maine.
22654. Gloucester, Massachusetts.
22711. " "
22910. " "
24422. " "
25093. Wood's Holl, Massachusetts.

SIMENCHELYIDÆ.

246. Simenchelys parasiticus Gill.

21675. Le Have Bank.
21676. "
21849. Western Bank, 200 fathoms.
21862. Banquereau.
22791. Grand Banks.
22794. Lat. 43° 25′ N., Lon. 60° 20′ W.
22888. Grand Banks.
23071. Lat. 44° 17′ N., Lon. 58° 10′ W., 120 fths.
23072. " " "
23075. Banquereau.
23076. Lat. 43° 18′ N., Lon. 60° 24′ W., 250 fths.
24370. Lat. 43° 15′ N., Lon. 50° 20′ W., 200 fths.
24384. Lat. 42° 48′ N., Lon. 63° W. 130 fathoms.
24385. Lat. 42° 37′ N., Lon. 62° 55′ W., 200 fathoms.
24386. Lat. 43° 05′ N., Lon. 61° 03′ W., 150 fathoms.
24387. Lat. 44° 12′ N., Lon. 58° 56′ W., 230 fathoms.
24388. Lat. 43° 27′ N., Lon. 60° W., 150 fathoms.
24395. Lat. 44° 02′ N., Lon. 59° W., 300 fathoms.
24414. Lat. 43° 42′ N., Lon. 59° 10′ W., 300 fathoms.
24426. Lat. 42° 37′ N., Lon. 66° 55′ W., 200 fathoms.
24427. " " "
24428. Lat. 44° 12′ N., Lon. 58° 56′ W., 230 fathoms.
24429. Lat. 43° 27′ N., Lon. 60° W., 150 fathoms.
24733. Lat. 43° 48′ W., Lon. 59° W., 300 fathoms.

MURÆNIDÆ.

247. Muræna sanctæ-helenæ.

20183. Bermuda.

SYNAPHOBRANCHIDÆ.

248. Synaphobranchus pinnatus (Gronow) Gthr.

21683. Le Have Bank.
21684. "
21685. "
21848. Western Bank, 200 fathoms.
21860. Le Have Bank, 150 fathoms.
21868. Lat. 43° 23′ N., Lon. 60° 40′ W., 280 fths.
21871. Lat. 59° 50′ N., Lon, 43° 25′ W., 300 fths.
22792. Lat. 42° 47′ N., Lon. 63° 10′ W.
22889. Grand Banks.
22892. Grand Banks, 200 fathoms.
22893. 30 miles S. N. W. light of Sable Island.
23077. Lat. 43° 53′ N., Lon. 58° 51′ W., 250 fths.
23078. Lat. 43° 53′ N., Lon. 58° 51′ W., 250 fths.
23080. Near George's Bank.
23083. Banquereau.
23145. Banquereau.
23146. Lat. 44° 29′ N., Lon. 57° 09′ W., 250 fathoms.
24209. Banquereau.
24210. "
24216. Lat. 44° 30′ N., Lon. 57° 08′ W., 200 fathoms.
24271. Lat. 43° 41′ N., Lon. 59° 15′ W., 200 fathoms.
24272. Lat. 42° 41′ N., Lon. 62° 58′ W., 200 fathoms.
24352. Lat. 44° 30′ N., Lon. 57° 08′ W., 200 fathoms.
24353. Lat. 47° 20′ N., Lon. 50° 48′ W., 48 fathoms.
24383. Lat. 43° 25′ N., Lon. 60° W., 180 fathoms.
24390. Lat. 44° N., Lon. 58° 30′ W., 160 fathoms.
24430. Lat. 43° 05′ N., Lon. 61° 03′ W., 150 fathoms.
24734. Southern part of Western Bank.
24735. Grand Banks, Lat. 44°.

AMIIDÆ.

249. Amia calva Linnæus.

3227. Falls of the Missouri.
6702. Mississippi Valley.
9502. "
11017. Sandusky, Ohio.
11018. " "
11134. " "
11135. " "
11137. " "
11139. " "
11141. " "
12495. " "
16584. New York Market.
18545. Mississippi Valley.
18546. "
18547. "
18548. "
18549. "
18550. "
18551. "
18552. "
18553. "
18555. "
23104. Avoca, North Carolina.

LEPIDOSTEIDÆ.

250. Lepidosteus osseus (Linn.) Ag.

3236. Potomac River.
6785. Mississippi Valley.
9510. "
9512. "
10637. Potomac River.
10717. "
12493. Detroit, Michigan.
15366. Potomac River.
15449. "
15450. "
15451. "
15452. "
18298. Saint John's River, Florida.
18523. Kinston, North Carolina.

18556. Potomac River.
18558. "
18559. "
18560. "
18561. "
18562. "
19048. Florida.
19444. "
19445. "
19446. "
19875. Potomac River.
22496. "
23102. Avoca, North Carolina
25149. Potomac River.
25151. "
25153. "
25154. "
25155. "
25158. "

251. Lepidosteus platystomus Rafinesque.

9505. Great Lakes and W. to Rocky Mts.
12497. Great Lakes and W. to Rocky Mts.

POLYODONTIDÆ.

252. Polyodon folium Lac.

3234. Foxburg, Pa.
3235. Tennessee.
12228. Cincinnati, Ohio.
12229. " "
12230. " "
12231. " "
12232. " "
12233. " "
12297. " "
12331. Madison, Indiana.
12334. " "
12414. Cincinnati, Ohio.
15475. Madison, Indiana.
15480. " "
15481. " "
15482. " "
15483. " "

ACIPENSERIDÆ.

253. Acipenser oxyrhynchus Mitchell.

19897. Potomac River.
20336. "
22703. "
22956. Potomac River.
22957. "

254. Acipenser ruthenus Linnæus.

22974. Baltimore, Maryland.

255. Scaphirhynchops platyrhynchus (Raf.) Gill.

2565. Cincinnati, Ohio.
3246. Republican River, Kansas.
3255. Cincinnati, Ohio.
12236. " "
12237. " "
12238. " "
12239. " "
12240. " "
12241. " "
12242. " "
12244. Cincinnati, Ohio.
12245. " "
12461. " "
12463. " "
12473. Yellowstone River.
15476. Madison, Indiana.
15478. " "
15479. " "
22158. Mt. Carmel, Illinois.

CHIMÆRIDÆ.

256. Chimæra plumbea Gill.

21805. Lat. 43° 51′ N., Lon. 59° 05′ W.
21858. Le Have Bank,
21904. Banquereau.
22642. "
22667. Grand Banks.
23912. Banquereau.
23913. "
23914. Lat. 43° 32′ N., Lon. 60° 21′ W., 250 fathoms.
24287. Lat. 42° 37′ N., Lon. 62° 55′ W., 200 fathoms.
24303. Lat. 44° 15′ N., Lon. 58° 52′ W., 250 fathoms.
24304. Lat. 44° N., Lon. 58° 30′ W., 160 fathoms.
24305. " " "
24306. Fishing Banks.

DASYBATIDÆ.

257. Dasybatis centrurus (Mitch.) Gill, MSS.

22938. ?

RAIIDÆ.

258. Raia eglanteria Lac.

22270. Gloucester, Massachusetts.
22661. " "
24203. Provincetown, Massachusetts.

259. Raia erinacea Mitch.

14156. Wood's Holl, Massachusetts.
14159. " "
14160. " "
14161. " "
14165. " "
14169. " "
14172. " "
14176. Wood's Holl, Massachusetts.
22320. Gloucester, Massachusetts.
22386. Noank, Connecticut.
22887. East coast of United States.
22954. " "
24358. Provincetown, Massachusetts.

260. Raia ocellata Mitch.

14158. Wood's Holl, Massachusetts.
22886. Gloucester, Massachusetts.
24226. " "
24227. " "
24229. Gloucester, Massachusetts.
24230. " "
24248. Provincetown, Massachusetts.

261. Raia radiata Donovan.

21012. Halifax, Nova Scotia.
21031. " "
21048. " "
21502. Salem, Massachusetts.
21815. Gloucester, Massachusetts.
22271. " "
22295. Off Gloucester, Massachusetts.
22312. Gloucester, Massachusetts.
22662. Gloucester, Massachusetts.
24310. Provincetown, Massachusetts.
24354. " "
24608. Off coast of Nova Scotia.
24631. " "
25193. Wood's Holl, Massachusetts.
25210. Gloucester, Massachusetts.

ODONTASPIDIDÆ.

262. Eugomphodus littoralis Gill.

22720. East coast of United States.

SPHYRNIDÆ.

263. Sphyrna zygæna (L.) Müll. & Henle.

22942. East coast of United States.
22943. East coast of United States.

GALEORHINIDÆ.

264. Eulamia obscurus (LeS.) Gill.

19420. Wood's Holl, Massachusetts.
19421. " "
19422. " "
19423. Wood's Holl, Massachusetts.
19424. "

265. Mustelus canis (Mitch.) DeKay.

7298. East coast of United States.
7301. Beesley's Point, New Jersey.
14153. Noank, Connecticut.
14154. " "
14754. " "
16006. Wood's Hol, Massachusetts.
16028. " "
16213. " "
16214. " "
16215. " "
16242. " "
16243. " "
16244 " "
16245. Wood's Holl, Massachusetts.
16246. " "
16247. " "
16248. " "
16580. " "
19257. " "
19425. " "
19426. " "
21854. Newport, Rhode Island.
22712. East coast of United States.
22941. " "
23163. Wood's Holl, Massachusetts.

SPINACIDÆ.

266. Squalus acanthias Linnæus.

Squalus americanus (Storer) Gill.

19275. Wood's Holl, Massachusetts.
19276. " "
19277. " "
19278. " "
19279. " "
19921. Eastport, Maine.
19923. " "
21855. George's Bank.
22316. Gloucester, Massachusetts.
22660. " "

267. Centroscyllium Fabricii (Rhdt.) Müll. & Henle.

21622. Lat. 42° 40′ N., Lon 63° 50′ W., 250 fths.
21686. George's Bank.
21836. Off Gloucester, Massachusetts.
22281. " "
22637. Le Have Bank.
22743. Lat. 43° 56′ N., Lon. 59° 04′ W.
22744. Banquereau.
22749. Sable Island Bank.
22878. Lat. 44° 33′ N., Lon. 53° 48′ W.
22879. Lat. 44° 23′ N., Lon. 53° 25′ W., 200 fths.
22880. Lat. 44° 38′ N., Lon. 57° 09′ W., 200 fths.
23065. Banquerean.
23066. "
23067. Lat. 44° 20′ N., Lon. 57° 57′ W.
24257. Lat. 43° 25′ N., Lon. 60° W., 250 fathoms.
24300. Lat. 42° 37′ N., Lon. 62° 55′ W., 200 fathoms.
24392. " " "
24705. Lat. 43° 27′ N., Lon. 51° 47′ W., 200 fathoms.
24706. " " "
25105. Grand Banks.
25106. "
25111. Lat. 42° 46′ N., Lon. 65° 18′ W., 200 fathoms.

268. Centroscymnus cœlolepis Bocage & Capello.

21621. Lat. 42° 40′ N., Lon. 63° 50′ W., 260 fths.
21833. Grand Banks.
21835. "
21905. Banquereau.
22282. "
22668. Grand Banks, 200 fathoms.
23064. Banquerean.
24295. Lat. 43° 25′ N., Lon. 60° W., 180 fathoms.
24298. Lat. 42° 15′ N., Lon. 58° 52′ W., 250 fathoms.
24299. Lat. 42° 37′ N., Lon. 62° 55′ W., 200 fathoms.
24711. Lat. 44° N., Lon. 52° 50′ W., 250 fathoms.

MYXINIDÆ.

269. Myxine glutinosa Linnæus.

21679. Le Have Bank.
22894. Lat. 44° 45′ N., Lon. 53° 54′ W., 400 fths.
22895. Lat. 45° 03′ N., Lon. 54° 30′ W., 85 fths.
22896. Grand Banks.
22897. "
23085. Eastern part of George's Bank, 46 fths.
23086. " " "
23087. Lat. 44° 18′ N., Lon. 58° 24′ W., 150 fathoms.
23088. Grand Banks.
23089. Lat. 44° 17′ N., Lon. 58° 10′ W., 120 fathoms.
23090. " " "
24204. Grand Banks.
24367. Banquereau.
24725. Lat. 44° 30′ N., Lon. 58° 07′ W., 200 fathoms.

WASHINGTON, *May* 1, 1880.

THE LITTORAL MARINE FAUNA OF PROVINCETOWN, CAPE COD, MASSACHUSETTS.

By RICHARD RATHBUN.

The species enumerated in the following list were, unless otherwise stated, all collected by the United States Fish Commission during the summer of 1879. As the list, however, represents only a few days' collecting, at intervals when the steamer was not available for dredging purposes, it must be considered as far from complete, especially as regards the smaller forms, while no attempt has been made to include the groups of Entomostraca, Foraminifera, &c. Considering the fact that very little has yet been published concerning the shore animals of this region, I feel justified in offering the list in its present imperfect form in

order to supply more definite information as to the so-called boundary line separating the Northern and Southern New England faunæ.

Rock exposures are entirely wanting about the outer extremity of Cape Cod, and the sandy areas which compose the most of that region are generally of so pure a character as to offer little inducement to animal life in the way of food. The littoral fauna of Provincetown and vicinity is therefore less rich in species than a more diverse region would be. Nevertheless a more diligent search than has hitherto been instituted would undoubtedly result in the finding of many species additional to those given below. Prof. H. E. Webster, who spent the entire summer of 1879 in collecting and studying especially the shore annelids about Provincetown, obtained many new forms not included in this list.

The localities examined in 1879 were about as follows: The inner beach of the cape in front of the town of Provincetown, from the dike on the south to Wood End on the north and from high-water to low-water mark, including the eel-grass areas lying directly off the beach and the broad sand-flats in front of and behind it; the inner beach at Long Point; the piles of the wharves, especially those at the ends of the long steamboat and railroad wharves; and the outer beaches at Wood End, Race Point, &c. A few interesting species obtained at Wellfleet by Professor Webster are included in the list, and I am also indebted to him for material from about Provincetown. The identifications of species are only partly mine. Prof. A. E. Verrill furnishes the lists of worms and Nudibranchs; Prof. S. I. Smith has kindly identified the Amphipods and more difficult Decapods; and Mr. Sanderson Smith the more critical species of Mollusks. Mr. O. Harger has also examined the Isopods. In addition to the species contained in the list, a species of *Chironomus* in the larval stage was found abundantly on the shore, and one or more species of mites were common among Hydroids. Of the one hundred and fifty-seven species included in the list, all but twenty-one were previously known to range both to the north and south of Cape Cod. Of the species whose range has been extended, thirteen belong properly to the fauna of Southern New England and seven to that of Northern New England. The southern species are as follows: *Pallene empusa*, *Pinnixa chætopterana*, *Gebia affinis*, *Mœra levis*, *Microdeutopus grandimanus*, *Amphithoë longimana*, *Chelura terebrans*, *Caprella geometrica*, *Leptochelia algicola*, *Sigalion arenicola*, *Sthenelais picta*, *Anthostoma robustum*, and *Leptosynapta roseola*. The northern species are: *Leptochelia cæca*, *Praxilla zonalis*, *Tetrastemma vermiculus*, *Planocera elliptica*, *Embletonia fuscata*, *Stiliger fuscata*, and *Edwardsia sulcata*. The only new littoral species discovered by the Commission, so far as the collections have been worked up, is *Edwardsia pallida*.

Excepting in a few necessary instances the synonymy of the species has been omitted, but references have been given in nearly all cases to American publications in which the synonymy and range of the several species and other information concerning them are discussed.

NEW HAVEN, CONN., *April* 8, 1880.

PYCNOGONIDA.

Pallene empusa Wilson, Trans. Conn. Acad. Arts and Sciences, vol. v, p. 9, pl. iii, figs. 2*a* to 2*g*, 1878.—*Phoxichilidium maxillare* Smith, Inv. of Vineyard Sound, p. 544, 1874 (*non* Stimpson).

Found amongst the eel-grass, low water to ½ fathom. Former localities: Vineyard Sound (U. S. F. C., 1871) and Noank, Conn. (U. S. F. C., 1874).

MEROSTOMATA.

Limulus Polyphemus Latreille. Smith, Inv. V. S., p. 580, 1874.

Very common along the entire inner shore of the cape, in the vicinity of Provincetown. The living specimens were usually encountered partly buried in the sand, near low-water mark. They sometimes attain a very large size in this region, but the majority of the specimens seen were from small to medium size and females. All the larger specimens collected were males. The cast skins or exuviæ were sometimes so abundant that they nearly made up the little ridge of *débris* running along the upper part of the beaches.

Two specimens, both females, were obtained in the act of molting; one was living, the other dead. In the case of the latter the operation of throwing off the old skin had advanced considerably, allowing us to measure accurately the increase in the size of the carapax for the past year. Of the exuvia, the greatest width of the carapax was 57^{mm}; length of carapax along the median line, 35^{mm}; distance between the tips of the spines surmounting the compound eyes, 31.5^{mm}; length of compound eye, 3.5^{mm}. The carapax of the newly expanded animal had a width of 67^{mm}; length, 45^{mm}; distance between the spines of compound eyes, 43^{mm}; length of compound eye, 5^{mm}. The living specimen had only broken slightly through the outer skin, so that but one measurement could be made without destroying it. The width of the old carapax was 124^{mm}, of the new 141^{mm}; but as the latter had suffered contraction in alcohol, it must have been larger originally.

DECAPODA.

Gelasimus pugnax Smith, Trans. Conn. Acad., vol. ii, p. 131, 1870; ibid., vol. v, p. 33, 1879; Inv. V. S., p. 545, 1874.

Very abundant on the salt marshes and upper part of the beaches, between the town and Wood End Light. Also found at the same place by Prof. S. I. Smith and Mr. O. Harger, in 1872.

Gelasimus pugilator Latreille. Smith, Trans. Conn. Acad., vol. ii, p. 136, 1870; ibid., vol. v, p. 33, 1879; Inv. V. S., p. 545, 1874.

A few specimens only of this species have been noticed from Provincetown; they were found on the beach near the dike in 1872, by Smith and Harger.

Pinnixa chætopterana Stimp., Ann. Lyc. N. H., New York, vol. vii, p. 235, 1860.

Wellfleet, 1879; collected by Prof. H. E. Webster, who found it in great abundance in the tubes of *Amphitrite ornata*, on the flats near the town.

Platyonichus ocellatus Latr. Smith, Inv. V. S., p. 547, 1874; Trans. Conn. Acad., vol. v, p. 33, 1879.

Extremely abundant everywhere along the inner shore, in the vicinity of Provincetown, at low water and deeper. Large numbers were observed to be molting during August and the last of July, and fresh exuviæ were very common all through the latter half of the summer. One small specimen obtained while molting, and preserved in alcohol, afforded the following measurements: length of carapax in the exuvia, 35^{mm}; width, 42^{mm}; length of freshly expanded carapax, partly contracted in alcohol, 38^{mm}; width, 47^{mm}. The largest specimen taken on the shore measured: length of carapax, 71^{mm}; width, 86^{mm}. On August 16, and during one or more succeeding days, the young were seen swimming at the surface in countless numbers, but how far from the shore they extended was not determined; they were very plentiful about the end of the long steamboat wharf. They varied in length of carapax from about 11^{mm} to 16 ^{mm}. September 3 they were again abundant, but less so than on the former occasion, and they remained nearer the shore, or at least closer to the bottom. At this time they were from 18^{mm} to 23^{mm} long.

Carcinus mænas (Linné) Leach. Smith, Trans. Conn. Acad., vol. v, p. 34, 1879.—*C. granulatus* Smith, Inv. V. S., p. 547, 1874.

Collected by Smith and Harger, 1872.

Panopeus depressus Smith, Proc. Bos. Soc. N. H., vol. xii, p. 283, 1859; Inv. V. S., p. 547, 1874; Trans. Conn. Acad., vol. v, p. 37, 1879.

Collected by Smith and Harger, 1872.

Panopeus Sayi Smith, Proc. Bos. Soc. N. H., vol. xii, p. 284, 1859; Inv. V. S., p. 547, 1874; Trans. Conn. Acad., vol. v, p. 37, 1879.

Found abundantly in the eel-grass off the dike, and also collected by Smith and Harger, 1872.

Cancer irroratus Say. Smith, Trans. Conn. Acad., vol. v, p. 38, 1879.

Common; shore, at low water.

Libinia emarginata Leach. Smith, Trans. Conn. Acad., vol. v, p. 45, 1879.—*L. canaliculata* Smith, Inv. V. S., p. 548, 1874.

Very abundant at low water, Provincetown; several very large males were also obtained from Wellfleet Harbor, the largest measuring: length of carapax, 113^{mm}; width, excluding spines, 103^{mm}.

Eupagurus longicarpus (Say) Stimp. Smith, Inv. V. S., p. 549, 1874; Trans. Conn. Acad., vol. v, p. 47, 1879.

Very abundant.

Gebia affinis Say. Smith, Inv. V. S., p. 549, 1874.

This species was not collected at Provincetown, but was obtained from the flats at Wellfleet by Prof. H. E. Webster, in 1879, and seems to be abundant there. This is the first time it has been recorded from the north side of Cape Cod.

Crangon vulgaris Fabr. Smith, Inv. V. S., p. 550, 1874; Trans. Conn. Acad., vol. v, p. 55, 1879.

Very common along the shore.

Palæmonetes vulgaris (Say) Stimp. Smith, Inv. V. S., p. 550, 1874; Trans. Conn. Acad., vol. v, p. 88, 1879.

Only a very few specimens of this species were collected, although it was diligently sought for. These were found in the eel-grass in front of the town and off the dike.

SCHIZOPODA.

Mysis stenolepis Smith, Inv. V. S., p. 551, 1874; Trans. Conn. Acad., vol. v, p. 103, 1879.

A few specimens only were collected; they were from the eel-grass in front of the town.

AMPHIPODA.

Orchestia agilis Smith, Inv. V. S., p. 555, 1874.

Very abundant on the beaches, under dead sea-weeds, etc.

Talorchestia longicornis (Say) Smith, Inv. V. S., p. 556, 1874.

Very abundant on both the outer and inner beaches, burrowing deeply into the sand, about high-tide level.

Talorchestia megalopthalma (Bate) Smith, Inv. V. S., p. 556, 1874.

Associated with the preceding.

Hyale littoralis (Stimp.) Smith, Inv. V. S., p. 556, 1874.

Collected in 1879; and also in 1872, by Smith and Harger.

Calliopius læviusculus (Kroy.) Boeck. Smith, Inv. V. S., p. 557, 1874.

Found upon the beach at Long Point among stranded sea-weeds.

Gammarus locusta (Linné) Fabr., Systema Entomologia, 1775. Gould, Inv. Mass., ed. I, p. 334, 1841. Smith, Bull. U. S. Nat. Mus., No. 15, p. 139, 1879.—*G. ornatus* Edwards, Ann. des Sci. Nat., tome xx, p. 367, 1830; Hist. Nat. des Crust., tome iii, p. 47, 1840. Smith, Inv. V. S., p. 557, 1874.

Only a few specimens of small size were obtained from the eel-grass in various places. The scarcity of this species at Provincetown is probably due to the absence of rocks and of much rock-weed, which together form its favorite grounds. A comparison of European with American specimens has enabled Professor Smith to establish the identity of *G. ornatus* and *G. locusta*.

Gammarus annulatus Smith, Inv. V. S., p. 557, 1874.

Shore and flats at low water, and eel-grass; abundant.

Gammarus mucronatus Say, Journ. Phila. Acad., vol. i, p. 376, 1818. Smith, Inv. V. S., p. 559, 1874.

Shore and flats at low water; very abundant.

Mœra levis Smith, Inv. V. S., p. 559, 1874.

In the eel-grass off the dike. Not hitherto recorded from north of Vineyard Sound.

Microdeutopus grandimanus Smith.—*Autonoë grandimana* Bruz., Skand. Amphip. Gamm., p. 26, 1859.—*Microdeutopus minax* Smith, Inv. V. S., p. 562, 1874.

On the shore at low water, in the eel-grass off the dike, and among the sea-weeds on the piles of the wharves. Formerly known on the American coast only from Vineyard and Long Island Sounds.

Amphithoë longimana Smith, Inv. V. S., p. 563, 1874.

Found at low water and in the eel-grass in one-half fathom. Previously known only from south of Cape Cod.

Corophium cylindricum (Say) Smith, Inv. V. S., p. 566, 1874.

Eel-grass, one-half fathom.

Chelura terebrans Philippi. Smith, Proc. U. S. Nat. Mus., vol. ii, p. 232, 1879.

Abundant in old submerged piles of wharves, associated with *Limnoria lignorum* and *Teredo navalis*. First recorded from America in the paper of Professor Smith referred to above, but previously found by him at Wood's Holl in 1875.

Caprella geometrica Say, Journ. Acad. Nat. Sci., Phila., vol. i, p. 390, 1818. Smith, Inv. V. S., p. 567, pl. v, fig. 20, 1874.

In the eel-grass, one-half fathom, and also obtained from floating sea-weeds in Provincetown Harbor. Hitherto recorded from south of Cape Cod only, but discovered by the Fish Commission at Quahog Bay, Maine, in 1873.

ISOPODA.

Jæra albifrons Leach. Harger, Proc. U. S. Nat. Mus., vol. ii, p. 158, 1879.—*Jæra copiosa* Stimpson, Mar. Inv. Grand Manan, p. 40, 1853. Harger, Inv. V. S., p. 571, 1874.

Very abundant on the shore between tides, under loose stones and other objects; and also in the eel-grass in very shallow water.

Chiridotea cœca (Say) Harger, Am. Journ. Sci., III, vol. xv, p. 374, 1878.

Shore, low water; only a few specimens collected.

Idotea irrorata (Say) Edwards. Harger, Inv. V. S., p. 569, 1874; Proc. U. S. Nat. Mus., vol. ii, p. 160, 1879.—*Idotea tricuspidata* Desm., Dict. des Sci. Nat., tome xxviii, p. 373, 1823.

Very abundant on the shore, on piles of wharves, in the eel-grass, and swimming at the surface amongst floating sea-weeds.

Idotea phosphorea Harger, Inv. V. S., p. 569, 1874.

Occasionally found swimming at the surface in Provincetown Harbor, and also upon the beach, with stranded sea-weeds.

Epelys trilobus (Say) Smith, Inv. V. S., p. 571, pl. vi, fig. 28, 1874. Harger, Proc. U. S. Nat. Mus., vol. ii, p. 160, 1879.

Moderately abundant; shore, between tides, and in the eel-grass, one-half fathom; only specimens of small to medium size were met with.

Sphæroma quadridentatum Say. Harger, Proc. U. S. Nat. Mus., vol. ii, p. 161, 1879.

Abundant, but only specimens of small size were obtained; low water and between tides on the shore and flats, and upon eel-grass, in one-half fathom.

Limnoria lignorum (Rathke) White. Harger, Proc. U. S. Nat. Mus., vol. ii, p. 161, 1879.

In piles of old wharves, in company with *Leptochelia algicola* and *Chelura terebrans*.

Leptochelia algicola Harger, Proc. U. S. Nat. Mus., vol. ii, p. 162, 1879.—*Paratanais algicola* Harger, Am. Journ. Sci., III, vol. xv, p. 377, 1878.

Very abundant at low water, on eel-grass, in one-half fathom, and in old piles, associated with *Limnoria lignorum* and *Chelura*.

Leptochelia cœca Harger, Proc. U. S. Nat. Mus., vol. ii, p. 164, 1879.

A single specimen only of this species was recognized among the shore collections.

CIRRIPEDIA.

Balanus balanoides (Linné) Stimp., Mar. Inv. of Grand Manan, p. 39, 1853. Smith, Inv. V. S., p. 579, 1874.

Common on piles of wharves, on shells, stones, and wood on the beaches, and occasionally found on floating fucus. On the piles it was usually of small size, but on stones lying on the beaches it often exceeded half an inch in diameter.

Lepas fascicularis Ellis and Sol. Smith, Inv. V. S., p. 579, 1874.

On floating fucus in the harbor.

ANNELIDA.

Lepidonotus squamatus Leach. Verrill, Invertebrate Animals of Vineyard Sound, p. 581, pl. 10, figs. 40, 41, 1874.

On the piles of wharves.

Harmothoe imbricata Malmg. Ver., Inv. V. S., p. 582, 1874.

Piles of wharves.

Sigalion arenicola Ver., Proc. U. S. Nat. Mus., vol. ii, p. 167, 1879.

Shore, in sand, at low water.

Sthenelais picta Ver., Inv. V. S., p. 582, 1874; Proc. U. S. Nat. Mus., vol. ii, p. 167, 1879.

Shore, in sand, at low water.

Nephthys ciliata Rathke. Ver., Inv. V. S., p. 583, 1874.
Shore, in sand.

Phyllodoce catenula Ver., Inv. V. S., p. 587, 1874.
Piles of wharves.

Eulalia pistacia Ver., Inv. V. S., p. 584, 1874.
Piles of wharves.

Autolytus cornutus A. Ag., Jour. Bos. Soc. N. H., p. 392, 1863. Ver., Inv. V. S., p. 590, pl. 13, figs. 65, 66, 1874.
Piles of wharves, and among eel-grass near the beach.

Nereis limbata Ehlers. Ver., Inv. V. S., p. 590, pl. 11, fig. 51, 1874.
Shore, in sand, and among eel-grass.

Nereis virens Sars. Ver., Inv. V. S., p. 590, pl. 11, figs. 47–50, 1874.
Shore, in sand.

Lumbrinereis fragilis A. and E. Ver., Inv. V. S., p. 594, 1874 (*Lumbriconereis*).
Shore, in sand.

Lumbrinereis tenuis Ver., Check List, p. 8, 1879; Inv. V. S., p. 594, 1874 (*Lumbriconereis*).
Shore, in sand.

Arabella opalina Ver., Check List, p. 8, 1879; Inv. V. S., p. 594, pl. 13, figs. 69, 70, 1874 (*Lumbriconereis*).
Shore, in sand.

Goniada gracilis Ver., Proc. U. S. Nat. Mus., vol. ii, p. 174, 1879.—*Eone gracilis* Ver., Inv. V. S., p. 596, 1874.
Shore, in sand.

Rhynchobolus dibranchiatus Ver., Inv. V. S., p. 596, pl. 10, figs. 43, 44, 1874.
Shore, in sand.

Anthostoma fragile Ver., Inv. V. S., p. 598, 1874.
Shore, in sand.

Anthostoma robustum Ver., Inv. V. S., p. 597, pl. 14, fig. 76, 1874.
Shore, in sand.

Scolecolepis viridis Ver., Inv. V. S., p. 600, 1874.
Shore, in sand.

Polydora ciliatum Clapar. (?) Ver., Inv. V. S., p. 603, pl. 14, fig. 78, 1874.
Shore, in sand.

Cirratulus grandis Ver., Inv. V. S., p. 606, pl. 15, figs. 80, 81, 1874.
Shore, in sand.

Notomastus luridus Ver., Inv. V. S., p. 610, 1874.
Shore, in sand.

Notomastus filiformis Ver., Inv. V. S., p. 611, 1874.
Shore, in sand.

Praxilla zonalis Ver., Proc. Am. Ass. Adv. Sci., 1873, p. 384.
Shore, in sand.

Clymenella torquata Ver., Inv. V. S., p. 608, pl. 14, figs. 71–73, 1874.
Shore, in sand.

Cistenides Gouldii Ver., Inv. V. S., p. 612, pl. 17, figs. 87, 87*a*, 1874.
Shore, in sand.

Nicolea simplex Ver., Inv. V. S., p. 613, 1874.
Piles of wharf, and eel-grass.

Scionopsis palmata Ver., Inv. V. S., p. 614, 1874.
Piles of wharf.

Polycirrus eximius Ver., Inv. V. S., p. 616, pl. 16, fig. 85, 1874.
Shore, in sand, and piles of wharf.

Fabricia stellaris Blainv.—*Fabricia Leidyi* Ver., Inv. V. S., p. 619, 1874.
Piles of wharf.

Hydroides dianthus Ver., Check List, p. 11, 1879; Inv. V. S., p. 620, 1874 (*Serpula*).
On piles of wharves, and incrusting living and dead shells of *Pecten irradians*, *Ensatella americana*, *Littorina littorea*, *Anomia glabra*, &c.; also on fucus and other objects; especially abundant in the vicinity of the dike.

Spirorbis borealis Daud. Ver., Inv. V. S., p. 621, 1874.
On fucus growing on the piles and floating at the surface; abundant.

Clitellio irrorata Ver., Inv. V. S., p. 622, 1874.
Shore, in sand, near high-water mark.

Halodrillus littoralis Ver., Inv. V. S., p. 623, 1874.
On the beach, under dead sea-weeds near high-water mark.

GEPHYREA.

Phascolosoma Gouldii Dies. Ver., Inv. V. S., p. 627, pl. 18, fig. 93, 1874.
Shore, in sand.

ENTEROPNEUSTA.

Balanoglossus aurantiacus Ver., Inv. V. S., p. 627, 1874.
Shore, in sand.

NEMERTINA.

Tetrastemma dorsalis M'Int. Ver., Am. Journ. Sci., vol. x, p. 40, 1875.
Piles of wharves.

Tetrastemma vermiculus Ehr. (?) Ver., Proc. U. S. Nat. Mus., p. 184, 1879.
Piles of wharves.

Lineus viridis Ver., Am. Journ. Sci., vol. x, p. 40, 1875; Inv. V. S., p. 628, 1874 (*Nemertes*).

Piles of wharves.

Cerebratulus ingens (Leidy) Ver., Check List, p. 12, 1879; Inv. V. S., p. 630, 1874 (*Meckelia*).

Shore, in sand.

Cerebratulus roseus (Leidy) Ver., Check List, p. 12, 1879; Inv. V. S., p, 630, 1874 (*Meckelia*).

Shore, in sand.

TURBELLARIA.*

Planocera elliptica Gir., Proc. Bos. Soc. Nat. Hist., p. 251, 1850.

Piles of wharves, and on the shore under bits of wood, &c.

Bdelloura candida Gir. Ver., Inv. V. S., p. 634, 1874.

Parasitic on *Limulus Polyphemus*.

CEPHALOPODA.

Ommastrephes illecebrosa (Les.) Ver., Inv. V. S., p. 634, 1874.—*O. sagittatus* Binney, in Gould, Inv. Mass., ed. II, p. 510, 1870.

This species is caught in Provincetown Harbor during the summer and early fall in considerable numbers, to use for bait, and is often stranded upon the beaches at low tide. Prof. S. I. Smith and Mr. Oscar Harger, while at Provincetown in 1872, noticed large numbers of this squid about the docks, killing and eating young mackerel. Their observations on the habits and appearance of the creature made at that time are given in the report of the United States Fish Commission for 1871–'72, pp. 441, 442, 1874.

Loligo Pealei Les. Binney, in Gould, Inv. Mass., II, p. 514, 1870. Ver., Inv. V. S., p 635, 1874.

This species was not encountered at Provincetown by the Fish Commission, but it is represented in the collection of Mr. J. H. Blake, of that place, by two pens taken from specimens caught in the harbor, in July, 1879. It is not abundant north of Cape Cod, although several specimens were procured at Annisquam, on the north side of Cape Ann, by Professor Hyatt, in 1878, and it has also been previously noticed from Massachusetts Bay.

GASTEROPODA.

Ilyanassa obsoleta (Say) Stimp. Ver., Inv. V. S., p. 641, 1874. Gould, Inv. Mass., II, p. 362, 1870 (*Nassa*).

Very common on many of the inner beaches, and extending up to high-tide level. It is especially abundant in places where the brackish water from ponds runs down the face of the beach as it is left uncovered by the tide.

* About six species of *Rhabdocœla* were collected, but they have not been determined.

Purpura lapillus (Linné) Lam. Gould, Inv. Mass., II, p. 360, 1870. Ver , Inv. V. S., p. 642, 1874.

Shore, rare.

Anachis avara (Say) Perkins. Ver., Inv. V. S., p. 643, 1874. Gould, Inv. Mass., I, p. 313, 1841; II, p. 356, 1870 (*Columbella*).

Rare; only a single specimen was found by the writer, but others have collected it at Provincetown.

Astyris lunata (Say) Dall. Ver., Inv. V. S., p. 645, 1874.—*Columbella lunata* Gould, Inv. Mass., II, p. 359, 1870.

Abundant in the eel-grass in front of the town and off the dike.

Lunatia heros (Say) Adams. Gould, Inv. Mass., II, p. 338, 1870. Ver., Inv. V. S., p. 646, 1874.

Very common along the entire inner shore, and often picked up dead on the outer beaches.

Neverita duplicata (Say) Stimp. Gould, Inv. Mass., II, p. 345, 1870. Ver., Inv. V. S., p. 646, 1874.

Abundant, associated with *Lunatia heros*.

Littorinella minuta (Totten) Stimp. Ver., Inv. V. S., p. 653, 1874. Gould, Inv. Mass., II, p. 298, 1870 (*Rissoa*).

Common, shore at low water.

Skenea planorbis (Fabr.) Forbes and Hanley. Gould, Inv. Mass., II, p. 296, 1870. Ver., Inv. V. S., p. 655, 1874.

Common on the shore, with *Tottenia gemma*, *Littorinella minuta*, &c., and also on the piles of wharves.

Littorina littorea (Linné) Johnston. Gould, Inv. Mass., II, p. 308, 1870.

Very abundant on the shore, on piles of wharves, and on eel-grass which is more or less exposed at low tide. Just off the dike it occurs on the eel-grass in countless numbers, and, in common with all the other species of shells in that vicinity, is frequently covered with the white calcareous tubes of *Hydroides dianthus*.

Littorina rudis (Maton) Gould, Inv. Mass., I, p. 257, 1841; II, p. 304, 1870. Ver., Inv. V. S., p. 651, 1874.—*L. tenebrosa* Gould, Inv. Mass., I, p. 259; II, p. 306.

This is an exceedingly common species on the shore.

Littorina palliata (Say) Gould, Inv. Mass., I, p. 260, 1841; II, p. 309, 1870. Ver., Inv. V. S., p. 652, 1874.

Common on the shore and on piles of wharves among sea-weeds.

Lacuna vincta (Mont.) Turton. Gould, Inv. Mass., II, p. 302, 1870. Ver., Inv. V. S., p. 652, 1874.

On the eel-grass, shallow water; not found in much abundance.

Bittium nigrum (Totten) Stimp. Gould, Inv. Mass., II, p. 321, 1870. Ver., Inv. V. S., p. 648, 1874.

Very abundant amongst the eel-grass, in shallow water in front of the town, and off the dike, and also on the beaches, where it often occurs in immense numbers.

Crepidula fornicata (Linné) Lamarck. Gould, Inv. Mass., II, p. 271, 1870. Ver., Inv. V. S., p. 649, 1874.

Common, especially in the vicinity of the dike, on shells of *Pecten* and *Ensatella*.

Crepidula plana Say. Gould, Inv. Mass., II, p. 272, 1870. Ver., Inv. V. S., p. 650, 1874.

Common off the dike, and also found elsewhere.

Crepidula convexa Say. Gould, Inv. Mass., II, p. 273, 1870. Ver., Inv. V. S., p. 650, 1874.

Abundant off the dike, adhering to the surfaces of living and dead shells, to *Limulus*, and other objects.

Acmæa testudinalis (Müller) Forbes and Hanley. Ver., Inv. V. S., p. 661, 1874. Gould, Inv. Mass., II, p. 267, 1870 (*Tectura*).

Rare, shore; variety *alveus* also found.

Odostomia bisuturalis (Say) Gould, Inv. Mass., II, p. 327, 1870. Ver., Inv. V. S., p. 656, 1874.

Not uncommon; eel-grass off the dike, and elsewhere.

Odostomia trifida (Totten) Gould, Inv. Mass., I, p. 274, 1841; II, p. 328, 1870. Ver. Inv. V. S., p. 656, 1874.

Associated with the last, and about equally common.

Odostomia dealbata Stimp. Gould, Inv. Mass., II, p. 327, 1870. Ver., Inv. V. S., p. 656, 1874.

A single specimen only was obtained from the eel-grass off the dike.

Melampus lineatus Say, Am. Conch., p. 85, 1822.—*Melampus bidentatus* Say. Gould, Inv. Mass., II, p. 467, 1870. Ver., Inv. V. S., p. 662, 1874 (*non* Mont.).

Abundant, shore, between tides.

Onchidoris, sp.

An undetermined species of this genus was obtained from sea-weeds on the inner beach at Long Point.

Tergipes despectus Ald. and Han. Ver., Inv. V. S., p. 667, 1874.—*Æolis* (*Tergipes*) *despecta* Gould, Inv. Mass., II, p. 248, 1870.

From hydroids, on piles of wharves, and sea-weeds of beach.

Embletonia fuscata Gould, Inv. Mass., II, p. 251, 1870.

Found among the filamentous green algæ in little rills of water on the beaches and sand-flats.

Stiliger fuscata Bergh. Ver., Prelim. Check List, p. 23, 1879.—*Calliopæa* (?) *fuscata* Gould, Inv. Mass., II, p. 250, 1870.

Associated with *Embletonia fuscata*.

LAMELLIBRANCHIATA.

Teredo navalis Linné. Gould, Inv. Mass., II, p. 28, 1870. Ver., Inv. V. S., p. 669, 1874.

Very abundant in the piles at the outer end of steamboat wharf, and in other situations. A few years ago about forty feet of the above-mentioned wharf was so weakened by the borings of this shell-fish that it completely gave way under the weight of a ship's load of merchandise stored upon it.

Teredo megotara Hanley. Gould, Inv. Mass., II, p. 30, 1870. Ver., Inv. V. S., p. 670, 1874.

At Provincetown, in cedar buoys (Gould).

Teredo dilatata Stimp. Gould, Inv. Mass., II, p. 32, 1870. Ver., Inv. V. S., p. 670, 1874.

From pine buoy attached to lobster pots, at Provincetown (Gould).

Ensatella americana (Gould) Ver., Am. Journ. Sci., vol. iii, pp. 212, 284, 1872; Inv. V. S., p. 674, 1874.—*Solen americanus* Gould, Inv. Mass., II, p. 42, 1870.

Many dead adult shells and living young were collected on the sand-flats at low water.

Mya arenaria Linné. Gould, Inv. Mass., II, p. 55, 1870. Ver., Inv. V. S., p. 672, 1874.

Very abundant on the shores and flats; especially so on the broad flats between the town and Wood End Light House, where, in the clean sands, the shells are often of a nearly pure white.

Lyonsia hyalina Con. Gould, Inv. Mass., II, p. 64, 1870. Ver., Inv. V. S., p. 672, 1874.

Quite common at low water on the inner shore at Provincetown, and in the inlet behind Race Point Light House. It was also picked up in extreme abundance on the outer beach at Race Point.

Cochlodesma Leanum (Say) Couth. Gould, Inv. Mass., II, p. 68, 1870. Ver., Inv. V. S., p. 673, 1874.

Dead shells in fresh condition were collected on the outer beach at Race Point, but not on the inner.

Spisula solidissima (Dillw.) Gray.—*Mactra solidissima* Gould, Inv. Mass., II, p. 73, 1870. Ver., Inv. V. S., p. 680, 1874.

Living young and adult dead shells were frequently found on the shore at low water.

Ceronia arctata (Con.) Adams. Gould, Inv. Mass., II, p. 80, 1870. Ver., Inv. V. S., p. 679, 1874.

Many living specimens were obtained by Prof. H. E. Webster in the inlet behind Race Point Light House and on the outer beach near the same place; not known from the inner shore.

Cumingia tellinoides Con. Gould, Inv. Mass., II, p. 79, 1870. Ver., Inv. V. S., p. 679, 1874.

Not found by the Fish Commission, but several dead shells were collected on the inner beaches by Mr. J. H. Blake, of Cambridge, and Dr. Crocker, of Provincetown.

Angulus tener (Say) Adams. Ver., Inv. V. S., p. 677, 1874. Gould, Inv. Mass., II, p. 97, 1870 (*Tellina*).

Abundant on the shore, low water.

Venus mercenaria Linné. Gould, Inv. Mass., II, p. 133, 1870. Ver., Inv. V. S., p. 681, 1874.

Rare on the beaches at Provincetown, but very common farther south on the inner shores of the cape, especially in the neighborhood of Wellfleet, where they attain a large size and have the purple coloration of the interior of the shell more than usually intense and widespread.

Tottenia gemma (Totten) Perkins. Ver., Inv. V. S., p. 682, 1874.

Very abundant on the beaches in company with *Skenea planorbis* and *Littorinella minuta*, and also found amongst the eel-grass. The small dark-colored shells of this species are frequently scattered over the white beaches in the greatest profusion, appearing like coarse grains of black sand. But, being lighter than the sand, they are readily blown along by the wind until they collect in large numbers in the lee of any prominence that may present itself, and in the furrows of the beaches. In such places as these several handfuls of pure shells, with little admixture of sand, may often be scooped up. The first specimens of this species obtained by General Totten, its earliest describer, were from the beach at Provincetown.

Lævicardium Mortoni (Con.) Perkins. Ver., Inv. V. S., p. 683, 1874. Gould, Inv. Mass., II, p. 143, 1870 (*Liocardium*).

Low water, rare.

Cryptodon Gouldii (Phil.) Adams. Gould, Inv. Mass., II, p. 100, 1870. Ver., Inv. V. S., p. 686, 1874.

Dead shells frequently found along the beaches; probably lives in shallow water close to the shore, but not dredged in Cape Cod Bay in less than thirteen fathoms, at which depth it was very abundant.

Solemya velum Say. Gould, Inv. Mass., II, p. 48, 1870.—*Solenomya velum* Ver., Inv. V. S., p. 688, 1874.

A few dead valves only were picked up on the inner beaches.

Astarte castanea Say. Gould, Inv. Mass., II, p. 117, 1870. Ver., Inv. V. S., p. 685, 1874.

Found abundantly in Provincetown Harbor, west and north of the light-house, at low-water mark (Gould). Although searched for at this locality in 1879, no specimens were discovered; a very low tide is probably required to uncover them. Mr. J. H. Blake says they are also common low down on the inner shore, near Wood End Light.

Argina pexata (Say) Gray. Ver., Inv. V. S., p. 692, 1874. Gould, Inv. Mass., II, p. 147, 1870 (*Arca*).

Collected on the beach at Provincetown (S. I. Smith, 1872).

Mytilus edulis Linné. Gould, Inv. Mass., II, p. 183, 1870. Ver., Inv. V. S., p. 692, 1874.

Very abundant, shore, piles of wharves, attached to floating fucus, &c.

Modiola plicatula Lam. Gould, Inv. Mass., II, p. 188, 1870. Ver., Inv. V. S., p. 693, 1874.

Very abundant on the flats near high-water mark.

Crenella glandula (Totten) Adams. Gould, Inv. Mass., II, p. 194, 1870. Ver., Inv, V. S., p. 695, 1874.

A few fresh, but not living, shells were obtained from the beaches at low water. Provincetown, at low water (Stimpson, Shells of N. England). This species was first known to Totten, its describer, from Provincetown.

Pecten irradians Lam. Gould, Inv. Mass., II, p. 199, 1870. Ver., Inv. V. S., p. 695, 1874.

This species was formerly very abundant in front of the town, in the patches of eel-grass just below ordinary low-tide level, but at present the full-grown shells are rarely found there. They are, however, still very plentiful off the dike in similar situations. The adult shells rest on the ground amongst the eel-grass, which at low water becomes thickly matted above them, generally quite concealing them. Young shells usually adhere to the eel-grass by their byssus.

Anomia glabra Ver., Am. Journ. Sci., vol. iii, p. 213, 1872; Inv. V. S., p. 696, 1874.—*A. ephippium, electrica, squamula*, Gould (*non* Linné).

Abundant on the flats in front of the dike, but generally of small size, attached to dead shells of *Pecten irradians*, *Ensatella americana*, &c.

TUNICATA.

Molgula manhattensis Ver., Am. Journ. Sci., vol. i, p. 54, 1871; Inv. V. S., p. 699, 1874.

Abundant near high-tide level, amongst the grass in the pools left on the shore at low tide; attached to eel-grass and to floating sea-weeds. Also thrown up in immense numbers on the outer beach at Race Point during heavy storms.

Botryllus Gouldii Ver., Am. Journ. Sci., vol. i, p. 211, 1871; Inv. V. S., p. 702, 1874.

Growing on eel-grass in shallow water and on floating sea-weeds, &c.

BRYOZOA.

Crisia eburnea Lamour. Ver., Inv. V. S., p. 707, 1874.

Very abundant on fucus and eel-grass, often associated with *Bugula turrita;* on eel-grass everywhere in shallow water from the dike to Long Point, and on fucus growing on the piles and floating at the surface.

Tubulipora serpens (Linné) Flem., Brit. Anim., p. 529, t. Johnston, Hist. Brit. Zoöph., p. 275, 1847.—*T. flabellaris* Ver., Inv. V. S., p. 708, 1874.

Found very abundantly on the eel-grass in shallow water, forming small rounded clusters.

Flustrella hispida (Fabr.) Gray.—*Alcyonidium hispidum* Smitt. Ver., Inv. V. S., p. 708, 1874.

Incrusting floating fucus in the harbor, and probably also occurring on the sea-weeds of the piles.

Vesicularia, sp.

One or two small specimens of a *Vesicularia* with creeping stem, possibly *V. uva* Smitt, were found upon fucus growing upon the piles.

Bugula turrita (Desor) Ver., Inv. V. S., p. 712, pl. xxxiv, figs. 258, 259, 1874.

Very abundant on piles of wharves, eel-grass in shallow water, and on floating fucus; associated with *Crisia eburnea*.

Electra pilosa (Linné) Fisch., t. Ver., Preliminary Check List Mar. Inv. Atl. Coast, p. 29, 1879.—*Membranipora pilosa* Farre, Phil. Trans., p. 412, 1837. Ver., Inv. V. S., p. 712, 1874.

Incrusting fucus, laminaria, eel-grass, &c, floating in the harbor, and stranded on the beaches.

Cribrellina puncturata Smitt, Floridan Bryozoa, part II, p. 24, 1873.—*Escharipora punctata* Smitt, Öfvers: af K. Vetens.-Akad. Förh., 1868, appendix, p. 4. Ver., Inv. V. S., p. 713, 1874.

On eel-grass, one-half fathom, rare.

Hippothoa hyalina (Linné) Smitt, Floridan Bryozoa, part II, p. 40, 1873.—*Mollia hyalina* Smitt, Öfvers. af K. Vetens.-Akad. Förh., 1868, appendix, p. 16. Ver., Inv. V. S., p. 713, 1874.

On floating fucus and eel-grass in the harbor, and on the beaches.

Lepralia americana Ver., Am. Journ. Sci., III, vol. ix, p. 415, pl. vii, figs. 4, 5, 1875.—*Lepralia Pallasiana* Ver. Inv. V. S., p. 713, 1874 (with query; *non* Busk).

Very common; incrusting fucus and other sea-weeds on the piles, and also growing on eel-grass in shallow water.

ECHINODERMATA.

Leptosynapta Girardii (Pourtales) Ver., Inv. V. S., p. 716, 1874.

This species is common everywhere about Provincetown, on the sandy beaches between low-tide and half-tide levels, but it is most abundant on the sandy flats about midway between the town and Wood End Light House, where large areas are left dry for a considerable time at low water. It also occurs in abundance on the sand-flats inside of Race Point Light House, on the outer shore.

Leptosynapta roseola Ver., Inv. V. S., p. 716, 1874.

Provincetown beach, and sheltered inlets back of Race Point, on the outer side of Cape Cod, buried in the sand at low water, and associated

with *L. Girardii*. Collected at the latter place by Prof. H. E. Webster and Mr. Benedict. Hitherto known only from New Haven, Conn., and Vineyard Sound (Verrill).

Asterias Forbesii (Desor) Ver., Am. Journ. Sci., vol. xi., p. 418, 1876; Proc. Bos. Soc. Nat. Hist., vol. x, p. 345, 1866; Inv. V. S., p. 718, 1874.—*A. arenicola* Stimp., Proc. Bos. Soc. Nat. Hist., vol. viii, p. 268, 1862. Ver., *ibid.*, vol. x, p. 339, 1866; Inv. V. S., p. 718, 1874.—*Asteracanthion berylinus* Ag., A. Ag., Mem. Mus. Comp. Zoöl., vol. v, No. 1, p. 94, pl. ix, 1877.

Very abundant along the shore above and below low-water mark, and on piles of wharves, but always of comparatively small size. A comparison of the specimens from Provincetown with those obtained from Gloucester in 1878 shows more or less constant differences to exist between the two. In the former the spines are generally longer and more acute, sometimes even quite slender, and the pedicellariæ appear to be somewhat more numerous, and to vary greatly in their arrangement. These differences are, however, of very slight value in this exceedingly variable species.

Asterias vulgaris Stimp., MSS. Packard, Can. Nat., Dec., 1863. Ver., Proc. Bos. Soc. Nat. Hist., vol. x, p. 347, 1866; Inv. V. S., p. 718, 1874.

Below low-water mark at the outer ends of the long wharves.

Amphipholis elegans Ljung. Ver., Inv. V. S., p. 720, 1874.—*Amphiura squamata* Lyman, Illust. Cat. Mus. Comp. Zoöl., No. I, p. 121, 1865 (*non* Delle Chiaje, t. Ljung.).

Only a few specimens of this Ophiuran were obtained; they were from the eel-grass in very shallow water.

ANTHOZOA.

Metridium marginatum M.-Edw. Ver., Inv. V. S., p. 738, 1874.

Common on the mooring posts in the harbor (J. H. Blake).

Edwardsia sulcata Ver., Mem. Bos. Soc. N. H., vol. i, No. I, p. 29, 1864.

Sand, at low water.

Edwardsia pallida Ver., Proc. U. S. Nat. Mus., vol. ii, p. 198, 1879.

In sand, at low water.

ACALEPHÆ.

Clytia Johnstoni (Alder) Hincks. Ver., Inv. V. S., p. 725, 1874.

On floating fucus thrown up on inner beach of Long Point.

Campanularia flexuosa Hincks. Ver., Inv. V. S., p. 726, 1874.

Abundant on fucus of piles of wharves, &c.

Obelia geniculata (Linné) Allman. Ver., Inv. V. S., p. 727, 1874.

On floating fucus stranded on Long Point beach, inner shore.

Obelia dichotoma (Linné) Hincks. Ver., Inv. V. S., p. 728, 1874.

Very abundant on eel-grass, one-half fathom.

Sertularia pumila Linné. Ver., Inv. V. S., p. 732, 1874.

Very common, and growing principally on fucus, on piles of wharves; also on floating fucus in the harbor. A very robust variety was collected from fucus stranded on the outer beach at Race Point.

DESCRIPTION OF A NEW SPECIES OF RAY (RAIA STELLULATA) FROM MONTEREY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Raia stellulata sp. nov.

Allied to *Raia radula* Delaroche. Disk much broader than long, anteriorly broadly arched, and convex, the tip of the snout very slightly exserted. Anterior margin of pectorals undulated, convex anteriorly, then concave. Length of snout from eyes a little more than twice the width of the interocular space, which is concave, less than the distance between the outer angles of the spiracles. Breadth of disk equal to the distance from the tip of the tail to the shoulder-girdle. Length of tail equal to the distance from its root to the middle of the interocular area.

Male everywhere above rough with stellate prickles, the base of the pectorals being almost smooth. Along the middle region of the back and the whole upper surface of the tail is a band of close-set, rather low prickles, with broad, very distinctly stellate bases. An elongate patch of stout, recurved spines on the anterior part of the pectorals, and farther back the usual series of claw-like spines found in the males of all species. Stout spines above the eye, a few in the middle of the shoulder, and along the middle line of the tail. Sides of the tail without large prickles. Lower side smooth, except around the mouth.

Female everywhere above rough with stellate prickles, the anterior region, middle of back, and upper surface of tail most so. A median row of strong spines on the tail above, and six on the scapular region. A series of strong spines over the eye. A lateral row of rather strong prickles on the tail. Body smooth below, except anteriorly.

Tail flat below, with a conspicuous lateral fold. Dorsal fins low, their height equal to the interorbital space, separated by a space considerably shorter than their base. Caudal fin reduced to a very small fold, as in the "genus" *Uraptera*, to which this species would be referred in Müller & Henle's arrangement.

Mouth somewhat arched. Teeth not very sharp, tricuspid, about $\frac{35 \text{ to } 40}{35}$. Nasal flaps slightly fringed externally. Distance between nostrils about equal to the distance from them to the tip of the snout.

Color grayish-brown, everywhere mottled with light and dark colors, the markings sharp and distinct. Numerous black spots of all sizes, some of them ocellated. A black spot about as large as the eye at the

base of each pectoral, each surrounded by a pale ring and in turn by another dark one. Head with black cross-bars. The two sexes entirely similar in color.

This species is not uncommon in the Bay of Monterey. We have obtained eight examples, which agree with each other very closely. One of these is a female, about 18 inches in length, in which the ovaries are immature. The other females are about 30 inches in length, and the ovaries are fully matured, containing eggs. The males are about 30 inches long, likewise bearing evidences of maturity. These specimens are now in the United States National Museum. This species is readily distinguished from the two others known from the Pacific coast by its obtuse snout and its rough skin.

The *Raia binoculata* Girard is the common skate of the Pacific coast, and is brought in in large numbers to the San Francisco markets. In color it is uniform light brown, with a black ring near the base of each pectoral, and usually a dusky crescent on each ventral. The pectoral ocellus is often obscure, and sometimes can hardly be traced in preserved examples; in living specimens it is generally conspicuous.

The skin in the male is entirely smooth above, except the anterior edge of the pectorals, the bony part of the snout, and the larger spines on the front part of the pectorals, the supraocular region, a few (one to six) on the scapular region, and a series along the median line of the tail. There are two or three detached spines usually along the side of the tail. The claw-like pectoral spines are also present. The females have, in addition, a lateral series of spines on the tail and some prickles on the posterior part of the pectorals, the larger spines found on the pectorals of the male being wanting. The actual length of the snout in *R. binoculata* is not much greater than in *R. stellulata*, but its form is different, the disk being anteriorly acuminate, bounded by concave lines, its length being more than three times the interocular space. Male and female examples of this species, with ripe eggs, or well-developed claspers, are about two feet long.

Still another ray is known to us from a female example from Monterey about 30 inches in length. It agrees with *R. binoculata* in every respect, except in the form of the snout, which is extremely long, acuminate, and pointed, its length nearly four times the interorbital width. The anterior outline of the disk on each side of the snout forms a nearly uniform concave curve, it being scarcely at all undulated. These differences are shown by the appended table of measurements. We consider this at present a variety of *Raia binoculata*, although such variations in the length of the snout are unusual in the same species.

Still another form is known to us from two examples, a male and a female, each about 6 feet in length, taken at Monterey. This form must be considered as the *Raia cooperi* Girard, as the very imperfect description of the latter species agrees in all essential respects with these specimens.

Raia cooperi has the snout acutely produced, rather more so than in *R. binoculata*, though less than in the variety referred to, the distance from the eye to the tip of the snout being about twice the interorbital width. The length of the disk is $\frac{7}{8}$ its width; the tail is $\frac{2}{3}$ the length of the disk. The female is covered above with small stellate prickles, which are larger over the eye, on posterior edge of pectorals, on ventrals, the middle line of the back, and on the tail. Prickles on tail in several series. Differentiated spines present only over eye and on tail. The male is nearly smooth, its spines essentially as in *R. binoculata*. Color brown, with paler blotches; a large, obscure, blackish blotch at base of pectoral. This species has scarcely a trace of caudal fin, and is therefore likewise an "*Uraptera*." Its teeth are about $\frac{44}{40}$.

Whether this *Raia cooperi* is a distinct species or merely very old individuals of *Raia binoculata* we are now unable to decide. There are no important differences, except such as might accompany increased age.

Table of measurements.

	Raia stellulata. ♀	*Raia binoculata.* ♂	*Raia binoculata* var. ♀♀
Extreme length, in inches	17.45	21.6	28.8
Length of disk, in inches	10.10	13.00	18.4
Disk:			
Greatest width (hundredths of length of disk)	121	106	103
Greatest width at front of eyes	58	45.5	41
Width of snout, midway between eyes and tip of snout	41	16.7	14
Distance from shout to first gill-opening	43	50.5	.....
Distance between first gill-openings	31.5	25.5	.....
Distance between last gill-openings	18	14.3	.....
Distance from first to last gill-openings	14	12.8	12
Width of mouth	18	15	15.5
Width of interorbital space	8	7	8
Distance from snout to mouth	24	21.5	30
Diameter of orbit	8	6.2	5.5
Tail:			
Length	71.5	67	57
Distance between dorsals	5	3.8	3
Height of first dorsal	8	8	.....
Length of base of first dorsal	7.5	7.6	7

MONTEREY, CAL., *April* 7, 1880.

DESCRIPTIONS OF NEW SPECIES OF XIPHISTER AND APODICHTHYS, FROM MONTEREY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

1. Xiphister chirus sp. nov.

Body elongate, somewhat compressed, formed as in *Xiphister mucosus* (*Xiphidion mucosum* Girard). Head short, convex in profile, not depressed above the eyes. Mouth small, oblique, the maxillary extending to opposite middle of pupil. Eye small, as long as snout, about 5 in head. Lower jaw slightly projecting. Teeth strong, the anterior canine-like, bluntish; four canines in lower jaw, *six or more in the upper*, similar

to the posterior teeth, but somewhat enlarged. Lateral teeth of lower jaw short, blunt, the series extending behind the anterior canines. Lips full, the upper protractile. Head naked. Gill membranes united, without isthmus.

Body covered with minute scales, the usual three parallel lateral lines running without union from the head to the tail. Each of these, as in other species, with a series of simple, transverse, alternating, short branches at right angles, and each with one or two open pores. These branches correspond in the outer lines each to a dorsal or anal ray. Middle line farther from each of the outer lines than these are from the dorsal or anal. A short dorsal line, similar to the lateral lines and similarly branched, extending from the occiput to the first dorsal spine. An abdominal line on each side of the belly. These *gradually* converge anteriorly and meet on the breast. They *are not connected with the lower lateral line.* In the other species of the genus the lower lateral line sends a branch to the abdominal line.

The vertical fins are similar in all the species, the dorsal of low sharp spines only; the anal similar, but composed of soft rays, both slightly joined to the caudal.

Dorsal fin beginning close behind the pectoral, at a distance from the opercular angle not greater than the diameter of the eye. Anal beginning about a head's length nearer the snout than the base of the caudal, or about 1½ head's lengths nearer snout than end of caudal.

Pectoral fin quite small, *but several times larger than in any of the other species*, larger than the eye, its length about equal to the distance between the middle and lower lateral lines.

Fin rays: D. LXX; A. 50; P. 14.

Color olive-brown, yellowish below; the sides everywhere with marblings of different shades of brown, mostly in the form of vertical bars. Some round black spots along the back and upper part of the sides; a black spot behind opercles. Head brown above, yellowish below; a narrow black streak from eye directly backward across the temporal region. *Numerous black spots on sides of head, but no radiating bands.* Dorsal and anal fins with black spots; pectorals plain yellowish, a conspicuous dark axillary spot; caudal plain reddish.

This species differs from the others of the genus in the large pectorals, the absence of anterior union of the lower lateral and the abdominal lines, in the position of the first rays of dorsal and anal, in the presence of more than two canines in the upper jaw, and in the coloration, the sides of the head being without stripes and the caudal plain.

It is known to us from about twelve examples taken at the Point of Los Pinos, near Monterey. It inhabits rocks at the extreme low-tide mark, and is abundant chiefly among the masses of mussels which cover the outermost rocks exposed to the wash of the waves. Like the other species of the genus, it is very active and makes its way readily out of water over damp rocks and algæ. It seems to reach a smaller size than the other species.

2. Xiphister rupestris sp. nov.

Besides the foregoing species, which is distinguishable at sight from *Xiphister mucosus*, a second species occurs in great abundance among the rocks about Monterey. This species is more nearly allied to *X. mucosus*, agreeing with it in form of body, mouth, teeth, and arrangement of the lateral lines; differing in the coloration of the head, in the number of dorsal and anal rays, in the insertion of the dorsal and anal fins, and in the size of the pectoral fins. A description of these points will suffice, without the enumeration of features common to all the species of the genus.

The life coloration of *Xiphister mucosus* is blackish green, becoming pale green on the belly and sides of the head; toward the tail the blackish is commonly broken with much olive-green in various patterns; a transverse light-greenish bar at base of caudal, which extends to the dorsal and anal fins. Radiating backward from the eye are three olive-brown streaks, these much lighter in the center and edged above and below with blackish, outside of which is sometimes a streak of light green. These streaks all merge backward in the olive-green of the head. The upper streak from the eye toward the occiput is generally obsolete or small and indistinct; the middle streak is wedge-shaped, with the edges straight or nearly so; it is but slightly more than one-third the length of the head; the third streak terminates before reaching the margin of the preopercle. A very old example, over a foot long, has a diffuse yellow blotch on the back anteriorly.

In *Xiphister rupestris* the life coloration is olive-brown or reddish brown, uniform or variously marked and shaded with lighter; a light olivaceous bar at base of caudal, extending on dorsal and anal; behind this a blackish area; the tip of the caudal usually pale. Three long, well-defined streaks radiating backward from the eye, these streaks uniform black, overlaying the olive cheeks, and abruptly margined with very light olive; the upper streak is more distinct than in *X. mucosus;* the central streak proceeds straight backward from the eye, half the breadth of the cheeks, at which point it is broadest; it is then narrowed and bent abruptly downward; both the middle and lower streak reach the margin of the preopercle, the length of the middle streak being three-sevenths that of the head.

In *Xiphister mucosus* the dorsal fin begins anteriorly, nearly as in *Xiphister chirus*, the distance from its origin to the occiput *being less than that from the occiput to the tip of the snout.* The origin of the anal fin is nearly midway from the snout to the tip of the caudal, it being nearer the snout than the tip of the caudal fin by from one-third to two-thirds the length of the head. The fin rays are pretty constantly D. LXXIII, A. 48. The pectoral fin is as long as the eye.

In *Xiphister rupestris* the dorsal fin begins farther back, the distance from its origin to the occiput being *one-third greater than the distance from the occiput to the snout.* The anal fin begins much in advance of the

middle of the body, the distance from the first ray to the tip of the caudal exceeding the distance to the snout by nearly twice the length of the head. The fin rays are very constantly D. LXVI, A. 50. Pectoral fin very short, its length less than the diameter of the eye (about three-fifths).

These two species are extremely and equally abundant about Monterey, especially on the Point of Pines. They live under rocks in the sand, in crevices of rocks, and in masses of algæ between tide-marks. They are very active, making their way readily on land, and remaining out of water in damp places for hours without inconvenience. We have procured upwards of a hundred specimens of each species, and find the distinctive characters, although few, to be very constant.

Xiphister cruoreus (*Xiphidium cruoreum* Cope, Proc. Am. Philos. Soc., 1873), from Alaska, is apparently either identical with *Xiphister mucosus* or closely allied to it. The description agrees better with *mucosus* than with *rupestris*.

The systematic position of the genus *Xiphister* deserves a moment's notice. Professor Gill has referred it to a family, "*Xiphidiontidæ*," distinguished from "*Stichæidæ*" chiefly by the absence of pyloric cœca, and from "*Cebedichthyidæ*" by the short intestinal canal, the absence of pyloric cœca, and the absence of soft rays in the dorsal.

As a matter of fact, the intestinal canal in *Xiphister* is but little shorter than in *Cebedichthys*. It has *five or six well-developed pyloric cœca*. Whatever may be the value of the family "*Stichæidæ*," the writers do not believe that *Cebedichthys*, *Xiphister*, and *Apodichthys* are representatives of distinct families. The lateral line of *Cebedichthys*, by the way, corresponds to the upper lateral line of *Xiphister*, and like it has for its whole length a series of short lateral branches ending in open pores.

Table of measurements.

	X. chirus.	*X. mucosus*, 1.	*X. mucosus*, 2.	*X. rupestris*, 1.	*X. rupestris*, 2.
Total length, inches	4.08	10.90	6.70	7.08	6.25
Length to base of caudal = 100	3.90	10.40	6.40	6.75	6.10
Body:					
Greatest depth	10	12.9	13	10	.....
Least depth	.....	4.3	3.8	.....	.....
Head:					
Greatest length	14	13.7	14	15.4	15
Distance from snout to nape	.....	8.4	8.5	.....	10
Interorbital area	.....	2	.....	1.8	.....
Length of maxillary	.....	5.7	5	6.3	.....
Diameter of orbit	2.5	1.7	.....	2	.....
Dorsal:					
Distance from snout	15.5	16	15	21	21.5
Height	.....	3	.....	3	.....
Anal, distance from snout	43	51.5	51.5	44.5	43
Caudal, length	.....	4.7	.....	.....	.....
Pectoral, length	3	1.7	.....	1.5	.....
Pectoral, width	2.5	.....	.....	1	.....
Dorsal rays	70	73	.....	66	.....
Anal rays	50	48	.....	50	.....

3. Apodichthys fucorum sp. nov.

Allied to *Apodichthys flavidus* Girard, but differing in the form of the anal spine, in the smaller number of fin-rays, and in the smaller size of the pectoral fins.

Form of head and body and dentition as in *Apodichthys flavidus*. Mouth very oblique, the maxillary reaching the vertical from the center of the pupil. Dorsal fin beginning at a point considerably nearer the nape than the latter is from the end of the snout. *Anal spine small*, its length about one-fifth that of the head, *transversely very convex in front, and slightly concave or grooved behind*. Pectoral fins very small, about one-fifth the length of the head. Anal fin beginning nearer base of caudal than tip of snout by about three times the length of the head. Dosal, very constantly, LXXXIII; A. 35.

In *Apodichthys flavidus* the dorsal begins as much behind the nape as the latter is behind the tip of the snout. The *anal spine is very large*, two-fifths the length of the head, and *deeply excavated on its anterior surface and very convex behind*, the spine being very thin and with sharp edges, resembling a quill-pen.

Pectoral fins larger, about two-fifths the length of the head. Anal beginning nearer base of caudal than tip of snout by twice the length of the head. Fin rays: D. XCIII; A. 40.

The life coloration of *Apodichthys fucorum* is either bright olive-green or brownish red, becoming in alcohol either bright straw color or vermillion; a row of dark spots extending along axis of body, these sometimes with light-bluish center, and connected by a very narrow dark streak. Generally a dark streak downward from eye, but no other markings about the head.

The ground-color of these fishes, whether red, green, yellow, or brown, has no significance in specific distinction. As with many other species of rock-fish, they take the color of their surroundings. When in masses of *Fucus*, this species is always olive-green; when among *Chondrus*, or other red-brown algæ, it is colored like the plants. We have seen *Oligocottus maculosus* (which species is ordinarily brownish, mottled, the belly blue) dark grayish red in pools lined with Corallina, deep crimson when surrounded by brighter algæ, plain gray in pools with granite bottoms and no plants, and of the most intense grass-green when taken from among fronds of Ulva. Other fishes imitate exactly the brown branches of the kelp (*Macrocystis*). Thus the names *flavidus*, *virescens*, and *sanguineus* have been successively applied to differently colored examples of *Apodichthys flavidus*.

Our specimens of the latter species are orange-red, everywhere dusted with minute punctulations. A few pale round spots on axis of body posteriorly. A narrow jet-black bar downward and backward from eye, falling behind the maxillary; a shorter black streak from eye toward occiput. Anal fin obliquely barred with brownish.

Apodichthys fucorum is exceedingly abundant about the Point of Los

Pinos, near Monterey. It is found mostly in masses of *Fucus* attached to rocks between tide-marks, and it is often found at low tide at a considerable distance from any water, kept damp by the masses of algæ. Sometimes a dozen of them can be shaken from a bunch of algæ attached to a dry rock. It is, like the species of *Xiphister*, very active, moving over stones or sand, and showing less anxiety about the presence of its native element than any other fish known to us. The very numerous typical examples are all of nearly the same size as the one measured below. It probably does not attain so great a size as *Apodichthys flavidus*.

We have little doubt that Professor Gill is right in uniting *flavidus* Girard, *virescens* Ayres, and *sanguineus* Gill as one species. Whether *inornatus* Gill is different or not we do not know. At any rate, its number of fin-rays (D. XC, A. 38) will separate it from *A. fucorum*.

Table of measurements.

	A. furcorum.	*A. flavidus.*
Extreme length, in inches	4.35	8.90
Length to base of caudal = 100	4.10	8.50
Body, greatest depth	9.5	11
Head:		
Length	10	11
Distance from snout to nape	8	6
Dorsal, distance from snout	13	11.5
Anal:		
Distance from snout	68	60
Height of spine	2	4
Length of pectoral	2	4
Dorsal rays	83	93
Anal rays	35	40

MONTEREY, CAL., *April* 7, 1880.

DESCRIPTION OF A VERY LARGE FOSSIL GASTEROPOD FROM THE STATE OF PUEBLA, MEXICO.

By C. A. WHITE.

The United States National Museum has received from Mr. H. B. Acton, through the Hon. J. W. Foster, United States minister to Mexico, the very interesting fossil shell which is described in the following paragraphs. Mr. Acton says, in a letter accompanying the specimen, that it was obtained from the strata upon which are located the Zapotitlan Salt Works, which works are about six miles southwestward from the town of Tehuacan, in the State of Puebla, Mexico, and about 115 miles inland from the Gulf coast. He gives the elevation of that locality as 6,500 feet above the level of the sea.

Only one example of this species has been received, and it is accompanied with examples of no other species. Fragments of the imbedding rock, which is a dense bluish limestone, have been carefully examined, and although they were found to contain numerous fragments of

fossil shells, not any of them were sufficiently well preserved to indicate even their generic relations. No satisfactory information has been obtained concerning any geological observations that may have been made in that region, which might convey a knowledge of the geological age of the strata of the locality from which the fossil in question was obtained, and I am therefore under the necessity of relying wholly upon the testimony afforded by the fossil itself. The genus to which I have referred it has hitherto been known only in rocks of Cretaceous age; and there appears to be no good reason to doubt that the strata from which this Mexican shell was obtained belong also to that period.

Genus TYLOSTOMA Sharpe.

TYLOSTOMA PRINCEPS (sp. nov.).

(Plate II, figs. 1 and 2.)

Shell very large, general form rhombic-ovate, inflated; spire moderately extended; volutions five or six, convex, having an ill-defined narrow shouldering at the distal or upper portion, adjacent to the suture; umbilicus none, suture impressed; aperture ovate-semilunate, large, its length equal to more than two-thirds the full length of the shell; outer lip forming an approximately regular curve from near the suture to the anterior portion of the aperture, which, although broad, is somewhat produced; margin of the outer lip only slightly sinuate; inner lip bearing a broad, moderately thin callus, its outline somewhat strongly sinuate and its margin narrowly flexed along its anterior portion.

Surface marked by the ordinary lines of growth.

Length from the apex to the front margin of the aperture, 220 millimeters; greatest breadth, 160 millimeters; length of aperture, 150 millimeters. (Museum, No. 8864.)

This is much the largest fossil gasteropod that has ever been found in North American Mesozoic strata; and it is excelled in size by only comparatively few of its class that have since existed.

It has much the general aspect of a *Lunatia*, but it is referred without much hesitation to the genus *Tylostoma* Sharpe. This last-named genus is regarded by some malacologists as having affinities with the Tectibranchiata, near *Pterodonta;* but I agree with Stoliczska and Zittel in referring it to the Pectinibranchiata, and placing it near *Lunatia* in the Naticidæ. It is true that all the characteristics of *Tylostoma*, as enumerated by Sharpe and characteristic of most if not all the species which have been referred to that genus, are not clearly observable upon the only example of this species that has been discovered; but being plainly without an umbilicus, or any umbilical perforation, in connection with its other characteristics, it cannot be referred to any other recognized genus of the Naticidæ. The condition of our example is not such as to show clearly whether or not the outer lip was thickened at the time of the death of the mollusk.

The varices or alternate swellings, characteristic of *Tylostoma*, are present, but not so conspicuous upon this example as they are upon some species of the genus, especially upon *T. mutabilis* Gabb, another Mexican Cretaceous form; but they are quite as conspicuous as they are shown to be in the published figures of Sharpe's type species, *T. torrubiæ*. These varices or swellings are more apparent in our example by an apical than by a lateral view of it, but their presence is indicated in fig. 2 upon the ultimate and penultimate whorls.

Although size cannot generally be relied upon as a specific character, the extraordinary dimensions of this shell separate it clearly from any other known form with which it might be otherwise in danger of being confounded. The only fossil species which resemble it, or even approximately approach it in size, are the *Natica pedernalis* and *N. præ-grandis* of Roemer, from the Cretaceous of Texas; but both these species evidently belong to a group that is now generally referred to *Lunatia*, or *Euspira;* and the largest known examples of either of these forms have scarcely more than half the dimensions of the example here described.

DESCRIPTION OF TWO NEW SPECIES OF SEBASTICHTHYS (SEBASTICHTHYS ENTOMELAS AND SEBASTICHTHYS RHODOCHLORIS), FROM MONTEREY BAY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sebastichthys entomelas sp. nov.

Allied to *S. ovalis* (Ayres).

Body oblong, rather elongate, the back regularly but not strongly arched, contracted to a rather slender caudal peduncle. Head moderate, the profile less steep than in related species, but the tip of the snout blunter than in *ovalis*. Mouth small, the short maxillary extending to below the middle of the eye. Lower jaw projecting, its tip entering the profile, but considerably less protruding than in *ovalis*. Palatine teeth few.

Preorbital very narrow, without spine. Eye rather large, about 4 in length of head, less than the interorbital space, which is strongly convex, especially in its middle part.

Nasal spines minute. Preocular spine broad, triangular, rather prominent, more conspicuous than in *melanops*, but much less so than in *ovalis*. Supraocular ridge little developed, its spine minute, sharp, concealed by the scales. Postocular spine present, minute, similarly concealed. No tympanic spine. Occipital ridges scarcely developed, concealed by the scales, without distinct spine at tip. In *ovalis* all these spines, though small, are distinct. In *flavidus* there is no trace of any spines on the cranium, and the ridges are little developed.

Preopercular spines rather small, directed backwards, the two lower obsolete. Opercular spines small, two suprascapular spines. Scales on

top and sides of head very small, present on maxillary, mandible, preorbital, and snout.

Scales on body small, in about 65 transverse series.

Gill-rakers numerous, long and slender, their length about half the diameter of the eye.

Dorsal spines very low and slender, the fin moderately emarginate, the membrane joining the last spine at about two-fifths its height. Soft dorsal long and low, the soft rays about as high as the highest spines, a little more than one-third the length of the head. Caudal forked. Anal low, its second spine stronger than third, but scarcely higher, less than two-thirds the height of the first soft ray. Pectoral fins moderate, not reaching vent, their tips beyond tips of ventrals, their base 3½ in length of head.

Fin rays: D. XIII, 15; A. III, 8.

Color rather dull olive-green. Sides with obscure round rusty spots. Belly, lips, and lower parts tinged with creamy. Obscure light and dark shades across cheeks. Traces of two or three obscure dark vertical bars. Dorsal dusky, with reddish shades. Caudal dusky, the rays olive. Other fins dusky, with creamy reddish at base. Lower half of pectoral distinctly reddish.

Peritoneum *jet-black*.

This species is known to us from five specimens taken in deep water outside of Monterey Bay, in company with *S. ovalis*, *rubrivinctus*, *elongatus*, etc. It is known to the Portuguese fishermen as "*Buda*." Its relations are probably most intimate with *ovalis*, which differs in the following respects:

Ovalis is much deeper and more oval in form, with the back considerably more elevated, and the profile much more steep, the lower jaw more protruding. The mouth reaches to the posterior edge of the pupil. The preocular ridge is very strong, forming a large triangular protuberance ending in a spine; small supraocular, postocular, tympanic, and occipital spines are present, the tympanic spine very minute, but constant. The dorsal fin is very low, the *notch between the spinous and soft parts extremely shallow*, the membrane joining the last spine at more than two-thirds its height, the height of the spinous and soft portions about equal. The *second anal spine* is considerably the longest and strongest, scarcely lower than the soft rays. The pectoral fins are long, reaching to the vent.

Anal rays, III, 7, or III, 8.

The color of this species when adult is olivaceous, strongly tinged with pale creamy red, especially below. The membrane of both dorsals are covered with many small round black spots. Some of these are usually present on the body. The upper fins are greenish, the lower more yellowish, and most of them are more or less dusky-edged. Caudal fin rather dark.

Peritoneum black.

The remaining species of this type, *melanops*, *simulans*, and *flavidus*, differ in the absence of any distinct spines on the cranium, as well as in color, form, and other peculiarities. *Melanops* has the preocular ridge considerably developed, and occasionally ending in a spine. The others have this ridge obsolete. The mouth in *simulans* and *flavidus* is considerably larger than in the other species. In *melanops* and *simulans* the fins are slaty black, like the body. In *flavidus* they are olivaceous, the caudal being distinctly brownish yellow (hence the popular name of Yellow-tail). The peritoneum in *flavidus* is pure white, in *melanops* somewhat dusky.

Sebastichthys rhodochloris sp. nov.

Allied to *S. rosaceus* (Girard).

Body oblong, more elongate than in *rosaceus*, the back less elevated, the profile less steep. Mouth comparatively large, but rather smaller than in *rosaceus*, the maxillary not reaching beyond posterior border of pupil. Jaws about equal in the closed mouth, the lower with a small symphyseal prominence. Preorbital narrow, with two bluntish projections. Eye very large, longer than the long snout, $3\frac{1}{2}$ in head.

Spinous ridges on top of head very high, slender, and sharp, more elevated than in *rosaceus*, *chlorostictus*, and *constellatus*, and sharper. *Nasal*, *preocular*, *supraocular*, *postocular*, *tympanic*, and *occipital* spines present, as in most of the red species. Supraocular ridge long and prominent. Postocular and tympanic spines close behind it, sharp and large. *Interorbital space very narrow*, its width even posteriorly less than length of supraocular spine (in *rosaceus* considerably more). Interorbital space with two longitudinal ridges, sharp and conspicuous, not covered by the scales, the very narrow interspace between them strongly concave, the spinous ridges strongly divergent behind.

Preopercular spines sharp, directed backward, the three upper long and pointed, more developed than in *rosaceus*, less radiating than in *chlorostictus*. Two sharp suprascapular spines. Opercular spines short and sharp.

Gill-rakers about as in *rosaceus* and *chlorostictus*, moderately long and slender, much shorter than in *ovalis* or *pinniger*, but longer than in *nebulosus* and *ruber*, the longest gill-raker about one-fourth the diameter of the eye.

Dorsal fin still lower than in *rosaceus*, the membranes little emarginate, the longest spine about $2\frac{2}{3}$ in head (in *rosaceus* $2\frac{1}{2}$). Emargination of dorsal moderate. Soft rays low, the highest about equal to the highest spine. Caudal fin slightly emarginate.

Second anal spine proportionately longer than in any other of our species, very strong, curved, its length about equal to that of the maxillary or the base of the soft dorsal, or about half the length of the head. It is higher than the soft rays of the anal. Pectoral fins reaching past tips of the ventrals nearly to the anal.

D. XIII, 14; A. III, 6.

Scales moderate, in 58 transverse series, the small accessory scales very numerous.

Ground-color bright clear rose-red, *without any trace of purplish.* Region above the lateral line with much deep green, in the form of reticulating streaks. Below the lateral line the green gives place to bright golden yellow, which is similarly mixed with the red. Top of head with cross-bands of green and red, green streaks radiating from the eye, one to snout, one along maxillary, three across cheeks and opercles, and one across temporal region.

Four bright pale pink spots on the sides of the back, arranged as in *rosaceus*, *constellatus*, and *chlorostictus;* the color brighter than in these species, and entirely devoid of the purplish ring which is found in *rosaceus;* one spot is under the fourth dorsal spine, one near the lateral line under eighth dorsal spine, one under junction of spinous and soft rays, and one under the last soft ray. The first and third of these spots are each surrounded by a distinct ring of green. Another pink spot on the tip of the opercle. A distinct pale area behind eye. Dorsal with the rays red and the membranes olive-green. Caudal and anal with the rays red and the membranes golden. Pectorals red, dashed with olive. Ventrals red. Under parts of head and the inside of the mouth pale red, unspotted.

In *S. rosaceus* the red on head above, and around the pink spots on the sides, is distinctly purple-red. The yellow or olive on the back and sides blends with the red instead of forming distinct reticulations, and there is little if any green on the back or fins. The lateral line is clear red, usually not crossed by the olive marks.

Sebastichthys rhodochloris occurs in abundance in the deep waters of the Bay of Monterey. It is a small fish, like *S. rosaceus*, and rarely reaches a weight of more than a pound. It is known to the fishermen of Monterey by the name of "Fly-fish," *S. rosaceus* being called "Corsair."

One fisherman who procured a number of them for us, on being told that his "Fly-fish" was very much like the "Corsair," summed up the relationships of the two as follows: "You bet it is like it, but it is a different kind of fish."

The following species of "rock-fish" were obtained by us in Monterey Bay. The names used by the fishermen of Monterey are appended. Most of these are evidently names in use for other species at the Azores, transferred to species of Californian waters:

S. paucispinis .....Meron, Tom-cod, Jack-fish.
S. flavidus .....Yellow-tail.
S. simulans .....
S. melanops.....Pesce Pretre (Priest-fish, from its color).
S. entomelas .....Buda.
S. ovalis .....Viuva (Widow).

S. atrovirens ..... Garrupa (Vera).
S. pinniger ..... Fliaum.
S. miniatus ..... Rasher.
S. auriculatus .....
S. proriger .....
S. elongatus ..... Reña.
S. vexillaris ..... Yellow Garrupa.
S. chlorostictus ..... Pesce Vermiglia.
S. rhodochloris ..... Fly-fish.
S. rosaceus ..... Corsair.
S. constellatus ..... Bagre.
S. ruber ..... Tambor.
S. rubrivinctus ..... Spanish Flag.
S. rostrelliger ..... Garrupa.
S. maliger .....
S. carnatus ..... Red Garrupa.
S. nebulosus .....
S. fasciolaris ..... Spotted Garrupa.
S. serriceps ..... Tree-fish.

Table of measurements.

	Entomelas (Monterey).	*Ovalis* (Monterey).	*Melanops* (Sta. Barbara).	*Flavidus* (Monterey).	*Rhodochloris* (Monterey).	*Rosaceus* (Monterey).
Extreme length, inches	12	13	12.25	14.90	9.10	8.85
Length to base caudal, inches = 100	10	11	10.10	12.05	7.90	7.55
Body:						
Greatest height	29.5	35	36	33.8	34	36
Least height	9	9	11	11.5	9	
Head:						
Length	30.5	32	31.6	36.5	39.5	35
Diameter of eye	7.8	8	7.3	8.5	12	10
Maxillary	12.5	11.5	13	16	18.5	19.5
Width interorbital area	8.7	8	9.5	9.3	5	6
Longest gill-rakers	5	5	3.8	5	3	3.5
Supraocular spine					8	5
Occipital spine					7.5	7
Dorsal:						
Height highest spine	12	13	11.3	13.7	15	16
Highest soft ray	12.5	12	15	17	15	15.5
Height 12th spine	4	8				
Height membrane 12th spine	3.5	5.5				
Anal:						
Second spine	9.5	12.5	8	9.5	19	17
Third spine	9	11.5	10	10.7	13.5	15
Longest ray	14	14.5	17.5	20	17	19
Caudal:						
Middle rays	14	14.5	17	19.3		
External rays	21	19	23	22.5		
Pectoral:						
Width base	8	9	29	27	9	9.5
Length	27	31	29	27	27	27.5
Ventral, length	18	20	20.5	22.5	21.5	20

SANTA CRUZ, CAL., *April* 15, 1880.

ON THE OCCURRENCE OF A SPECIES OF CREMNOBATES AT SAN DIEGO, CALIFORNIA.

By ROSA SMITH.

Three specimens of a small scaly Blenny found in those rocky tide-pools which are heavily lined with algæ, on March 6, 1880.

This Blenny is evidently of rare occurrence, this one point being at present its only known habitat on the Pacific coast of the United States, and these three specimens the only ones I could procure. It is accompanied by *Oligocottus analis*, which in this vicinity is abundant in all rock-pools, by *Gibbonsia elegans* of a dull color, and by *Hypleurochilus gentilis*.

These specimens were provisionally identified as belonging to *Cremnobates monophthalmus* (Günther) Steindachner (*Anchenopterus monophthalmus* Günther, Cat. Fishes Brit. Mus., iii, 275), a species hitherto known from three examples from the Pacific coast of Central America. My specimens differ from Günther's description in the following particulars: *The dorsal fin is continuous*, the membrane of the third spine joining the fourth near its summit in two examples, at its first third in the other. The head is proportionally shorter, forming two-ninths of the total length instead of one-fourth, and the body is less elongate, its depth forming one-fifth the total length instead of one-sixth. The characters of the San Diegan form of this genus agree more closely with Steindachner's description of *Cremnobates affinis* (Ichthyologische Beiträge, v, 178), a species considered by its describer as doubtfully distinct from *C. monophthalmus*. *C. affinis* is known from one individual taken on the West Indian island of St. Thomas, the proportions and coloration of which accord with my specimens, but this species also has the membrane from the third dorsal spine joining the fourth *at its base* ("die Membrane des dritten letzten Strahles setzt sich an die Basis des folgenden ersten Stachels des zweiten Dorsales an").

If the specimens from San Diego prove to be of a distinct species, which seems probable, they will be separated from those already known by the single merely emarginate dorsal fin, instead of two separate fins. In any event, the genus *Cremnobates* furnishes an interesting addition to the fauna of our Pacific coast.

Cremnobates integripinnis sp. nov.

DESCRIPTION.—The body is oblong, compressed. The head is less than the fourth of the total length, which measures two inches and an eighth. Gape of mouth oblique, the maxillaries reaching a vertical line intersecting posterior rim of orbit. Head conical, thickish, with the orbits placed far forward, small fringed tentacles on their superior margins, a tentacle on posterior margin of anterior nostril, and palmate tentacles on occiput. A cusp or spine on opercle.

Dorsal continuous, composed wholly of spines of nearly equal height

throughout, the first and second spines a little higher than the third, which is rather higher than the fourth, the third and fourth somewhat separated, but connected by membrane nearly as high as that connecting fourth and fifth, the other spines gradually increasing in height backward. The three anterior spines less stiff than the others.

The two anal spines are connected by a membrane to the soft part of that fin, the anterior insertion of which is about midway between tip of snout and base of caudal. The caudal is posteriorly rounded, its interradial membrane being emarginate; the membrane of the last dorsal spine joins the base of the first ray of the caudal, while the latter is free from anal, the free tips of which extend beyond base of caudal.

Pectorals fan-like, their extremities reaching a vertical line intersecting vent. Branchiostegal membranes continuous under throat. Body covered with conspicuous cycloid scales, which are smaller on the belly. No scales on head or fins.

Lateral line of thirty-eight scales, beginning on the scapular region, running anteriorly very high, abruptly curving around pectorals, and pursuing a straight course on the median line of the side to the tail.

Teeth rather strong, conical, in a narrow band; a single series of rather strong teeth on vomer.

Color varies in three individuals: one is a dark brownish gray; another, of equal size (2⅛ inches long), is lighter; while a third, of 1½ inches in length, is lavender in color. The markings are similar on all my specimens, each being maculated and obscurely barred with a darker shade of its own color; the dorsal region is always darkest, and each individual has an ocellated spot, black, with narrow pale edging on posterior portion of dorsal fin. Dorsal and anal fins each with narrow pale edging. Pectoral fins reddish violet at base, with a black crescent around it, the rest of the fin pale, with dark cross-bars. Ventrals barred. Caudal with a dark bar at base, the rest of the fin translucent, with narrow dark bars formed of spots.

Table of measurements.

Length:	
Total, in inches	2.05
To base of caudal, in inches	100 = 1.70
Body, greatest depth	23
Head:	
Length	26
Diameter of eye	7.5
Length of maxillary	11
Dorsal fin:	
Total length	80
Distance from snout	21
Length of anterior part	9
Height of first spine	6
Height of second spine	7
Height of third spine	4
Height of fourth spine	3
Height of highest spine	7.5
Height of membrane connecting third and fourth spines	1.8

Anal fin, distance from snout	4.7
Caudal, length	18
Pectoral, length	24
Ventral, length	17
Fin rays:	
Dorsal	XXXII
Anal	II, 20
Scales in lateral line	38

The specimens have been presented to the United States National Museum.

San Diego, Cal., *April* 10, 1880.

ON SOME NEW SPECIES OF EOCENE MOLLUSCA FROM THE SOUTHERN UNITED STATES.

By ANGELO HEILPRIN.

A part of the species herein described have been for several past years among the collections of the United States National Museum. Those which are mentioned as coming from Texas were collected by Mr. G. W. Marnoch, who sent them some years ago to Dr. C. A. White, and were by the latter gentleman presented to the National Museum. The number following the description of each species is that by which it is recorded in the museum register.

PLEUROTOMA, Lam.

Pleurotoma pagoda, n. sp.

Plate, fig. 1.

Ventricose; whorls about nine, the body-whorl nodulated on its most convex portion (nearly central), the nodulation consisting of a single series of sharp, obtusely-pointed, and flattened spines or nodes, which frequently appear double by the crossing of an impressed line over their basal portion; upper volutions with a similar series of nodes almost immediately above the sutural line, and gradually dwindling off into a crenulation; upper surface of the whorls concave, faintly striated, the sinual rugæ indicating but a faint sinus; lower surface with numerous well-developed revolving lines, which show a tendency to alternate. Aperture exceeding the spire in length, considerably contracted at about its center.

Length, 1½ inch. (No. 1505.)

Eocene of Alabama.

This species in its general appearance greatly resembles certain forms of *Fusus*, and a comparison of more numerous specimens may show it to belong to that genus, although the ornamentation of the whorls, as well as the sinual indication, more clearly point to *Pleurotoma*. The

only two specimens in the collection have the outer lip fractured, and I am therefore unable to pronounce conclusively upon the presence of a true notch.

PLEUROTOMA VENUSTA, n. sp.

Plate, fig. 2.

Slender, acuminate; whorls about nine, convex, ornamented by numerous fine revolving lines, which on the body-whorl are disposed in pairs; one deeply impressed line margins the majority of the volutions immediately below the suture; sinuated lines of growth not prominent; spire and aperture of about equal length.

Length, 1¼ inch. (No. 1509.)

Jackson, Miss.

PLEUROTOMA PLATYSOMA, n. sp.

Plate, fig. 3.

Whorls ? in number, flattened, each volution following the other almost in direct continuation without any prominent sutural division, and ornamented with numerous revolving lines, which on the caudal portion of the body-whorl tend to alternate, a fine line interposing itself between the more prominent ones; aperture probably a little more than one-third the length of the entire shell; notch deep, sigmoidal.

Length, 2 inches? (No. 8916.)

Atascosa County, Texas.

EUCHEILODON, Gabb.

EUCHEILODON CRENO-CARINATA, n. sp.

Plate, fig. 4.

Whorls subscalariform, flattened above, the angulation formed by a doubly crenulated carina; volutions ornamented by numerous revolving, profoundly elevated striæ, which are decussated by the much finer sinuated lines of growth; the upper or flattened portion with a prominent beaded line bordering the suture, and two (a finer and a coarser line) intermediate ones between the same and the carina; outer lip grooved within, and probably sharply crenulated by the terminations of the revolving striæ; columella with about eleven beads, which decrease in size from above downwards. Aperture nearly equal in length to the spire?

Length of fragment, 1 inch. (No. 8921.)

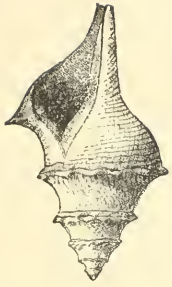
Jackson, Miss.

SCALARIA, Lam.

SCALARIA UNILINEATA, n. sp.

Plate, fig. 5.

Whorls about nine in number, convex, with numerous very faint, almost invisible, revolving lines, and much more prominent transverse



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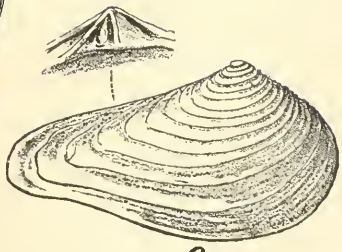

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ones (about 24 on the body-whorl); two very distinct revolving lines on the last volution, the upper one placed at about the middle, the lower one subcarinating it (only the upper of these two lines is seen on the remaining whorls, appearing there as a central line); base striated by revolving lines, and radially by the continuations of the transverse lines; apperture elliptical, somewhat produced distally.

Length, $\frac{3}{4}$ inch. (No. 8920.)

Jackson, Miss.

FUSUS, Lam.

Subgenus STREPSIDURA, Swainson.

FUSUS MARNOCHI, n. sp.

Plate, fig. 6.

Volutions seven or eight, the earlier three or four convex, the remainder flattened; body-whorl subangulate; suture impressed; aperture less than one-half the length of shell, the canal sharply twisted; columella with a pseudo-fold following the curve of the canal. The whorls in the single specimen before me are destitute of ornamentation, but some traces of the former existence of revolving lines are apparent.

Length, $\frac{4}{5}$ inch. (No. 8917.)

Atascosa County, Texas.

Named after Mr. G. W. Marnoch, through whom this and other species of older Tertiary Texas fossils have been obtained.

TEREBRA, Lam.

TEREBRA PLICIFERA, n. sp.

Plate, fig. 8.

Turreted; whorls ? in number, flattened, rapidly decreasing in size from the base upwards, and ornamented by numerous broad and prominently defined plicæ, having a sigmoidal flexure; an impressed line on the upper portion of each volution produces a subsutural ring or band, over which the plicæ and corresponding sulci are continued, and which occasionally tends to become double from the presence of a second impressed line. Body-whorl with two elevated revolving lines on its basal angulation; base radiately and longitudinally striated; aperture? (broken in all specimens).

Length? (No. 8919.)

Atascosa County, Texas.

CRASSATELLA, Lam.

CRASSATELLA DECLIVIS, n. sp.

Plate, fig. 9.

Very inequilateral, somewhat inflated anteriorly, the posterior dorsal margin descending very obliquely to the extremity, which is subcunei-

form; anterior margin descending rather abruptly, obtusely rounded; basal margin somewhat sinuous posteriorly. Surface deeply sulcated for the greater portion, the sulci mainly disappearing on the umbonial slope, where they give place to finely crowded striæ; apex acute; muscular impressions impressed; margin minutely crenulated.

Length, $1\frac{3}{4}$ inches. (No. 2490.)

Aquia Creek, Virginia.

April 25, 1880.

DESCRIPTION OF A NEW AGONOID FISH (BRACHYOPSIS XYOSTERNUS), FROM MONTEREY BAY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Brachyopsis xyosternus sp. nov.

Form of head and body as in *Brachyopsis verrucosus* Lockington. Body elongate, depressed, broadest at the shoulders, thence tapering rapidly to the snout, and gradually and evenly to the tail. Snout broad, obtuse, depressed, its sides parallel. Mouth terminal, very oblique, the lower jaw much the longer, its tip projecting upward above the upper profile of the snout. Mandible very broad, its greatest depth one-third its length, maxillary reaching to half way between front of orbit and pupil. A long barbel three-fourths the diameter of the orbit at its end. Premaxillaries anteriorly above the level of the pupil. Jaws with bands of villiform teeth. Vomer and palatines with slight asperities. Nasal spines present. No spines on top of cranium. Interorbital space broad, concave, from the elevation of the supraocular ridges. Preorbital with two spines. A sharp spine on the suborbital at lower posterior margin of eye. Preopercle with four processes, the upper one a sharp spine. Opercle striate, without spine. Top of head and the upper parts of the body without the small prickles which are found in *B. verrucosus*. Occipital pit obsolete.

No isthmus, the gill membrane united across the breast. No slit behind the last gill.

Body with the usual eight series of long keeled plates. Each keel terminating in a strong spine hooked backward, striæ radiating in every direction from the spine.

Dorsal series of plates 32, 6 before the spinous dorsal, 6 along its base, 4 between the two dorsals, 5 along the base of the soft dorsal, and 11 behind it. The two dorsal series uniting immediately behind the soft dorsal, the resultant single series round, with radiating striæ, the keel and spine obsolete. The two abdominal series similarly unite close behind the anal fin.

The plates in the upper lateral series diminish in size forward, becoming very small anteriorly. The lower lateral series becomes broader forwards as the other series decreases. It terminates abruptly opposite

the origin of the second dorsal. In the lower lateral series are 29 plates, in the abdominal series 30, 10 before the anal, 8 along its base, and 11 behind it.

Breast without distinct plates, but *entirely covered with minute tubercles*) *each of which has a central spine.* A series of five plates in front of the base of the pectorals, four of them armed with hooked spines.

Fin rays: D. VI–6; A. 8; V. I, 2.

Lowest rays of pectorals not so short as in *B. verrucosus*, the lowermost two-thirds the length of the longest (in *B. verrucosus* two-sevenths). Pectorals barely reaching front of anal.

Ventrals much shorter than in *B. verrucosus*, the tips reaching slightly more than half the distance to the anal fin (beyond front of anal in *B. verrucosus*). Inner ray of ventrals very little longer than the outer, the connecting membrane narrow (very broad in *verrucosus*). Vent but little behind ventrals.

Coloration.—Upper parts dusky; mandible, cheek, and subopercle silvery. Belly pale, with reddish tint. Lower half of pectoral reddish at base, the rest of the fin thickly dusted with black points. Ventrals reddish. Dorsal membrane immaculate, the rays punctulate with black. Caudal blackish. Anal reddish anteriorly, dusky behind.

This species is related to *Brachyopsis verrucosus*, lately described by Mr. Lockington, differing, however, in several important respects, especially (*a*) in the presence of small prickles on the breast instead of the large wart-like plates characteristic of *verrucosus*, (*b*) in the short ventral fins, (*c*) the absence of small prickles on the plates of the body, (*d*, the smaller number of plates, (*e*) the shorter vertical fins, (*f*) the long maxillary barbel, and (*g*) the deep mandible.

Brachyopsis verrucosus is comparatively common in the open water between Point Reyes and the Farallones, and is frequently brought in in the trawl-nets. *Brachyopsis xyosternus* is thus far known only from a specimen found on the beach at Santa Cruz by Dr. C. L. Anderson, and presented by him to the United States National Museum.

The genus to which these two species belong is well separated from *Agonus* by the absence of an isthmus, as well as by the entirely different form of the mouth and anterior portion of the head. Whether they are congeneric with the type of *Brachyopsis* Gill (*Agonus rostratus* Tilesius, from Kamtschatka) is yet to be proven.

Table of measurements.

	Xyosternus, Santa Cruz.	*Verrucosus*, Punta Reyes.
Extreme length, in inches	5.20	6.45
Length to base of caudal = 100	4.40	5.55
Body, greatest depth	11 (ca)	12
Head:		
Length	23	24
Distance from snout to nape	17.5	19.5
Greatest width	15	16.5
Interorbital width	4	5
Length of snout	4.2	6

Table of measurements—Continued.

	Xyosternus, Santa Cruz.	*Verrucosus*, Punta Reyes.
Head:		
Length of maxillary	6.5	7.5
Length of mandible	11	12
Depth of mandible	3.6	2.5
Diameter of orbit	5	6
Length of maxillary barbel	3.5	1
Dorsal (*spinous*):		
Distance from snout	31	25.5
Greatest height		
Length of base { to end of membrane	17	11
Length of base { to last spine	11	19
Dorsal (*soft*):		
Length of base { to end of membrane	16	
Length of base { to last ray	10	13.5
Height of longest ray	13	12
Anal:		
Distance from snout	47.5	52
Length of base { to end of membrane	22	
Length of base { to last ray	16.5	24
Height of longest ray	13	10
Caudal, length	19.5	16.5
Pectoral, length	24	24.5
Ventral:		
Distance from snout	24	28
Length	14.5	29.5
Dorsal rays	VI–6	IX–7
Anal rays	8	11
Pectoral rays	17	14
Ventral rays	I, 2	I, 2
Number of tubes in lateral line	34	37
Number of plates in dorsal series	32	35
Number of plates in lower lateral series	29	35

SANTA CRUZ, CAL., *April* 20, 1880.

DESCRIPTION OF A NEW FLOUNDER (HIPPOGLOSSOIDES EXILIS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Hippoglossoides exilis sp. nov.

Eyes and color on the right side. Body elongate, comparatively slender, rather closely compressed; the dorsal outline more curved than the ventral, and neither strongly arched; the body tapering backwards into a slender caudal peduncle, which is considerably longer than deep. Greatest depth about one-third the length to base of caudle.

Head moderate, not obtuse, the outline of the snout continuous with the descending profile of the back. Mouth not large, very oblique, the upper jaw with its margin on each side concave, the lower jaw correspondingly convex. Lower jaw slightly protruding, with a distinct symphyseal knob. Maxillary rather narrow, its posterior end obliquely truncate, not extending quite to opposite the middle of the pupil. Premaxillary anteriorly on the level of the interorbital space.

Teeth all conical, the upper jaw with two distinct series; outer series of teeth smaller than in the other species of *Hippoglossoides*, not large anteriorly, and becoming quite small posteriorly. Teeth of the inner series quite small, closely and evenly set. Lower jaw with a single

series of close-set teeth, much smaller than in the outer series of the upper jaw.

Eyes large, the lower somewhat in advance of the upper, their diameter two-sevenths of the length of the head. The upper eye with some vertical range, but not encroaching on the dorsal line.

Interorbital space a very narrow sharp ridge, with three rows of small scales, a slight ridge connecting it with the lateral line. A series of mucous pores around lower eye behind. About 8 scales in a series obliquely across the cheeks.

Gill-rakers rather slender, shorter than in the other species of this genus, but similar in form, compressed, toothed on the inner edge, somewhat curved forwards. About 10 of them below the angle of the arch, the longest not one-third the diameter of the eye.

Scales comparatively large, very much larger than in the other species of *Hippoglossoides*, thin, almost membranaceous, and somewhat readily deciduous, their edges conspicuously ctenoid, but much less rough than in *H. jordani*. In the latter species the scales are of much firmer texture, and their cilia are spine-like and stiff. The character of the scales is similar to that of *Atheresthes stomias*, which this species also simulates in form and color. Scales on the head entirely similar to those on the body, but somewhat smaller. Those on left side also similar, but less strongly ctenoid. They are, however, considerably rougher than on the blind side in related species.

Lateral line very prominent, its tubes coarse. It is straight behind, slightly and regularly rising anteriorly, without trace of arch or convexity.

Rays of both dorsal and anal fins extensively scaly on both sides. Scales extending high up on all the fins. Scales 16–71–18 (42–125–43 in *Hippoglossoides jordani*).

Fins low, rather fragile, the rays set well apart.

Dorsal fin beginning immediately in front of the pupil, its anterior rays very low, the highest rays much behind the middle of the fin, their height much less than the length of the caudal peduncle, and but little more than the diameter of the eye.

Anal fin similar to the dorsal, but rather higher, preceded by a spine which is shorter than in *H. jordani*.

Caudal fin long, somewhat pointed, the middle rays unusually produced.

Pectoral fins small, little more than half the length of the head, that of the left side less than a third. Ventral fins both lateral, small, not reaching to the anal spine.

Fin rays: D. 78; A. 62; V. 6.

Color pale olivaceous brown, rendered darker by black punctulations, which form an edging around each scale, sometimes with a few very faint bronze spots. Fins somewhat dusky, especially the caudal and

pectoral; dorsal and anal edged with yellowish anteriorly; ventrals with considerable light yellow.

This species is known to us from upwards of a hundred specimens taken in sweep-nets between the Golden Gate and Point Reyes.

All the specimens are small, ranging from 8 to 12 inches in length. Its abundance, in the San Francisco market at least, seems to be confined to the month of April.

Its relations are not intimate with the two species of this genus previously known—*H. platessoides* of the North Atlantic and *H. jordani* of the North Pacific. From both it differs in the elongate form, much larger scales, fewer fin rays, smaller teeth, &c. With *H. jordani*, which inhabits the same waters, it agrees in scarcely any respect, excepting in the characters of the genus *Hippoglossoides*, *i. e.*, the large mouth, conical teeth, ctenoid scales, simple, straight, lateral line, convex caudal, dextral eyes, &c.

Table of measurements.

	Exilis.	*Jordani.*
Extreme length, in inches	10.25	9.08
Length to base of caudal, in inches=100	8.40	7.70
Body:		
Greatest height	33	41
Least height	8.2	9.8
Length of caudal peduncle	12.5	8
Head:		
Greatest length	25.5	28.5
Width of interorbital area	.50	1.50
Length of snout	3.7	3.8
Length of orbit	9.3	9
Length of maxillary	9	11
Length of mandible	11.5	14
Length of longest gill-raker	2	3
Dorsal:		
Distance from snout	9.3	9
Greatest height	8	11.5
Anal:		
Distance from snout	35	33
Height at longest ray	9.5	10.5
Caudal:		
Length of middle rays	20.5	17.5
Length of outer rays	17	17
Pectoral:		
Right side, length	14	15.5
Left side, length	8	11
Ventral, right side, length	7.5	8
Dorsal rays	78	94
Anal rays	62	73
Scales in lateral line	71	125
Scales in transverse row above lateral line	16	42
Scales in transverse row below lateral line	18	43

SAN FRANCISCO, CAL., *April* 21, 1880.

DESCRIPTIONS OF NEW INVERTEBRATE FOSSILS FROM THE MESOZOIC AND CENOZOIC ROCKS OF ARKANSAS, WYOMING, COLORADO, AND UTAH.

By C. A. WHITE.

The fossils described in the following paragraphs are among the collections of the National Museum. All except one species have been selected for description from among the collections that were made under the auspices of the surveys formerly in charge, respectively, of Professor Powell, Dr. Hayden, and Captain Wheeler. Two of them, *Callianassa ulrichi* and *Spirorbis dickhauti*, are embraced in a small collection of Cretaceous fossils sent to the National Museum from near Little Rock, Ark., by Mr. E. O. Ulrich, of Cincinnati, Ohio.

MOLLUSCA.

CONCHIFERA.

Genus PTERIA Scopoli.

Subgenus OXYTOMA Meek.

PTERIA (OXYTOMA) ERECTA (sp. nov.).

Avicula linguiformis White, 1876 (not Shumard), Powell's Rep. Geol. Uinta Mts., p. 95.

Shell rather small, appearing to be nearly erect, but the axis is slightly oblique to the hinge-line; both valves convex, but the right one less convex than the left; hinge-line long, much longer than the axial length of the shell; posterior wing large, its extremity acutely angular and moderately prominent; anterior wing comparatively large, prominent, obtusely pointed, defined from the body of the shell by a sinus or furrow in both valves, the direction of which forms a slightly obtuse or nearly right angle with the hinge-line; front, exclusive of the anterior wing, nearly perpendicular the margin forming a nearly regular curve from the front all the way around to the posterior side, where it is flexed with a backward curve to meet the extremity of the hinge-line; umbones somewhat prominent, especially that of the left valve. Surface having a nearly smooth appearance, but the lens reveals the presence of somewhat regularly disposed concentric lines.

Length of hinge-line, 32 millimeters; axial length of the shell, 26 millimeters. (Museum No. 8771.)

This shell was formerly referred by me (*loc. cit.*) to the *Avicula linguiformis* of Shumard, but it differs from that species by having larger wings, a much longer hinge-line, and a much less oblique axis. It may be compared with *P.* (*O.*) *salinensis* White, Proc. U. S. Nat. Mus., vol. ii, p. 296, pl. 5, figs. 1 and 2; but it differs in being less robust, having

proportionally larger wings, narrower body, and a more nearly erect axis.

Position and locality.—Lower Potato Valley, Southern Utah, where it was obtained by Prof. J. W. Powell from Cretaceous strata.

Genus SOLEMYA Lamarck.

Solemya bilix (sp. nov.).

Shell about two and a half times as long as high, broader anteriorly than posteriorly; both ends rounded, the posterior one more narrowly so than the other; both dorsal and basal margins gently convex or nearly straight; test thin and fragile; valves moderately convex from above downward, the greatest convexity in that direction being near the dorsum; beaks, having the usual inconspicuous character common to the genus, situated near the posterior end; ligament necessarily short, but apparently well developed, and resting upon a fulcrum of support of the usual character in each valve. Surface bright and, besides the usual lines of growth, marked by numerous faint radiating lines, which are visible to the unassisted eye, but are satisfactorily seen only under a lens, nearly uniformly distributed over the whole surface, but upon the middle portion they are arranged in pairs.

Length, 20 millimeters; height at the broadest part, which is in front of the middle, 8 millimetres. (Museum No. 8913.)

This is plainly a characteristic species of *Solemya*, but the only fossil species with which it need be compared is *S. subplicata* Meek & Hayden, from the Fox Hills Cretaceous of the Upper Missouri. It differs from that species in being proportionally broader in front, in the character and uniformity of distribution of its radiating striæ, and in wanting the subplicate character of the front portion. The extension of the epidermis has not been observed, but in other respects this species may be compared with the living *S. velum* Say in general form, and in the pairing of its radiating lines.

Position and locality.—Cretaceous strata, associated with *Mactra holmesii* (= *Cyrena? holmesii* Meek), about four miles north of Golden, Colo., where it was obtained by Mr. W. H. Holmes. These strata were formerly supposed to belong to the Lignite series (Laramie), but they are marine Cretaceous, as I have shown in An. Rep. U. S. Geol. Sur. Terr. for 1877, pp. 193–196.

Genus LUCINA Bruguière.

Lucina profunda (sp. nov.).

Shell subcircular or subpentahedral; valves not very convex; posterior side truncate, narrower than the anterior; basal border having its margin more abruptly convex at its middle than towards the front and rear; dorsal margin short, nearly straight; front margin having a nearly

regular curve; beaks small, submedially located, distinct but inconspicuous; umbonal ridge slightly developed, curved, passing near the dorsal and posterior borders. Surface marked by the usual concentric lines of growth.

Length, 20 millimeters; height, from base to beaks, 18 millimeters. (Museum No. 8362.)

This species is readily recognizable by its comparatively narrow posterior side, its deeply convex basal border, and slight convexity of the valves.

Position and locality.—Cretaceous strata, Monument Creek, Colorado, where it was obtained by Dr. A. C. Peale.

GASTEROPODA.

Genus PLANORBIS Guettard.

PLANORBIS ÆQUALIS (sp. nov.).

Shell rather small, coiled nearly in a plane, apparently sinistral; whorls apparently 4 or 5, in close contact but only slightly involute, broadly convex upon the periphery, but their sides more narrowly convex, their transverse diameter greater than that which corresponds with the plane of the coil.

Surface marked by a considerable number of revolving raised lines or slight angulations, which are crossed by the usual lines of growth.

Diameter of the full coil of the largest example discovered, 6 millimeters. (Museum No. 8909.)

This is apparently the only species of typical biumbilicate *Planorbis* that has yet been discovered among the fossil fresh-water faunæ of the Western region, and it therefore needs no detailed comparison.

Position and locality.—Green River Group, Eocene, Henry's Fork of Green River, Southern Wyoming.

Subgenus GYRAULUS Agassiz.

PLANORBIS (GYRAULUS) MILITARIS (sp. nov.).

Shell very small, dextral, depressed-convex above, umbilicate below; volutions two and a half to three and a half, convex on all sides except the inner, which is very narrowly flattened against each preceding coil; suture deeply impressed both above and below; surface marked by comparatively coarse lines of growth.

Diameter of the full coil of the larger examples in the collection, 4 millimeters. (Museum No. 8594.)

This form was noticed but not named by me in vol. iv, U. S. Expl. & Sur. West of the 100th Merid., p. 210. At that time I was not satisfied as to the mature condition of these shells, but by careful examina-

tion of a larger number of examples there seems to be no reason for doubt upon that point.

The subgenus *Gyraulus* has not heretofore been published as occurring among our large fossil pulmonate molluscan faunæ of the West, but at least two other species probably exist there, one in the Bear River (Laramie) strata, and the other in those of the Green River Group.

Position and locality.—Head of Soldiers' Fork, Utah, where they were obtained by one of the parties of the survey in charge of Lieutenant Wheeler. The true age of the strata is not at present definitely known, but it is understood to be either that of the upper portion of the Laramie or the lower portion of the Wahsatch Group.

Genus LIMNÆA Lamarck.

Subgenus LEPTOLIMNEA Swainson.

LIMNÆA (LEPTOLIMNEA) MINUSCULA (sp. nov.).

Shell rather small, moderately attenuate; spire much longer than the aperture; volutions six or seven, moderately convex, the distal border very narrowly appressed against each preceding coil; aperture small, elongate, subovate; columellar fold distinct, but not large. Surface marked by distinct lines of growth, but no revolving lines have been detected.

The only two examples of this species that have been discovered are broken, but the full length of the larger one is estimated at 9 millimeters; diameter of last volution, 3 millimeters; length of aperture, $3\frac{1}{2}$ millimeters. (Museum No. 8907.)

Position and locality.—From strata belonging to either the basal portion of the Green River Group or the upper portion of the Wahsatch Group, about three miles east of Table Rock Railroad station, Southern Wyoming, where it is associated with *Planorbis cirratus* White, and also a small Limnæid that is probably referable to *Acella* Haldeman.

Genus HELIX Linnæus.

Subgenus PATULA Haldeman.

HELIX (PATULA) SEPULTA (sp. nov.).

Shell convex above; umbilicus moderately wide; volutions about six, convex upon all sides except the inner; suture impressed; surface regularly but minutely ribbed, the ribs having the same direction as the lines of growth.

All the examples discovered are distorted by pressure, but the diameter of the full coil of the largest example was about 12 millimeters and its full height about 7 millimeters. (Museum No. 8908.)

Position and locality.—The coal-bearing series of strata at Evanston, Wyo., where it is associated with *H. evanstonensis* White and other forms. These strata belong either to the upper part of the Laramie or the lower portion of the Wahsatch Group.

ARTICULATA.

VERMES.

Genus SPIRORBIS Lamarck.

SPIRORBIS? DICKHAUTI (sp. nov.).

Shell discoid, one side being nearly flat and the other broadly umbilicate; volutions about five, partially embracing but all of them visible, somewhat rugose but increasing in size with considerable regularity; peripheral side of the volutions flattened or gently convex, having a single revolving raised line along its middle and another similar one at each border, where it sharpens the angularity between the lateral and peripheral sides; outer portion of both the lateral sides of the volutions concave, and the inner portion convex, giving the last-named portion a greater transverse diameter than the outer portion, the larger part of which is embraced by the next succeeding volution; aperture small, round, and apparently, but not really, contracted. The cavity being round, the outer portion of the test only partakes of the irregularity described, and seems to have been deposited as an encrustation upon the first-formed inner portion, that of adjacent volutions seeming to blend, obscuring the suture. Besides a considerable degree of rugosity, the surface shows under the lens a peculiar granular or rather an etched appearance.

Greatest diameter of the full coil of the largest example discovered, 9 millimeters; greatest diameter of the outer volution, near the aperture, 2½ millimeters. (Museum No. 9073.)

In size and general aspect this species resembles *S. rotulus* Morton sp., from the Cretaceous of New Jersey, but although doubtless congeneric, it differs from that species in the character of its surface ornamentation, and in having a round instead of quadrangular aperture. This shell is referred to the shell-bearing worms and not to the mollusca on account of the peculiar character of the test. It probably does not strictly belong to the genus *Spirorbis*, but it is regarded as at least a closely related form.

Position and locality.—Cretaceous strata near Little Rock, Ark., where it was obtained by Mr. E. O. Ulrich, and also by Mr. H. E. Dickhaut, in whose honor the specific name is given.

CRUSTACEA.

Genus CALLIANASSA Leach.

CALLIANASSA ULRICHI (sp. nov.).

Hand quadrate, flattened; inner face less convex than the outer; both upper and lower edges acute, the lower one more so than the upper, and finely crenulate; fixed finger slender, plain, its transverse section sub-

triangular, gently curved, shorter than the hand; movable finger larger and stronger than the fixed one, having a moderately strong prominent ridge upon the inner side, between the front end of which and the extremity of the finger there is sometimes a distinct tooth. Surface nearly smooth, but some examples are granulate about the middle of both sides of the hand, and several small foramina are observable along the upper margin of the movable finger.

Length of hand, 13 millimeters; breadth, 10 millimeters; thickness, 4 millimeters. (Museum No. 8910.)

Position and locality.—This species has been sent to the United States National Museum by Mr. E. O. Ulrich, in whose honor the specific name is given. He obtained it from Cretaceous strata near Little Rock, Ark. Associated with it, besides certain characteristic Cretaceous mollusca, there are several separate movable fingers which plainly belong to another decapod crustacean; but although complete in themselves, they constitute too small a portion of the animal to satisfactorily base a specific description upon them.

A CATALOGUE OF THE BIRDS OF NORTH AMERICA.

By ROBERT RIDGWAY.

INTRODUCTION.

During the interval of twenty-one years which has elapsed since the publication of the last Smithsonian catalogue,* a great advance has naturally been made in our knowledge of North American ornithology; and so numerous and important are the changes which have resulted, through additions of new species, rectifications of synonymy, etc., that a new list seems desirable to take the place of the old one.

The total apparent number of species given in the old catalogue has been increased only from 738 to 764, a slight numerical discrepancy which it is necessary to explain. From the catalogue of 1859 there have been eliminated no less than 62 names, which are either not entitled to a place in the North American fauna or which have been degraded to varietal or sub-specific rank, the number of the species in the latter case being here simply duplicated as many times as there are varieties of a species. To offset this large reduction, 59 valid new species have been described since 1859, and 77 added, or restored, to the fauna, the accessions thus numbering 127 species, or 65 more than the eliminations. The forms considered to be of merely subspecific rank number 160, which, added to the 764 valid species recognized, gives a total of 924 definable forms composing the North American avian fauna, as now understood.†

It is found impracticable to here distinguish, in all cases, between

* Two catalogues of North American birds have been issued by the Smithsonian Institution, as follows:

(1) Catalogue of North American Birds, chiefly in the Museum of the Smithsonian Institution. By Spencer F. Baird, Assistant Secretary of the Smithsonian Institution. Washington: Smithsonian Institution. October, 1858. 4to, paper. 1 p. l., pp. xvii–lvi. [Reissue, with new title-page, of pp. xvii–lvi of Vol. IX, Pacific R. R. Reports ("Birds of North America"). Includes, besides the list of 738 species, with habitats, tables of the higher groups, and lists of extralimital species (23 in number) treated in the general report, and of others (31) claimed, on apparently insufficient grounds, as North American; also a summary of the number of species given in the works of Wilson, Bonaparte, and Audubon.]

(2) Catalogue of North American Birds, chiefly in the Museum of the Smithsonian Institution. By Spencer F. Baird. First octavo edition. Washington: Smithsonian Institution. [Smithsonian Miscellaneous Collections, No. 108.] 1859. 8vo. 2 p. ll., pp. 19+2. [Essentially the same as the quarto list, but without habitats, and the matter relating to classification, etc. The two additional pages are an alphabetical index of the North American genera. As in the quarto list, there are, ostensibly, 738 species, but 22 numbers are duplicated, making a total of 760 names in the list.]

† A full analysis of the changes made in this catalogue is given on pages 213–234.

species which are truly or peculiarly North American and those which are more properly visitants from other countries; but in the case of those whose occurrence appears to be accidental or occasional, the number preceding the name is inclosed in brackets. Of the latter class, species which there is good reason to believe did not reach our limits through natural means (*i. e.*, those escaped from confinement) have been, in every case, carefully excluded, as have likewise *all* introduced species.

It has been deemed best, in view of the recent discoveries along our southwestern border, to retain as North American all the species (less than a dozen in number) treated by Professor Baird in Volume IX, Pacific Railroad Reports ("Birds of North America"), and likewise given in the old catalogue, on account of their having been obtained just across the boundary, in Northern Mexico; their discovery within our limits being quite certainly only a question of time and investigation. For the same reason, the remaining few of Giraud's "Sixteen New Species of Texan Birds"* are also included. Neither are we prepared to relinquish several Audubonian species which at the present time are known only from the descriptions and figures by their discoverer (*e. g.*, *Regulus cuvieri*, *Perissoglossa* [?] *carbonata*, *Dendræca montana*, and *Wilsonia minuta*, as well as other better-known species which are given by Audubon *on his own authority* (*e. g.*, *Chrysomitris "magellanica"* = *C. notata*, and *Eudocimus ruber*).

Several species peculiar to the islands of Socorro and Guadalupe, off the coast of northwestern Mexico and Lower California, respectively, together with the few forms peculiar to the latter peninsula, are regarded as truly North American, their affinities, with perhaps only two exceptions (*i. e.*, *Conurus holochlorus* and *Polyborus lutosus*), being strictly "Nearctic."

The greatest difficulty encountered in the compilation of this work has been in the way of distinguishing between valid "species" and those forms to be regarded as geographical races of merely subspecific rank. The greatest care has been taken in all doubtful cases of this kind, and previous conclusions (published in "History of North American Birds"† and elsewhere) carefully reconsidered, with the aid of all the material accessible, including many specimens not previously in hand. This reconsideration of the subject has, in not a few cases, resulted in a reversal of former opinion, specimens from important localities not before represented often deciding the point one way or the other. Every form whose characteristics bear unmistakably the impress of climatic or

*A Description of Sixteen New Species of North American Birds, by Jacob P. Giraud, jr. New York. George F. Nesbitt, printer, Tontine Building, corner of Wall and Water streets. 1841. Folio, not paged, 8 plates. [For species given in this work, which have not since been obtained within the limits of the United States, see p. 229.]

†A History of North American Birds, by S. F. Baird, T. M. Brewer, and R. Ridgway. Land Birds. Illustrated by 64 colored plates and 593 woodcuts. 3 vols., royal 4to. Boston. Little, Brown, & Co.

local influences, gradually less marked toward the habitat of another form, with which it thus intergrades; and all forms which certainly intergrade, no matter how widely distinct the opposite extremes may appear (*e. g.*, *Colaptes auratus* and *mexicanus*), together with intergrading forms whose peculiarities are not explained by any known "law" of variation, have been reduced to subspecific rank. On the other hand, where the difference between allied forms is slight, but at the same time absolutely constant, and not coincident with a difference of habitat (*e. g.*, certain of the small Thrushes and the various forms of *Junco*), specific rank is upheld. There are some forms which future investigation, based upon adequate material, may decide to be of different rank from that accorded them here. We cheerfully acknowledge our fallibility, but at the same time would say that we have endeavored to be as conscientious and consistent as possible, giving the rank of each form as it appears in the light of our present knowledge, independent of previous conclusions.

SMITHSONIAN INSTITUTION, *January* 22, 1880.

CATALOGUE.

1. **HYLOCICHLA MUSTELINA** (Gmel.) Baird.
   Wood Thrush. [148.]

2. **HYLOCICHLA FUSCESCENS** [Steph.] Baird.
   Wilson's Thrush. [151.]

3. **HYLOCICHLA ALICIÆ** Baird.
   Gray-cheeked Thrush. [154.]

4. **HYLOCICHLA USTULATA** (Nutt.) Baird.
   Russet-backed Thrush. [152.]

4*a*. **HYLOCICHLA USTULATA SWAINSONI** (Caban.) Ridgw.
   Olive-backed Thrush. [153.]

5. **HYLOCICHLA UNALASHKÆ** (Gmel.) Ridgw.
   Dwarf Thrush. [150.]

5*a*. **HYLOCICHLA UNALASHKÆ AUDUBONII** (Baird) Ridgw.
   Rocky Mountain Hermit Thrush. [149*a*.]

5*b*. **HYLOCICHLA UNALASHKÆ PALLASI** (Caban.) Ridgw.
   Hermit Thrush. [149.]

[6.] **TURDUS ILIACUS** Linn.
   Red-wing Thrush.

7. **MERULA MIGRATORIA** (Linn.) Sw. & Rich.
   American Robin. [155.]

7*a*. **MERULA MIGRATORIA PROPINQUA** Ridgw.
   Western Robin.

8. **MERULA CONFINIS** (Baird) Ridgw.
   Saint Lucas Robin.

9. **HESPEROCICHLA NÆVIA** (Gmel.) Baird.
   Varied Robin. [156.]

10. **OREOSCOPTES MONTANUS** (Towns.) Baird.
    Sage Thrasher. [255.]

11. **MIMUS POLYGLOTTUS** (Linn.) Boie.
    Mockingbird. [253, 253*a*.]

12. **GALEOSCOPTES CAROLINENSIS** (LINN.) CABAN.
Catbird. [254.]

13. **HARPORHYNCHUS RUFUS** (LINN.) CABAN.
Brown Thrasher. [261, 261*a*.]

13*a*. **HARPORHYNCHUS RUFUS LONGIROSTRIS** (LAFR.) COUES.
Mexican Brown Thrasher. [260.]

14. **HARPORHYNCHUS CINEREUS** XANTUS.
Saint Lucas Thrasher.

14*a*. **HARPORHYNCHUS CINEREUS BENDIREI** (COUES) HENSH.
Bendire's Thrasher.

15. **HARPORHYNCHUS CURVIROSTRIS** (SW.) CABAN.
Curve-billed Thrasher. [259, 259*a*.]

15*a*. **HARPORHYNCHUS CURVIROSTRIS PALMERI** RIDGW.
Palmer's Thrasher.

16. **HARPORHYNCHUS REDIVIVUS** (GAMB.) CABAN.
Californian Thrasher. [256.]

16*a*. **HARPORHYNCHUS REDIVIVUS LECONTEI** (LAWR.) COUES.
Leconte's Thrasher. [257.]

17. **HARPORHYNCHUS CRISSALIS** HENRY.
Red-vented Thrasher. [258.]

18. **HARPORHYNCHUS GRAYSONI** BAIRD.
Socorro Thrasher.

19. **CINCLUS MEXICANUS** SWAINS.
American Water Ouzel. [164.]

[20.] **CYANECULA SUECICA** (LINN.) BREHM.
Blue-throated Warbler.

[21.] **SAXICOLA ŒNANTHE** (LINN.) BECHST.
Stone Chat. [157.]

22. **SIALIA SIALIS** (LINN.) HALDEM.
Bluebird. [158.]

23. **SIALIA MEXICANA** SWAINS.
Californian Bluebird. [159.]

24. **SIALIA ARCTICA** SWAINS.
Rocky Mountain Bluebird. [160.]

25. **MYIADESTES TOWNSENDI** (AUD.) CABAN.
Townsend's Solitaire. [235.]

26. **PHAINOPEPLA NITENS** (SW.) SCL.
Black-crested Flycatcher. [234.]

27. **POLIOPTILA CÆRULEA** (LINN.) SCL.
Blue-gray Gnatcatcher. [232.]

28. **POLIOPTILA PLUMBEA** BAIRD.
Plumbeous Gnatcatcher. [283.]

29. **POLIOPTILA MELANURA** LAWR.
Black-capped Gnatcatcher. [284.]

30. **REGULUS CALENDULA** (LINN.) LICHT.
Ruby-crowned Kinglet. [161.]

31. **REGULUS OBSCURUS** RIDGW.
Dusky Kinglet.

32. **REGULUS CUVIERI** AUD.
Cuvier's Kinglet. [163.]

33. **REGULUS SATRAPA** LICHT.
Golden-crowned Kinglet. [162.]

33*a*. **REGULUS SATRAPA OLIVACEUS** BAIRD.
Western Golden-crowned Kinglet.

[34.] **PHYLLOSCOPUS BOREALIS** (BLAS.) DRESSER.
Kennicott's Warbler.

35. **CHAMÆA FASCIATA** GAMB.
Ground Tit. [274.]

36. **LOPHOPHANES BICOLOR** (LINN.) BP.
Tufted Titmouse. [285.]

37. **LOPHOPHANES ATROCRISTATUS** CASS.
Black-crested Titmouse. [286.]

38. **LOPHOPHANES INORNATUS** (GAMB.) CASS.
Plain Titmouse. [287.]

39. **LOPHOPHANES WOLLWEBERI** BONAP.
Wollweber's Titmouse. [288.]

40. **PARUS MONTANUS**, GAMB.
Mountain Chickadee. [294.]

41. **PARUS ATRICAPILLUS** LINN.
Black-capped Chickadee. [290.]

41*a*. **PARUS ATRICAPILLUS SEPTENTRIONALIS** (HARRIS) ALLEN.
Long-tailed Chickadee. [289, 289*a*.]

41*b*. **PARUS ATRICAPILLUS OCCIDENTALIS** (BAIRD) COUES.
Oregon Chickadee. [291.]

42. **PARUS CAROLINENSIS** AUD.
Carolina Chickadee. [293.]

43. **PARUS MERIDIONALIS** SCL.
Mexican Chickadee. [292.]

[44.] **PARUS CINCTUS** BODD.
Siberian Chickadee.

45. **PARUS HUDSONICUS** Forst.
Hudsonian Chickadee. [296.]

46. **PARUS RUFESCENS** Towns.
Chestnut-backed Chickadee. [295.]

46*a*. **PARUS RUFESCENS NEGLECTUS**, Ridgw.
Californian Chickadee.

47. **PSALTRIPARUS MINIMUS** (Towns.) Bp.
Least Tit. [298.]

48. **PSALTRIPARUS PLUMBEUS** Baird.
Lead-colored Tit. [299.]

49. **PSALTRIPARUS MELANOTIS** (Hartl.) Bp.
Black-eared Tit. [297.]

50. **AURIPARUS FLAVICEPS** (Sundev.) Baird.
Yellow-headed Tit. [300.]

51. **SITTA CAROLINENSIS** Gmel.
White-bellied Nuthatch. [277.]

51*a*. **SITTA CAROLINENSIS ACULEATA** (Cass.) Allen.
Slender-billed Nuthatch. [278.]

52. **SITTA CANADENSIS** Linn.
Red-bellied Nuthatch. [279.]

53. **SITTA PUSILLA** Lath.
Brown-headed Nuthatch. [280.]

54. **SITTA PYGMÆA** Vig.
Pigmy Nuthatch. [281.]

55. **CERTHIA FAMILIARIS RUFA** (Bartr.) Ridgw.
Brown Creeper. [275.]

55*a*. **CERTHIA FAMILIARIS MEXICANA** (Gloger) Ridgw.
Mexican Creeper. [276.]

56. **CAMPYLORHYNCHUS BRUNNEICAPILLUS** (Lafr.) Gray.
Cactus Wren. [262.]

57. **CAMPYLORHYNCHUS AFFINIS** Xantus.
Saint Lucas Cactus Wren.

58. **SALPINCTES OBSOLETUS** (Say) Caban.
Rock Wren. [264.]

58*a*. **SALPINCTES OBSOLETUS GUADALUPENSIS** Ridgw.
Guadalupe Rock Wren.

59. **CATHERPES MEXICANUS** (Sw.) Baird.
Mexican White-throated Wren. [263.]

59*a*. **CATHERPES MEXICANUS CONSPERSUS** Ridgw.
White-throated Wren.

60. **THRYOTHORUS LUDOVICIANUS** (Gm.) Bp.
Carolina Wren. [265.]

60*a*. **THRYOTHORUS LUDOVICIANUS BERLANDIERI** (Couch) Coues.
Berlandier's Wren. [266.]

60*b*. **THRYOTHORUS LUDOVICIANUS MIAMENSIS** Ridgw.
Florida Wren.

61. **THRYOMANES BEWICKI** (Aud.) Baird.
Bewick's Wren. [267.]

61*a*. **THRYOMANES BEWICKI SPILURUS** (Vig.) Baird.
Californian Bewick's Wren.

61*b*. **THRYOMANES BEWICKI LEUCOGASTER** Baird.
Texan Bewick's Wren.

62. **THRYOMANES BREVICAUDA** Ridgw.
Guadalupe Wren.

63. **TROGLODYTES AËDON**, Vieill.
House Wren. [270, 272.]

63*a*. **TROGLODYTES AËDON PARKMANNI** (Aud.) Coues.
Western House Wren. [271.]

64. **TROGLODYTES INSULARIS** Baird.
Socorro Wren.

65. **ANORTHURA TROGLODYTES HYEMALIS** (Vieill.) Coues.
Winter Wren. [273.]

65*a*. **ANORTHURA TROGLODYTES PACIFICUS** (Baird) Ridgw.
Western Winter Wren.

66. **ANORTHURA ALASCENSIS** (Baird) Coues.
Alaskan Wren.

67. **TELMATODYTES PALUSTRIS** (Wils.) Baird.
Long-billed Marsh Wren. [268.]

67*a*. **TELMATODYTES PALUSTRIS PALUDICOLA** Baird
Tule Wren.

68. **CISTOTHORUS STELLARIS** (Licht.) Caban.
Short-billed Marsh Wren. [269.]

[69.] **MOTACILLA ALBA** Linn.
White Wagtail.

[70.] **BUDYTES FLAVA** (Linn.) Gray.
Yellow Wagtail.

71. **ANTHUS LUDOVICIANUS** (Gm.) Licht.
American Titlark. [165.]

[72.] **ANTHUS PRATENSIS** (Linn.) Bechst.
European Titlark.

73. **NEOCORYS SPRAGUEI** (AUD.) SCL.
Sprague's Titlark. [166.]

74. **MNIOTILTA VARIA** (LINN.) VIEILL.
Black-and-white Creeper. [167 *a*.]

74*a*. **MNIOTILTA VARIA BOREALIS** (NUTT.) RIDGW.
Small-billed Creeper. [167.]

75. **PROTONOTARIA CITREA** (BODD.) BAIRD.
Prothonotary Warbler. [169.]

76. **HELONÆA SWAINSONI** AUD.
Swainson's Warbler. [179.]

77. **HELMITHERUS VERMIVORUS** (GMEL.) BP.
Worm-eating Warbler. [178.]

78. **HELMINTHOPHAGA BACHMANI** (AUD.) CABAN.
Bachman's Warbler. [182.]

79. **HELMINTHOPHAGA PINUS** (LINN.) BAIRD.
Blue-winged Yellow Warbler. [180.]

80. **HELMINTHOPHAGA LAWRENCEI** HERRICK.
Lawrence's Warbler.

81. **HELMINTHOPHAGA CHRYSOPTERA** (LINN.) BAIRD.
Golden-winged Warbler. [181.]

82. **HELMINTHOPHAGA LEUCOBRONCHIALIS** BREWSTER.
White-throated Warbler.

83. **HELMINTHOPHAGA LUCIÆ** COOPER.
Lucy's Warbler.

84. **HELMINTHOPHAGA VIRGINIÆ** BAIRD.
Virginia's Warbler. [183*a*.]

85. **HELMINTHOPHAGA RUFICAPILLA** (WILS.) BAIRD.
Nashville Warbler. [183.]

86. **HELMINTHOPHAGA CELATA** (SAY) BAIRD.
Orange-crowned Warbler. [184.]

86*a*. **HELMINTHOPHAGA CELATA LUTESCENS** RIDGW.
Luteous Warbler.

87. **HELMINTHOPHAGA PEREGRINA** (WILS.) BAIRD
Tennessee Warbler. [185.]

88. **PARULA AMERICANA** (LINN.) BP.
Blue Yellow-backed Warbler. [168.]

89. **PARULA PITIAYUMI INSULARIS** (LAWR.) Ridgw.
Socorro Warbler.

89*a*. **PARULA PITIAYUMI NIGRILORA** COUES.
Sennett's Warbler.

90. **PERISSOGLOSSA TIGRINA** (GMEL.) BAIRD.
Cape May Warbler. [206.]

91. **PERISSOGLOSSA CARBONATA** (AUD.) BAIRD.
Carbonated Warbler. [207.]

92. **PEUCEDRAMUS OLIVACEUS** (GIRAUD) COUES.
Olive-headed Warbler.

93. **DENDRŒCA ÆSTIVA** (GMEL.) BAIRD.
Summer Yellow Bird. [203.]

94. **DENDRŒCA CÆRULESCENS** (LINN.) BAIRD.
Black-throated Blue Warbler. [193.]

95. **DENDRŒCA CORONATA** (LINN.) GRAY.
Yellow-rump Warbler. [194.]

96. **DENDRŒCA AUDUBONII** (TOWNS.) BAIRD.
Audubon's Warbler. [195.]

97. **DENDRŒCA MACULOSA** (GMEL.) BAIRD.
Black-and-yellow Warbler. [204.]

98. **DENDRŒCA CÆRULEA** (WILS.) BAIRD.
Cerulean Warbler. [201.]

99. **DENDRŒCA PENNSYLVANICA** (LINN.) BAIRD.
Chestnut-sided Warbler. [200.]

100. **DENDRŒCA CASTANEA** (WILS.) BAIRD.
Bay-breasted Warbler. [197.]

101. **DENDRŒCA STRIATA** (FORST.) BAIRD.
Black-poll Warbler. [202.]

102. **DENDRŒCA BLACKBURNIÆ** (GM.) BAIRD.
Blackburnian Warbler. [196.]

103. **DENDRŒCA DOMINICA** (LINN.) BAIRD.
Yellow-throated Warbler. [209.]

103*a*. **DENDRŒCA DOMINICA ALBILORA** BAIRD.
White-browed Yellow-throated Warbler.

104. **DENDRŒCA GRACIÆ** COUES.
Grace's Warbler.

105. **DENDRŒCA NIGRESCENS** (TOWNS.) BAIRD.
Black-throated Gray Warbler. [192.]

106. **DENDRŒCA CHRYSOPARIA** SCL. & SALV.
Golden-cheeked Warbler.

107. **DENDRŒCA VIRENS** (GMEL.) BAIRD.
Black-throated Green Warbler. [189.]

108. **DENDRŒCA TOWNSENDI** (NUTT.) BAIRD.
Townsend's Warbler. [191.]

109. **DENDRŒCA OCCIDENTALIS** (Towns.) Baird.
Hermit Warbler. [190.]

110. **DENDRŒCA KIRTLANDI** Baird.
Kirtland's Warbler. [205.]

111. **DENDRŒCA PINUS** (Wils.) Baird.
Pine-creeping Warbler. [198.]

112. **DENDRŒCA MONTANA** (Wils.) Baird.
Blue Mountain Warbler. [199.]

113. **DENDRŒCA PALMARUM** (Gmel.) Baird.
Red-poll Warbler. [208.]

113*a*. **DENDRŒCA PALMARUM HYPOCHRYSEA** Ridgw.
Yellow Red-poll Warbler.

114. **DENDRŒCA DISCOLOR** (Vieill.) Baird.
Prairie Warbler. [210.]

115. **SIURUS AURICAPILLUS** (Linn.) Swains.
Golden-crowned Thrush. [186.]

116. **SIURUS NÆVIUS** (Bodd.) Coues.
Small-billed Water Thrush. [187.]

116*a*. **SIURUS NÆVIUS NOTABILIS** Grinnell.
Grinnell's Water Thrush.

117. **SIURUS MOTACILLA** (Vieill.) Coues.
Large-billed Water Thrush. [188.]

118. **OPORORNIS AGILIS** (Wils.) Baird.
Connecticut Warbler. [174.]

119. **OPORORNIS FORMOSA** (Wils.) Baird.
Kentucky Warbler. [175.]

120. **GEOTHLYPIS PHILADELPHIA** (Wils.) Baird.
Mourning Warbler. [172.]

121. **GEOTHLYPIS MACGILLIVRAYI** (Aud.) Baird.
Macgillivray's Warbler. [173.]

122. **GEOTHLYPIS TRICHAS** (Linn.) Caban.
Maryland Yellow-throat. [170.]

123. **ICTERIA VIRENS** (Linn.) Baird.
Yellow-breasted Chat. [176.]

123*a*. **ICTERIA VIRENS LONGICAUDA** (Lawr.) Coues.
Long-tailed Chat. [177.]

124. **WILSONIA MITRATA** (Gmel.) Bp.
Hooded Warbler. [211.]

125. **WILSONIA PUSILLA** (Wils.) Bp.
Black-capped Yellow Warbler. [213.]

125*a*. **WILSONIA PUSILLA PILEOLATA** (PALL.) RIDGW.
Pileolated Warbler.

126. **WILSONIA MINUTA** (WILS.) RIDGW.
Small-headed Flycatcher. [212.]

127. **WILSONIA CANADENSIS** (LINN.) COUES.
Canadian Flycatching Warbler. [214, 215.]

128. **SETOPHAGA RUTICILLA** (LINN.) SWAINS.
American Redstart. [217.]

129. **SETOPHAGA PICTA** SWAINS.
Painted Redstart. [218.]

130. **SETOPHAGA MINIATA** SWAINS.
Red-bellied Redstart. [219]

131. **CARDELLINA RUBRIFRONS** (GIRAUD) SCL.
Red-faced Warbler.

132. **ERGATICUS RUBER** (SWAINS.) BAIRD.
Red Warbler. [216.]

133. **BASILEUTERUS CULICIVORUS** (LICHT.) BONAP.
Brasier's Warbler.

134. **BASILEUTERUS BELLII** (GIRAUD) SCL.
Bell's Warbler.

135. **VIREOSYLVIA OLIVACEA** (LINN.) BONAP.
Red-eyed Vireo. [240.]

136. **VIREOSYLVIA AGILIS FLAVO-VIRIDIS** (CASS.) RIDGW.
Yellow-green Vireo. [241.]

137. **VIREOSYLVIA CARIDRIS BARBATULA** (CABAN.) RIDGW.
Black-whiskered Vireo. [243.]

138. **VIREOSYLVIA PHILADELPHICA** CASS.
Philadelphia Vireo. [244.]

139. **VIREOSYLVIA GILVA** (VIEILL.) CASS.
Warbling Vireo. [245.]

139*a*. **VIREOSYLVIA GILVA SWAINSONI** BAIRD.
Western Warbling Vireo.

140. **LANIVIREO FLAVIFRONS** (VIEILL.) BAIRD.
Yellow-throated Vireo. [252.]

141. **LANIVIREO SOLITARIUS** (VIEILL.) BAIRD.
Blue-headed Vireo. [250.]

141*a*. **LANIVIREO SOLITARIUS CASSINI** (XANTUS) RIDGW.
Cassin's Vireo. [251.]

141*b*. **LANIVIREO SOLITARIUS PLUMBEUS** (COUES) ALL.
Plumbeous Vireo.

142. **VIREO ATRICAPILLUS** Woodh.
Black-capped Vireo. [247.]

143. **VIREO NOVEBORACENSIS** (Gmel.) Bp.
White-eyed Vireo. [248.]

144. **VIREO HUTTONI** Cass.
Hutton's Vireo. [249.]

145. **VIREO BELLII** Aud.
Bell's Vireo. [246.]

146. **VIREO PUSILLUS** Coues.
Least Vireo.

147. **VIREO VICINIOR** Coues.
Gray Vireo.

148. **LANIUS BOREALIS** Vieill.
Great Northern Shrike. [236.]

149. **LANIUS LUDOVICIANUS** Linn.
Loggerhead Shrike. [237.]

149*a*. **LANIUS LUDOVICIANUS EXCUBITORIDES** (Sw.) Coues.
White-rumped Shrike. [238.]

149*b*. **LANIUS LUDOVICIANUS ROBUSTUS** Baird.
Large-billed Shrike.

150. **AMPELIS GARRULUS** Linn.
Northern Wax-wing. [232.]

151. **AMPELIS CEDRORUM** (Vieill.) Baird.
Cedar Wax-wing. [233.]

152. **PROGNE SUBIS** (Linn.) Baird.
Purple Martin. [231.]

152*a*. **PROGNE SUBIS CRYPTOLEUCA** Baird.
Cuban Martin. [231 *a*.]

153. **PETROCHELIDON LUNIFRONS** (Say) Lawr.
Cliff Swallow. [226.]

154. **HIRUNDO ERYTHROGASTRA** Bodd.
Barn Swallow. [225.]

155. **TACHYCINETA BICOLOR** (Vieill.) Caban.
White-bellied Swallow. [227.]

156. **TACHYCINETA THALASSINA** (Swains.) Caban.
Violet-green Swallow. [228.]

157. **COTILE RIPARIA** (Linn.) Boie.
Bank Swallow. [229.]

158. **STELGIDOPTERYX SERRIPENNIS** (Aud.) Baird.
Rough-winged Swallow. [230.]

159. CERTHIOLA BAHAMENSIS Reichenb.
Bahaman Honey Creeper. [301.]

160. EUPHONIA ELEGANTISSIMA (Bp.) Gray.
Blue-headed Euphonia. [224.]

161. PYRANGA RUBRA (Linn.) Viehl.
Scarlet Tanager. [220.]

162. PYRANGA LUDOVICIANA (Wils.) Bp.
Western Tanager. [223.]

163. PYRANGA HEPATICA Swains.
Hepatic Tanager. [222.]

164. PYRANGA ÆSTIVA (Linn.) Vieill.
Summer Redbird. [221.]

164*a*. PYRANGA ÆSTIVA COOPERI Ridgw.
Cooper's Tanager.

165. HESPERIPHONA VESPERTINA (Cooper) Bp.
Evening Grosbeak. [303.]

166. PINICOLA ENUCLEATOR (Linn.) Vieill.
Pine Grosbeak. [304.]

[167.] PYRRHULA CASSINI Baird.
Alaskan Bullfinch.

168. CARPODACUS PURPUREUS (Gm.) Baird.
Purple Finch. [305.]

168*a*. CARPODACUS PURPUREUS CALIFORNICUS Baird.
Californian Purple Finch. [306.]

169. CARPODACUS CASSINI Baird.
Cassin's Purple Finch. [307.]

170. CARPODACUS FRONTALIS (Say) Gray.
House Finch. [308.]

170*a*. CARPODACUS FRONTALIS RHODOCOLPUS (Caban.) Ridgw.
Crimson House Finch.

171. CARPODACUS AMPLUS Ridgw.
Guadalupe House Finch.

172. LOXIA CURVIROSTRA AMERICANA (Wils.) Coues.
American Crossbill. [318.]

172*a*. LOXIA CURVIROSTRA MEXICANA (Strickl.) Baird.
Mexican Crossbill. [318*a*.]

173. LOXIA LEUCOPTERA Gm.
White-winged Crossbill. [319.]

174. LEUCOSTICTE GRISEINUCHA (Brandt) Baird.
Aleutian Rosy Finch. [323.]

175. **LEUCOSTICTE TEPHROCOTIS** SWAINS.
Gray-crowned Rosy Finch. [322.]

175*a*. **LEUCOSTICTE TEPHROCOTIS LITTORALIS** (BAIRD) COUES.
Gray-headed Rosy Finch.

176. **LEUCOSTICTE ATRATA** RIDGW.
Black Rosy Finch.

177. **LEUCOSTICTE AUSTRALIS** ALLEN.
Brown-capped Rosy Finch.

178. **ÆGIOTHUS CANESCENS** GOULD.
Mealy Redpoll. [321.]

178*a*. **ÆGIOTHUS CANESCENS EXILIPES** (COUES) RIDGW.
White-rumped Redpoll.

179. **ÆGIOTHUS LINARIA** (LINN.) CABAN.
Common Redpoll. [320.]

179*a*. **ÆGIOTHUS LINARIA HOLBOLLI** (BREHM) RIDGW.
Greater Redpoll.

180. **ÆGIOTHUS BREWSTERI** RIDGW.
Brewster's Linnet.

181. **ASTRAGALINUS TRISTIS** (LINN.) CAB.
American Goldfinch. [313.]

182. **ASTRAGALINUS PSALTRIA** (SAY) COUES.
Green-backed Goldfinch. [314.]

182*a*. **ASTRAGALINUS PSALTRIA ARIZONÆ**, COUES.
Arizona Goldfinch. [315.]

182*b*. **ASTRAGALINUS PSALTRIA MEXICANUS** (SW.) COUES.
Mexican Goldfinch.

183. **ASTRAGALINUS LAWRENCEII** (CASS.) BP.
Lawrence's Goldfinch. [316.]

184. **CHRYSOMITRIS NOTATA** (DU BUS) BP.
Black-headed Goldfinch. [310.]

185. **CHRYSOMITRIS PINUS** (WILS.) BP.
Pine Goldfinch. [317:]

186. **PLECTROPHANES NIVALIS** (LINN.) MEYER.
Snow Bunting. [325.]

187. **CENTROPHANES LAPPONICUS** (LINN.) CABAN.
Lapland Longspur. [326.]

188. **CENTROPHANES PICTUS** (SWAINS.) CABAN.
Smith's Longspur. [327.]

189. **CENTROPHANES ORNATUS** (TOWNS.) CABAN.
Chestnut-collared Longspur. [328, 329.]

190. **RHYNCHOPHANES MACCOWNI** (LAWR.) BAIRD
McCown's Longspur. [330.]

191. **CENTRONYX BAIRDII** (AUD.) BAIRD.
Baird's Bunting. [331.]

192. **PASSERCULUS PRINCEPS** MAYNARD.
Ipswich Sparrow.

193. **PASSERCULUS SANDWICHENSIS** (GMEL.) BAIRD.
Sandwich Sound Sparrow. [333.]

193*a*. **PASSERCULUS SANDWICHENSIS SAVANNA** (WILS.) RIDGW.
Savannah Sparrow. [332.]

193*b*. **PASSERCULUS SANDWICHENSIS ALAUDINUS** (BP.) RIDGW.
Western Savannah Sparrow. [335.]

194. **PASSERCULUS ANTHINUS** BONAP.
Titlark Sparrow. [334.]

195. **PASSERCULUS GUTTATUS** LAWR.
Saint Lucas Sparrow.

196. **PASSERCULUS ROSTRATUS** (CASS.) BAIRD.
Large-billed Sparrow. [336.]

197. **POŒCETES GRAMINEUS** (GM.) BAIRD.
Grass Finch. [337.]

197*a*. **POŒCETES GRAMINEUS CONFINIS** BAIRD.
Western Grass Finch.

198. **COTURNICULUS PASSERINUS** (WILS.) BP.
Yellow-winged Sparrow. [338.]

198*a*. **COTURNICULUS PASSERINUS PERPALLIDUS** RIDGW.
Western Yellow-winged Sparrow

199. **COTURNICULUS HENSLOWI** (AUD.) BP.
Henslow's Sparrow. [339.]

200. **COTURNICULUS LECONTEI** (AUD.) BP.
Leconte's Sparrow. [340.]

201. **AMMODROMUS CAUDACUTUS** (GM.) SWAINS.
Sharp-tailed Finch. [341.]

201*a*. **AMMODROMUS CAUDACUTUS NELSONI** ALLEN.
Nelson's Sharp-tailed Finch.

202. **AMMODROMUS MARITIMUS** (WILS.) SWAINS.
Sea-side Finch. [342.]

203. **AMMODROMUS NIGRESCENS** RIDGW.
Black-and-white Sea-side Finch.

204. **CHONDESTES GRAMMICA** (SAY) BP.
Lark Finch. [344.]

204*a*. **CHONDESTES GRAMMICA STRIGATA** (Sw.) Ridgw.
Western Lark Finch.

205. **ZONOTRICHIA QUERULA** (Nutt.) Gamb.
Harris's Sparrow. [348.]

206. **ZONOTRICHIA LEUCOPHRYS** (Forst.) Swains.
White-crowned Sparrow. [345.]

207. **ZONOTRICHIA GAMBELI** (Nutt.) Gamb.
Gambel's White-crowned Sparrow.

207*a*. **ZONOTRICHIA GAMBELI INTERMEDIA** Ridgw.
Intermediate White-crowned Sparrow. [346.]

208. **ZONOTRICHIA CORONATA** (Pall.) Baird.
Golden-crowned Sparrow. [347.]

209. **ZONOTRICHIA ALBICOLLIS** (Gm.) Bp.
White-throated Sparrow. [349.]

210. **SPIZELLA MONTANA** (Forst.) Ridgw.
Tree Sparrow. [357.]

211. **SPIZELLA DOMESTICA** (Bartr.) Coues.
Chipping Sparrow. [359.]

211*a*. **SPIZELLA DOMESTICA ARIZONÆ** (Coues) Ridgw.
Western Chipping Sparrow.

212. **SPIZELLA PALLIDA** (Sw.) Bp.
Clay-colored Sparrow. [360.]

213. **SPIZELLA BREWERI** Cass.
Brewer's Sparrow. [361.]

214. **SPIZELLA PUSILLA** (Wils.) Bp.
Field Sparrow. [358.]

215. **SPIZELLA ATROGULARIS** (Caban.) Bd.
Black-chinned Sparrow. [362.]

216. **JUNCO AIKENI** Ridgw.
White-winged Snowbird.

217. **JUNCO HYEMALIS** (Linn.) Scl.
Black Snowbird. [354.]

218. **JUNCO OREGONUS** (Towns.) Scl.
Oregon Snowbird. [352.]

219. **JUNCO ANNECTENS** Baird.
Pink-sided Snowbird.

220. **JUNCO CANICEPS** (Woodh.) Baird.
Gray-headed Snowbird. [353.]

221. **JUNCO DORSALIS** Henry.
Red-backed Snowbird. [351.]

222. **JUNCO CINEREUS** (SWAINS.) CABAN.
Mexican Snowbird. [350.]

223. **JUNCO INSULARIS** RIDGW.
Guadalupe Snowbird.

224. **AMPHISPIZA BILINEATA** (CASS.) COUES.
Black-throated Sparrow. [355.]

225. **AMPHISPIZA BELLII** (CASS.) COUES.
Bell's Sparrow. [356.]

225*a*. **AMPHISPIZA BELLII NEVADENSIS** RIDGW.
Sagebrush Sparrow.

226. **PEUCÆA ÆSTIVALIS** (LICHT.) CABAN.
Bachman's Finch. [370.]

226*a*. **PEUCÆA ÆSTIVALIS ILLINOENSIS** RIDGW.
Oak-woods Sparrow.

227. **PEUCÆA ARIZONÆ** RIDGW.
Arizona Sparrow.

228. **PEUCÆA CASSINI** (WOODH.) BAIRD.
Cassin's Sparrow. [371.]

229. **PEUCÆA CARPALIS** COUES.
Rufous-winged Sparrow.

230. **PEUCÆA RUFICEPS** (CASS.) BAIRD.
Rufous-crowned Sparrow. [372.]

230*a*. **PEUCÆA RUFICEPS BOUCARDI** (SCL.) B. B. & R.
Boucard's Sparrow.

231. **MELOSPIZA FASCIATA** (FORST.) SCOTT.
Song Sparrow. [363.]

231*a*. **MELOSPIZA FASCIATA FALLAX** BAIRD.
Mountain Song Sparrow. [367.]

231*b*. **MELOSPIZA FASCIATA HEERMANNI** BAIRD.
Heermann's Song Sparrow. [364.]

231*c*. **MELOSPIZA FASCIATA SAMUELIS** BAIRD.
Californian Song Sparrow. [343, 365.]

231*d*. **MELOSPIZA FASCIATA GUTTATA** (NUTT.) BAIRD.
Rusty Song Sparrow. [366.]

231*e*. **MELOSPIZA FASCIATA RUFINA** (BRANDT) BAIRD.
Sooty Song Sparrow.

232. **MELOSPIZA CINEREA** (GM.) RIDGW.
Aleutian Song Sparrow.

233. **MELOSPIZA PALUSTRIS** (WILS.) BAIRD.
Swamp Sparrow. [369.]

234. **MELOSPIZA LINCOLNI** (AUD.) BAIRD.
Lincoln's Finch. [368.]

235. **PASSERELLA ILIACA** (MERREM) SW.
Fox-colored Sparrow. [374.]

235*a*. **PASSERELLA ILIACA UNALASHKENSIS** (GM.) RIDGW.
Townsend's Sparrow. [375.]

235*b*. **PASSERELLA ILIACA MEGARHYNCHA** (BAIRD) RIDGW.
Thick-billed Sparrow. [376*a*.]

235*c*. **PASSERELLA ILIACA SCHISTACEA** (BAIRD) ALLEN.
Slate-colored Sparrow. [376.]

236. **EMBERNAGRA RUFIVIRGATA** LAWR.
Texas Sparrow. [373.]

237. **PIPILO ERYTHROPHTHALMUS** (LINN.) VIEILL.
Chewink; Towhee. [391.]

237*a*. **PIPILO ERYTHROPHTHALMUS ALLENI** COUES.
Florida Towhee.

238. **PIPILO MACULATUS ARCTICUS** (SWAINS.) COUES.
Northern Towhee. [393.]

238*a*. **PIPILO MACULATUS MEGALONYX** (BAIRD) COUES.
Spurred Towhee. [394.]

238*b*. **PIPILO MACULATUS OREGONUS** (BELL) COUES.
Oregon Towhee. [392.]

238*c*. **PIPILO MACULATUS CONSOBRINUS** RIDGW.
Guadalupe Towhee.

238*d*. **PIPILO MACULATUS CARMANI** BAIRD.
Socorro Towhee.

239. **PIPILO CHLORURUS** (TOWNS.) BAIRD.
Green-tailed Towhee. [398.]

240. **PIPILO FUSCUS MESOLEUCUS** (BAIRD) RIDGW.
Cañon Towhee. [397.]

240*a*. **PIPILO FUSCUS ALBIGULA** (BAIRD) COUES.
Saint Lucas Brown Towhee.

240*b*. **PIPILO FUSCUS CRISSALIS** (VIG.) COUÉS.
Californian Brown Towhee. [396.]

241 **PIPILO ABERTI** BAIRD.
Abert's Towhee. [395.]

242. **CARDINALIS VIRGINIANUS** (BRISS.) BP.
Cardinal Grosbeak. [390.]

242*a*. **CARDINALIS VIRGINIANUS IGNEUS** (BAIRD) COUES.
Saint Lucas Cardinal.

243. **PYRRHULOXIA SINUATA** Bonap.
Texan Cardinal. [389.]

244. **ZAMELODIA LUDOVICIANA** (Linn.) Coues.
Rose-breasted Grosbeak. [380.]

245. **ZAMELODIA MELANOCEPHALA** (Swains.) Coues.
Black-headed Grosbeak. [381.]

246. **GUIRACA CÆRULEA** (Linn.) Swains.
Blue Grosbeak. [382.]

247. **PASSERINA PARELLINA** (Bp.) Ridgw.
Blue Bunting. [383.]

248. **PASSERINA CYANEA** (Linn.) Gray.
Indigo Bunting. [387.]

249. **PASSERINA AMŒNA** (Say) Gray.
Lazuli Bunting. [386.]

250. **PASSERINA VERSICOLOR** (Bonap.) Gray.
Varied Bunting. [385.]

251. **PASSERINA CIRIS** (Linn.) Gray.
Painted Bunting; Nonpareil. [384.]

252. **SPERMOPHILA MORELETII** Pucheran.
Morelet's Seedeater. [388.]

253. **PHONIPARA ZENA** (Linn.) Bryant.
Black-faced Seedeater.

254. **SPIZA AMERICANA** (Gm.) Bonap.
Black-throated Bunting. [378.]

255. **SPIZA TOWNSENDI** (Aud.) Ridgw.
Townsend's Bunting. [379.]

256. **CALAMOSPIZA BICOLOR** (Towns.) Bonap.
Lark Bunting. [377.]

257. **DOLICHONYX ORYZIVORUS** (Linn.) Swains.
Bobolink. [399.]

258. **MOLOTHRUS ATER** (Bodd.) Gray.
Cowbird. [400.]

258*a*. **MOLOTHRUS ATER OBSCURUS** (Gmel.) Coues.
Dwarf Cowbird.

259. **MOLOTHRUS ÆNEUS** (Wagl.) Caban.
Bronzed Cowbird.

260. **XANTHOCEPHALUS ICTEROCEPHALUS** (Bonap.) Bd.
Yellow-headed Blackbird. [404.]

261. **AGELÆUS PHŒNICEUS** (Linn.) Vieill.
Red-and-buff-shouldered Blackbird. [401.]

261*a*. **AGELÆUS PHŒNICEUS GUBERNATOR** (WAGL.) COUES.
Red-and-black-shouldered Blackbird. [402.]

262. **AGELÆUS TRICOLOR** (NUTT.) BP.
Red-and-white-shouldered Blackbird. [403.]

263. **STURNELLA MAGNA** (LINN.) SWAINS.
Meadow Lark. [406.]

263*a*. **STURNELLA MAGNA MEXICANA** (SCL.) RIDGW.
Mexican Meadow Lark.

264. **STURNELLA NEGLECTA** AUD.
Western Meadow Lark. [407.]

265. **ICTERUS VULGARIS** DAUD.
Troupial. [408.]

266. **ICTERUS AUDUBONII** GIRAUD.
Audubon's Oriole. [409.]

267. **ICTERUS WAGLERI** SCL.
Wagler's Oriole. [412.]

268. **ICTERUS PARISORUM** BONAP.
Scott's Oriole. [411.]

269. **ICTERUS CUCULLATUS** SWAINS.
Hooded Oriole. [413.]

270. **ICTERUS SPURIUS** (LINN.) BP.
Orchard Oriole. [414.]

271. **ICTERUS GALBULA** (LINN.) COUES.
Baltimore Oriole. [415.]

272. **ICTERUS BULLOCKI** (SWAINS.) BP.
Bullock's Oriole. [416.]

273. **SCOLECOPHAGUS FERRUGINEUS** (GM.) SWAINS.
Rusty Blackbird. [417.]

274. **SCOLECOPHAGUS CYANOCEPHALUS** (WAGL.) CABAN.
Brewer's Blackbird. [418.]

275. **QUISCALUS MACRURUS** SWAINS.
Great-tailed Grackle. [419.]

276. **QUISCALUS PALUSTRIS** SWAINS.
Mexican Boat-tailed Grackle.

277. **QUISCALUS MAJOR** VIEILL.
Boat-tailed Grackle. [420.]

278. **QUISCALUS PURPUREUS** (BARTR.) LEICHT.
Purple Grackle. [421.]

278*a*. **QUISCALUS PURPUREUS AGLÆUS** (BAIRD) COUES.
Florida Grackle. [422.]

278*b*. **QUISCALUS PURPUREUS ÆNEUS** Ridgw.
Bronzed Grackle.

[279.] **STURNUS VULGARIS** Linn.
European Starling.

280. **CORVUS CORAX CARNIVORUS** (Bartr.) Ridgw.
American Raven. [423, 424.]

281. **CORVUS CRYPTOLEUCUS** Couch.
White-necked Raven. [425.]

282. **CORVUS FRUGIVORUS** Bartr.
Common Crow. [426.]

282*a*. **CORVUS FRUGIVORUS FLORIDANUS** (Baird) Ridgw.
Florida Crow. [427.]

282*b* **CORVUS FRUGIVORUS CAURINUS** (Baird) Ridgw.
Northwestern Fish Crow. [428.]

283. **CORVUS OSSIFRAGUS** Wils.
Fish Crow. [429.]

284. **PICICORVUS COLUMBIANUS** (Wils.) Bp.
Clarke's Nutcracker. [430.]

285. **GYMNOCITTA CYANOCEPHALA** Max.
Maximilian's Nutcracker; Piñon Jay. [431.]

286. **PICA RUSTICA HUDSONICA** (Scop.) Baird.
Black-billed Magpie. [432.]

287. **PICA NUTTALLI** Aud.
Yellow-billed Magpie. [433.]

288. **PSILORHINUS MORIO** (Wagl.) Gray.
Brown Jay. [444.]

289. **CYANOCITTA CRISTATA** (Linn.) Strickl.
Blue Jay. [434.]

290. **CYANOCITTA STELLERI** (Gm.) Caban.
Steller's Jay. [435.]

290*a*. **CYANOCITTA STELLERI FRONTALIS** Ridgw.
Blue-fronted Jay.

290*b*. **CYANOCITTA STELLERI ANNECTENS** (Baird) Ridgw.
Black-headed Jay.

290*c*. **CYANOCITTA STELLERI MACROLOPHA** (Baird) Ridgw.
Long-crested Jay. [436.]

291. **APHELOCOMA FLORIDANA** (Bartr.) Caban.
Florida Jay. [439.]

292. **APHELOCOMA WOODHOUSEI** (Baird) Ridgw.
Woodhouse's Jay. [438.]

293. APHELOCOMA CALIFORNICA (VIG.) CABAN.
California Jay. [437.]

294. APHELOCOMA ULTRAMARINA COUCHII BAIRD.
Couch's Jay. [441.]

295. APHELOCOMA SORDIDA ARIZONÆ RIDGW.
Arizona Jay. [440.]

296. XANTHURA LUXUOSA (LESS.) BP.
Green Jay. [442.]

297. PERISOREUS CANADENSIS (LINN.) BP.
Canada Jay. [443.]

297*a*. PERISOREUS CANADENSIS CAPITALIS BAIRD.
White-headed Jay.

297*b*. PERISOREUS CANADENSIS FUMIFRONS RIDGW.
Smoky-fronted Jay.

298. PERISOREUS OBSCURUS RIDGW.
Oregon Jay.

[299.] ALAUDA ARVENSIS LINN.
Sky Lark.

300. EREMOPHILA ALPESTRIS (FORST.) BOIE.
Shore Lark. [302.]

300*a*. EREMOPHILA ALPESTRIS LEUCOLÆMA COUES.
White-throated Shore Lark.

300*b*. EREMOPHILA ALPESTRIS CHRYSOLÆMA (WAGL.) COUES.
Mexican Shore Lark.

301. MILVULUS FORFICATUS (GM.) SWAINS.
Scissor-tailed Flycatcher. [123.]

[302.] MILVULUS TYRANNUS (LINN.) BP.
Fork-tailed Flycatcher. [122.]

303. TYRANNUS DOMINICENSIS (GM.) REICH.
Gray Kingbird. [125.]

304. TYRANNUS CAROLINENSIS (LINN.) TEMM.
Kingbird; Bee Martin. [124.]

305. TYRANNUS MELANCHOLICUS COUCHII BAIRD.
Couch's Kingbird. [128, 129.]

306. TYRANNUS VERTICALIS SAY.
Western Kingbird. [126.]

307. TYRANNUS VOCIFERANS SWAINS.
Cassin's Kingbird. [127.]

308. PITANGUS DERBIANUS (KAUP) SCL.
Mexican Pitangus.

309. **MYIOZETETES TEXENSIS** (GIRAUD) SCL.
Giraud's Flycatcher.

310. **MYIODINASTES LUTEIVENTRIS** BONAP.
Henshaw's Flycatcher.

311. **MYIARCHUS MEXICANUS** (KAUP) LAWR.
Mexican Great Crested Flycatcher. [132.]

312. **MYIARCHUS CRINITUS** (LINN.) CABAN.
Great Crested Flycatcher. [130.]

313. **MYIARCHUS CINERASCENS** LAWR.
Ash-throated Flycatcher. [131.]

314. **MYIARCHUS LAWRENCEI** (GIRAUD) BAIRD.
Lawrence's Flycatcher. [133.]

315. **SAYORNIS FUSCUS** (GMEL.) BAIRD.
Phœbe Bird; Pewee. [135.]

316. **SAYORNIS SAYI** (BONAP.) BAIRD.
Say's Pewee. [136.]

317. **SAYORNIS NIGRICANS** (SWAINS.) BP.
Black Pewee. [134.]

318. **CONTOPUS BOREALIS** (SWAINS.) BAIRD.
Olive-sided Flycatcher. [137.]

319. **CONTOPUS PERTINAX** CABAN.
Coues's Flycatcher.

320. **CONTOPUS VIRENS** (LINN.) CABAN.
Wood Pewee. [139.]

321. **CONTOPUS RICHARDSONII** (SW.) BAIRD.
Western Wood Pewee. [138.]

322. **EMPIDONAX FLAVIVENTRIS** BAIRD.
Yellow-bellied Flycatcher. [144.]

323. **EMPIDONAX DIFFICILIS** BAIRD.
Western Yellow-bellied Flycatcher. [144*a*.]

324. **EMPIDONAX ACADICUS** (GMEL.) BAIRD.
Acadian Flycatcher. [143.]

325. **EMPIDONAX PUSILLUS** (SWAINS.) BD.
Little Flycatcher. [141.]

325*a*. **EMPIDONAX PUSILLUS TRAILLII** (AUD.) BAIRD.
Traill's Flycatcher. [140.]

326. **EMPIDONAX MINIMUS** BAIRD.
Least Flycatcher. [142.]

327. **EMPIDONAX HAMMONDI** (XANTUS) BD.
Hammond's Flycatcher. [145.]

328. **EMPIDONAX OBSCURUS** (SWAINS.) BAIRD.
Wright's Flycatcher. [146.]

329. **EMPIDONAX FULVIFRONS** (GIRAUD) SCL.
Fulvous Flycatcher.

329*a*. **EMPIDONAX FULVIFRONS PALLESCENS** COUES.
Buff-breasted Flycatcher.

330. **PYROCEPHALUS RUBINEUS MEXICANUS** (SCL.) COUES.
Vermilion Flycatcher. [147.]

331. **ORNITHION IMBERBE** (SCL.) COUES.
Small-billed Flycatcher.

332. **PACHYRHAMPHUS MAJOR** (BONAP.) SCL.
Thick-billed Flycatcher. [121.]

333. **HADROSTOMUS AGLAIÆ** (LAFR.) CAB.
Rose-throated Flycatcher. [120.]

334. **EUGENES FULGENS** (SWAINS.) GOULD.
Refulgent Hummingbird.

335. **TROCHILUS COLUBRIS** LINN.
Ruby-throated Hummingbird. [101.]

336. **TROCHILUS ALEXANDRI** BOURC. & MULS.
Black-chinned Hummingbird. [102.]

337. **CALYPTE COSTÆ** (BOURC.) GOULD.
Costa's Hummingbird. [106.]

338. **CALYPTE ANNÆ** (LESS.) GOULD.
Anna's Hummingbird. [105.]

339. **SELASPHORUS PLATYCERCUS** (SWAINS.) BP.
Broad-tailed Hummingbird. [104.]

340. **SELASPHORUS RUFUS** (GMEL.) AUD.
Rufous Hummingbird. [103.]

341. **SELASPHORUS ALLENI** HENSH.
Allen's Hummingbird.

342. **ATTHIS HELOISÆ** (LESS.) REICH.
Heloise's Hummingbird.

343. **STELLULA CALLIOPE** GOULD.
Calliope Hummingbird.

344. **CALOTHORAX LUCIFER** (SWAINS.) GRAY.
Lucifer Hummingbird.

345. **AMAZILIA FUSCICAUDATA** (FRASER) RIDGW.
Rieffer's Hummingbird.

346. **AMAZILIA YUCATANENSIS** (CABOT) GOULD.
Buff-bellied Hummingbird.

347. **BASILINNA XANTUSI** (LAWR.) ELLIOT.
Xantus's Hummingbird.

348. **IACHE LATIROSTRIS** (SWAINS.) ELLIOT.
Broad-billed Hummingbird.

349. **CYPSELUS SAXATILIS** WOODH.
White-throated Swift. [107.]

350. **CYPSELOIDES NIGER BOREALIS** (KENNERLY) RIDGW.
Black Swift. [108.]

351. **CHÆTURA PELAGICA** (LINN.) BAIRD.
Chimney Swift. [109.]

352. **CHÆTURA VAUXII** (TOWNS.) DE KAY.
Vaux's Swift. [110.]

353. **ANTROSTOMUS CAROLINENSIS** (GM.) GOULD.
Chuck-will's-widow. [111.]

354. **CAPRIMULGUS VOCIFERUS** (WILS.) BP.
Whip-poor-will. [112.]

355. **PHALÆNOPTILUS NUTTALLI** (AUD.) RIDGW.
Poor-will. [113.]

356. **NYCTIDROMUS ALBICOLLIS** (GM.) BURM.
Parauque Goatsucker. [116*a*.]

357. **CHORDEILES POPETUE** (VIEILL.) BD.
Nighthawk. [114.]

357*a*. **CHORDEILES POPETUE HENRYI** (CASS.) ALLEN.
Western Nighthawk. [115.]

357*b*. **CHORDEILES POPETUE MINOR** (CABAN.) RIDGW.
Cuban Nighthawk.

358. **CHORDEILES ACUTIPENNIS TEXENSIS** (LAWR.) RIDGW.
Texan Nighthawk. [116.]

359. **CAMPEPHILUS PRINCIPALIS** (LINN.) GRAY.
Ivory-billed Woodpecker. [72.]

360. **PICUS VILLOSUS** LINN.
Hairy Woodpecker. [74.]

360*a*. **PICUS VILLOSUS LEUCOMELAS** (BODD.) RIDGW.
Great White-backed Sapsucker.

360*b*. **PICUS VILLOSUS HARRISI** (AUD.) ALLEN.
Harris's Woodpecker. [75.]

361. **PICUS PUBESCENS** LINN.
Downy Woodpecker. [76.]

361*a*. **PICUS PUBESCENS GAIRDNERI** (AUD.) COUES.
Gairdner's Woodpecker. [77.]

362. **PICUS QUERULUS** WILS.
Red-cockaded Woodpecker. [80.]

363. **PICUS SCALARIS** WAGL.
Texan Sapsucker. [79.]

363*a*. **PICUS SCALARIS LUCASANUS** (XANT.) RIDGW.
Saint Lucas Sapsucker.

364. **PICUS NUTTALLI** GAMB.
Nuttall's Woodpecker. [78.]

365. **PICUS STRICKLANDI** MALH.
Strickland's Woodpecker.

366. **XENOPICUS ALBOLARVATUS** (CASS.) BAIRD.
White-headed Woodpecker. [81.]

367. **PICOIDES ARCTICUS** (SWAINS.) GRAY.
Black-backed Three-toed Woodpecker. [82.]

368. **PICOIDES TRIDACTYLUS AMERICANUS** (BREHM) RIDGW.
Banded-backed Three-toed Woodpecker. [83.]

368*a*. **PICOIDES TRIDACTYLUS DORSALIS** (BAIRD) RIDGW.
Striped-backed Three-toed Woodpecker. [84.]

369. **SPHYRAPICUS VARIUS** (LINN.) BAIRD.
Yellow-bellied Woodpecker. [85.]

369*a*. **SPHYRAPICUS VARIUS NUCHALIS** BAIRD.
Red-naped Woodpecker. [86.]

369*b*. **SPHYRAPICUS VARIUS RUBER** (GM.) RIDGW.
Red-breasted Woodpecker. [87.]

370. **SPHYRAPICUS THYROIDEUS** (CASS.) BAIRD.
Black-breasted Woodpecker. [88, 89.]

371. **HYLOTOMUS PILEATUS** (LINN.) BAIRD.
Pileated Woodpecker; Logcock. [90.]

372. **CENTURUS CAROLINUS** (L.) BP.
Red-bellied Woodpecker. [91.]

373. **CENTURUS AURIFRONS** WAGL.
Golden-fronted Woodpecker. [92.]

374. **CENTURUS UROPYGIALIS** BAIRD.
Gila Woodpecker. [93.]

375. **MELANERPES ERYTHROCEPHALUS** (LINN.) SW.
Red-headed Woodpecker. [94.]

376. **MELANERPES TORQUATUS** (WILS.) BONAP.
Lewis's Woodpecker. [96.]

377. **MELANERPES FORMICIVORUS** (SW.) BP.
Californian Woodpecker. [95.]

377*a*. **MELANERPES FORMICIVORUS ANGUSTIFRONS** BAIRD.
Narrow-fronted Woodpecker.

378. **COLAPTES AURATUS** (LINN.) SW.
Yellow-shafted Flicker. [97.]

378*a*. **COLAPTES AURATUS HYBRIDUS** (BAIRD) RIDGW.
"Hybrid" Flicker. [98*a*.]

378*b*. **COLAPTES AURATUS MEXICANUS** (SW.) RIDGW.
Red-shafted Flicker. [98.]

379. **COLAPTES CHRYSOIDES** (MALH.) BAIRD.
Malherbe's Flicker. [99.]

380. **COLAPTES RUFIPILEUS** RIDGW.
Guadalupe Flicker.

381. **MOMOTUS CÆRULEICEPS** GOULD.
Blue-capped Motmot. [119.]

382. **CERYLE ALCYON** (LINN.) BOIE.
Belted Kingfisher. [117.]

383. **CERYLE AMERICANA CABANISI** (TSCHUDI) COUES.
Texan Kingfisher. [118.]

384. **TROGON AMBIGUUS** GOULD.
Coppery-tailed Trogon. [65.]

385. **GEOCOCCYX CALIFORNIANUS** (LESS.) BAIRD.
Road-runner; Chaparral Cock. [68.]

386. **COCCYZUS SENICULUS** (LATH.) VIEILL.
Mangrove Cuckoo. [71.]

387. **COCCYZUS AMERICANUS** (LINN.) BP.
Yellow-billed Cuckoo. [69.]

388. **COCCYZUS ERYTHROPHTHALMUS** (WILS.) BAIRD.
Black-billed Cuckoo. [70.]

389. **CROTOPHAGA ANI** LINN.
Savannah Blackbird. [66, 67.]

390. **CROTOPHAGA SULCIROSTRIS** SWAINS.
Groove-billed Crotophaga.

391. **RHYNCHOPSITTA PACHYRHYNCHA** (SWAINS.) BP.
Thick-billed Parrot. [64.]

392. **CONURUS CAROLINENSIS** (LINN.) KUHL.
Carolina Parakeet. [63.]

393. **CONURUS HOLOCHLORUS BREVIPES** BAIRD.
Socorro Parakeet.

394. **ALUCO FLAMMEUS AMERICANUS** (AUD.) RIDGW.
American Barn Owl. [47.]

395. **ASIO AMERICANUS** (STEPH.) SHARPE.
American Long-eared Owl. [51.]

396. **ASIO ACCIPITRINUS** (PALL.) NEWTON.
Short-eared Owl. [52.]

397. **STRIX NEBULOSA** FORST.
Barred Owl. [54.]

397*a*. **STRIX NEBULOSA ALLENI** RIDGW.
Florida Barred Owl.

398. **STRIX OCCIDENTALIS** (XANT.) RIDGW.
Spotted Owl.

399. **ULULA CINEREA** (GMEL.) BP.
Great Gray Owl. [53.]

[399*a*.] **ULULA CINEREA LAPPONICA** (RETZ.) RIDGW.
Lapland Owl.

400. **NYCTALE TENGMALMI RICHARDSONI** (BP.) RIDGW.
Richardson's Owl. [55.]

401. **NYCTALE ACADICA** (GMEL.) BP.
Saw-whet Owl. [56, 57.]

402. **SCOPS ASIO** (LINN.) BP.
Little Screech Owl. [49.]

402*a*. **SCOPS ASIO FLORIDANUS** RIDGW.
Florida Screech Owl.

402*b*. **SCOPS ASIO MACCALLI** (CASS.) RIDGW.
Texan Screech Owl. [50.]

402*c*. **SCOPS ASIO MAXWELLIÆ** RIDGW.
Rocky Mountain Screech Owl.

402*d*. **SCOPS ASIO KENNICOTTII** (ELLIOT) RIDGW.
Northwestern Screech Owl.

403. **SCOPS TRICHOPSIS** WAGL.
Mexican Screech Owl.

404. **SCOPS FLAMMEOLUS** (LICHT.) SCL.
Flammulated Screech Owl.

405. **BUBO VIRGINIANUS** (GM.) BP.
Great Horned Owl. [48.]

405*a*. **BUBO VIRGINIANUS SUBARCTICUS** (HOY) RIDGW.
Western Horned Owl.

405*b*. **BUBO VIRGINIANUS ARCTICUS** (SWAINS.) CASS.
Arctic Horned Owl.

405*c*. **BUBO VIRGINIANUS SATURATUS** RIDGW.
Dusky Horned Owl.

406. **NYCTEA SCANDIACA** LINN.
Snowy Owl. [61.]

407. **SURNIA FUNEREA** (LINN.) RICH & SW.
American Hawk Owl. [62.]

[407*a*.] **SURNIA FUNEREA ULULA** (LINN.) RIDGW.
European Hawk Owl.

408. **SPEOTYTO CUNICULARIA HYPOGÆA** (BONAP.) RIDGW.
Burrowing Owl. [58, 59.]

408*a*. **SPEOTYTO CUNICULARIA FLORIDANA** RIDGW.
Florida Burrowing Owl.

409. **GLAUCIDIUM GNOMA** WAGL.
California Pigmy Owl. [60.]

410. **GLAUCIDIUM PHALÆNOIDES** (DAUD.) SCL. & SALV.
Ferruginous Pigmy Owl.

411. **MICRATHENE WHITNEYI** (COOPER) COUES.
Whitney's Pigmy Owl.

412. **HIEROFALCO GYRFALCO CANDICANS** (GM.) RIDGW.
White Gyrfalcon. [11.]

412*a*. **HIEROFALCO GYRFALCO ISLANDUS** (GM.) RIDGW.
Iceland Gyrfalcon. [12.]

412*b*. **HIEROFALCO GYRFALCO SACER** (FORST.) RIDGW.
McFarlane's Gyrfalcon.

412*c*. **HIEROFALCO GYRFALCO OBSOLETUS** (GM.) RIDGW.
Labrador Gyrfalcon.

413. **HIEROFALCO MEXICANUS POLYAGRUS** (CASS.) RIDGW.
Prairie Falcon. [10.]

414. **FALCO PEREGRINUS NÆVIUS** (GM.) RIDGW.
American Peregrine Falcon; Duck Hawk. [5, 6.]

414*a*. **FALCO PEREGRINUS PEALEI** RIDGW.
Peale's Falcon.

415. **FALCO ALBIGULARIS** DAUD.
Chestnut-thighed Falcon. [8.]

[416.] **ÆSALON REGULUS** (PALL.) BLYTH.
European Merlin.

417. **ÆSALON COLUMBARIUS** (LINN.) KAUP.
Pigeon Hawk. [7.]

417*a*. **ÆSALON COLUMBARIUS SUCKLEYI** RIDGW.
Black Merlin.

418. **ÆSALON RICHARDSONII** RIDGW.
Richardson's Merlin.

419. **RHYNCHOFALCO FUSCO-CÆRULESCENS** (Vieill.) Ridgw.
Aplomado Falcon. [9.]

420. **TINNUNCULUS SPARVERIUS** (Linn.) Vieill.
Sparrow Hawk. [13.]

420*a*. **TINNUNCULUS SPARVERIUS ISABELLINUS** (Swains.) Ridgw.
Isabelline Sparrow Hawk.

421. **TINNUNCULUS SPARVERIOIDES** (Vig.) Gray.
Cuban Sparrow Hawk.

[422.] **TINNUNCULUS ALAUDARIUS** (Gm.) Gray.
European Kestril.

423. **POLYBORUS CHERIWAY** (Jacq.) Caban.
Caracara Eagle. [45.]

424. **POLYBORUS LUTOSUS** Ridgw.
Guadalupe Caracara.

425. **PANDION HALIAËTUS CAROLINENSIS** (Gm.) Ridgw.
American Osprey; Fish Hawk. [44.]

426. **ELANOIDES FORFICATUS** (Linn.) Ridgw.
Swallow-tailed Kite. [34.]

427. **ELANUS GLAUCUS** (Bartr.) Coues.
White-tailed Kite. [35.]

428. **ICTINIA SUBCÆRULEA** (Bartr.) Coues.
Mississippi Kite. [36.]

429. **ROSTRHAMUS SOCIABILIS PLUMBEUS** Ridgw.
Everglade Kite. [37.]

430. **CIRCUS HUDSONIUS** (Linn.) Vieill.
Marsh Hawk. [38.]

431. **ACCIPITER COOPERI** Bonap.
Cooper's Hawk. [15, 16.]

432. **ACCIPITER FUSCUS** (Gmel.) Bp.
Sharp-shinned Hawk. [17.]

433. **ASTUR ATRICAPILLUS** (Wils.) Bp.
American Goshawk. [14.]

433*a*. **ASTUR ATRICAPILLUS STRIATULUS** Ridgw.
Western Goshawk.

434. **ANTENOR UNICINCTUS HARRISI** (Aud.) Ridgw.
Harris's Hawk. [46.]

[435.] **BUTEO VULGARIS** Leach.
European Buzzard.

436. **BUTEO BOREALIS** (Gm.) Vieill.
Red-tailed Hawk. [23.]

436*a*. **BUTEO BOREALIS KRIDERI** Hoopes.
Krider's Hawk.

436*b*. **BUTEO BOREALIS CALURUS** (Cass.) Ridgw.
Western Red-tail. [20, 24.]

436*c*. **BUTEO BOREALIS LUCASANUS** Ridgw.
Saint Lucas Red-tail.

436*d*. **BUTEO BOREALIS SOCORROENSIS** Ridgw.
Socorro Red-tail.

437. **BUTEO COOPERI** Cass.
Cooper's Henhawk. [29.]

438. **BUTEO HARLANI** Aud.
Harlan's Hawk. [22.]

439. **BUTEO LINEATUS** (Gm.) Jard.
Red-shouldered Hawk. [25.]

439*a*. **BUTEO LINEATUS ELEGANS** (Cass.) Ridgw.
Red-bellied Hawk. [26.]

440. **BUTEO ABBREVIATUS** Caban.
Zone-tailed Hawk.

441. **BUTEO ALBICAUDATUS** Vieill.
White-tailed Hawk.

442. **BUTEO SWAINSONI** Bonap.
Swainson's Hawk. [18, 19, 21, 28.]

443. **BUTEO PENNSYLVANICUS** (Wils.) Bp.
Broad-winged Hawk. [27.]

444. **URUBITINGA ANTHRACINA** (Licht.) Lafr.
Mexican Black Hawk.

445. **ASTURINA NITIDA PLAGIATA** (Licht.) Ridgw.
Mexican Goshawk. [33.]

446. **ONYCHOTES GRUBERI** Ridgw.
Gruber's Hawk.

447. **ARCHIBUTEO LAGOPUS SANCTI-JOHANNIS** (Gmel.) Ridgw.
American Rough-legged Hawk. [30, 31.]

448. **ARCHIBUTEO FERRUGINEUS** (Licht.) Gray.
Ferruginous Rough-leg. [32.]

449. **AQUILA CHRYSAËTUS CANADENSIS** (Linn.) Ridgw.
Golden Eagle. [39.]

450. **THRASAËTUS HARPYIA** (Linn.) Gray.
Harpy Eagle.

451. **HALIÆËTUS LEUCOCEPHALUS** (Linn.) Savig.
Bald Eagle; Gray Eagle. [41, 43.]

452. **HALIÆËTUS ALBICILLA** (LINN.) LEACH.
Gray Sea Eagle. [42.]

453. **PSEUDOGRYPHUS CALIFORNIANUS** (SHAW) RIDGW.
Californian Condor. [2.]

454. **CATHARTES AURA** (LINN.) ILLIG.
Turkey Buzzard. [1.]

455. **CATHARISTA ATRATA** (WILS.) LESS.
Black Vulture; Carrion Crow. [3.]

456. **COLUMBA FASCIATA** SAY.
Band-tailed Pigeon. [445.]

457. **COLUMBA ERYTHRINA** LICHT.
Red-billed Pigeon. [446.]

458. **COLUMBA LEUCOCEPHALA** LINN.
White-crowned Pigeon. [447.]

459. **ECTOPISTES MIGRATORIA** (LINN.) SW.
Passenger Pigeon. [448.]

460. **ZENÆDURA CAROLINENSIS** (LINN.) BP.
Mourning Dove. [451.]

461. **ZENÆDURA GRAYSONI** BAIRD.
Socorro Dove.

462. **ZENÆDA AMABILIS** BP.
Zenaida Dove. [449.]

463. **ENGYPTILA ALBIFRONS** (BP.) COUES.
White-fronted Dove.

464. **MELOPELIA LEUCOPTERA** (L.) BP.
White-winged Dove. [450.]

465. **CHAMÆPELIA PASSERINA** (L.) SWAINS.
Ground Dove. [453.]

466. **SCARDAFELLA INCA** (LESS.) BP.
Scaled Dove. [452.]

467. **GEOTRYGON MARTINICA** (GM.) BP.
Key West Dove. [454.]

468. **STARNŒNAS CYANOCEPHALA** (LINN.) BP.
Blue-headed Dove. [455.]

469. **ORTALIS VETULA MACCALLI** (BAIRD) RIDGW.
Chachalaca; Texan Guan. [456.]

470. **MELEAGRIS GALLOPAVO** LINN.
Mexican Turkey. [458.]

470*a*. **MELEAGRIS GALLOPAVO AMERICANA** (BARTR.) COUES.
Wild Turkey. [457.]

471. **CANACE OBSCURA** (SAY) BP.
Dusky Grouse. [459.]

471*a*. **CANACE OBSCURA FULIGINOSA** RIDGW.
Sooty Grouse.

471*b*. **CANACE OBSCURA RICHARDSONII** (DOUGL.) BAIRD.
Richardson's Grouse.

472. **CANACE CANADENSIS** (LINN.) BP.
Canada Grouse; Spruce Partridge. [460.]

472*a*. **CANACE CANADENSIS FRANKLINI** (DOUGL.) BAIRD
Franklin's Grouse. [461.]

473. **BONASA UMBELLUS** (LINN.) STEPH.
Ruffed Grouse. [465.]

473*a*. **BONASA UMBELLUS UMBELLOIDES** (DOUGL.) BAIRD.
Gray Ruffed Grouse. [465*a*.]

473*b*. **BONASA UMBELLUS SABINEI** (DOUGL.) COUES.
Oregon Ruffed Grouse. [466.]

474. **LAGOPUS ALBUS** (GM.) AUD.
Willow Ptarmigan. [467, 470.]

475. **LAGOPUS RUPESTRIS** (GM.) LEACH.
Rock Ptarmigan. [468.]

476. **LAGOPUS LEUCURUS** SW.
White-tailed Ptarmigan. [469.]

477. **CUPIDONIA CUPIDO** (LINN.) BAIRD.
Prairie Hen. [464.]

477*a*. **CUPIDONIA CUPIDO PALLIDICINCTA** RIDGW.
Lesser Prairie Hen.

478. **PEDIŒCETES PHASIANELLUS** (L.) ELLIOT.
Northern Sharp-tailed Grouse.

478*a*. **PEDIŒCETES PHASIANELLUS COLUMBIANUS** (ORD) COUES.
Common Sharp-tailed Grouse. [463.]

479. **CENTROCERCUS UROPHASIANUS** (BP.) SWAINS.
Sage Cock. [462.]

480. **ORTYX VIRGINIANA** (L.) BP.
Bob-white; American Quail. [471.]

480*a*. **ORTYX VIRGINIANA FLORIDANA** COUES.
Florida Quail.

480*b*. **ORTYX VIRGINIANA TEXANA** (LAWR.) COUES.
Texan Quail. [472.]

481. **OREORTYX PICTA** (DOUGL.) BAIRD.
Mountain Quail. [473.]

481*a*. **OREORTYX PICTA PLUMIFERA** (GOULD) RIDGW.
Plumed Quail.

482. **LOPHORTYX CALIFORNICA** (SHAW) BP.
Californian Quail. [474.]

483. **LOPHORTYX GAMBELI** NUTT.
Gambel's Quail. [475.]

484. **CALLIPEPLA SQUAMATA** (VIG.) GRAY.
Scaled Quail. [476.]

485. **CYRTONYX MASSENA** (LESS.) GOULD.
Massena Quail. [477.]

486. **ARDEA OCCIDENTALIS** AUD.
Great White Heron; Würdemann's Heron. [488, 489.]

487. **ARDEA HERODIAS** LINN.
Great Blue Heron. [487.]

[488.] **ARDEA CINEREA** LINN.
Common European Heron.

489. **HERODIAS ALBA EGRETTA** (GMEL.) RIDGW.
American Egret. [486, 486*a*.]

490. **GARZETTA CANDIDISSIMA** (GMEL.) BP.
Snowy Heron. [485.]

491. **DICHROMANASSA RUFA** (BODD.) RIDGW.
Reddish Egret; Peale's Egret. [482, 483.]

492. **HYDRANASSA TRICOLOR LUDOVICIANA** (WILS.) RIDGW.
Louisiana Heron. [484.]

493. **FLORIDA CÆRULEA** (LINN.) BAIRD.
Little Blue Heron. [490.]

494. **BUTORIDES VIRESCENS** (LINN.) BP.
Green Heron. [493.]

495. **NYCTIARDEA GRISEA NÆVIA** (BODD.) ALLEN.
Black-crowned Night Heron. [495.]

496. **NYCTHERODIUS VIOLACEUS** (LINN.) REICH.
White-crowned Night Heron. [496.]

497. **BOTAURUS LENTIGINOSUS** (MONTAG.) STEPH.
American Bittern. [492.]

498. **ARDETTA EXILIS** (GMEL.) GRAY.
Least Bittern. [491.]

499. **MYCTERIA AMERICANA** LINN.
Jabiru.

500. **TANTALUS LOCULATOR** LINN..
Wood Ibis. [497.]

501. EUDOCIMUS ALBUS (Linn.) Wagl.
White Ibis. [499.]

502. EUDOCIMUS RUBER (Linn.) Wagl.
Scarlet Ibis. [498.]

503. PLEGADIS FALCINELLUS (Linn.) Kaup.
Glossy Ibis. [500.]

504. PLEGADIS GUARAUNA (Linn.) Ridgw.
White-faced Glossy Ibis. [500*a*.]

505. AJAJA ROSEA (Briss.) Ridgw.
Roseate Spoonbill. [501.]

[506.] HÆMATOPUS OSTRALEGUS Linn.
European Oystercatcher.

507. HÆMATOPUS PALLIATUS Temm.
American Oystercatcher. [512.]

508. HÆMATOPUS NIGER Pall.
Black Oystercatcher. [513.]

509. STREPSILAS INTERPRES (Linn.) Illig.
Turnstone. [515.]

510. STREPSILAS MELANOCEPHALA Vig.
Black Turnstone. [516.]

511. APHRIZA VIRGATA (Gmel.) Gray.
Surf Bird. [511.]

[512.] VANELLUS CRISTATUS Meyer.
Lapwing.

513. SQUATAROLA HELVETICA (Linn.) Cuv.
Black-bellied Plover. [510.]

[514.] CHARADRIUS PLUVIALIS Linn.
Golden Plover.

515. CHARADRIUS DOMINICUS Müll.
American Golden Plover. [503.]

[515*a*.] CHARADRIUS DOMINICUS FULVUS (Gmel.) Ridgw.
Pacific Golden Plover.

516. OXYECHUS VOCIFERUS (Linn.) Reich.
Killdeer. [504.]

517. ÆGIALITIS SEMIPALMATA (Bonap.) Caban.
Semipalmated Plover. [507.]

518. ÆGIALITIS HIATICULA (Linn.) Boie.
Ringed Plover.

[519.] ÆGIALITIS CURONICA (Gmel.) Gray.
Little Ringed Plover.

520. **ÆGIALITIS MELODA** (ORD) BP.
Piping Plover. [508.]

520*a*. **ÆGIALITIS MELODA CIRCUMCINCTA** RIDGW.
Belted Piping Plover.

521. **ÆGIALITIS CANTIANA NIVOSA** (CASS.) RIDGW.
Snowy Plover. [509.]

522. **OCHTHODROMUS WILSONIUS** (ORD) REICH.
Wilson's Plover. [506.]

523. **PODASOCYS MONTANA** (TOWNS.) COUES.
Mountain Plover. [505.]

[524.] **SCOLOPAX RUSTICULA** LINN.
European Woodcock.

525. **PHILOHELA MINOR** (GMEL.) GRAY.
American Woodcock. [522.]

[526.] **GALLINAGO MEDIA** LEACH.
English Snipe.

526*a*. **GALLINAGO MEDIA WILSONI** (TEMM.) RIDGW.
Wilson's Snipe. [523.]

527. **MACRORHAMPHUS GRISEUS** (GMEL.) LEACH.
Red-breasted Snipe; Gray Snipe. [524.]

527*a*. **MACRORHAMPHUS GRISEUS SCOLOPACEUS** (SAY) COUES.
Red-bellied Snipe; Greater Gray-back. [525.]

528. **MICROPALAMA HIMANTOPUS** (BONAP.) BAIRD.
Stilt Sandpiper. [536.]

529. **TRINGA CANUTUS** LINN.
Knot; Robin Snipe. [526.]

530. **ARQUATELLA MARITIMA** (BRÜNN.) BAIRD.
Purple Sandpiper. [528.]

531. **ARQUATELLA COUESII** RIDGW.
Aleutian Sandpiper.

532. **ARQUATELLA PTILOCNEMIS** (COUES) RIDGW.
Prybilov Sandpiper.

[533.] **ACTODROMAS ACUMINATA** (HORSF.) RIDGW.
Sharp-tailed Sandpiper.

534. **ACTODROMAS MACULATA** (VIEILL.) COUES.
Pectoral Sandpiper. [531.]

535. **ACTODROMAS COOPERI** (BAIRD) COUES.
Cooper's Sandpiper. [527.]

536. **ACTODROMAS FUSCICOLLIS** (VIEILL.) RIDGW
Bonaparte's Sandpiper. [533.]

537. **ACTODROMAS BAIRDII** COUES.
Baird's Sandpiper.

538. **ACTODROMAS MINUTILLA** (VIEILL.) BP.
Least Sandpiper. [532.]

[539.] **PELIDNA ALPINA** (LINN.) BOIE.
European Dunlin.

539*a*. **PELIDNA ALPINA AMERICANA** CASS.
Red-backed Sandpiper. [530.]

[540.] **PELIDNA SUBARQUATA** (GULD.) CUV.
Curlew Sandpiper. [529.]

541. **EREUNETES PUSILLUS** (LINN.) CASS.
Semipalmated Sandpiper. [535.]

541*a*. **EREUNETES PUSILLUS OCCIDENTALIS** (LAWR.) COUES.
Western Sandpiper.

542. **CALIDRIS ARENARIA** (LINN.) ILLIG.
Sanderling. [534.]

543. **LIMOSA FEDOA** (LINN.) ORD.
Marbled Godwit. [547.]

544. **LIMOSA LAPPONICA NOVÆ-ZEALANDIÆ** GRAY.
Pacific Godwit.

545. **LIMOSA HÆMASTICA** (LINN.) COUES.
Hudsonian Godwit. [548.]

[546.] **LIMOSA ÆGOCEPHALA** (LINN.) LEACH.
Black-tailed Godwit.

[547.] **TOTANUS GLOTTIS** (LINN.) BECHST.
Green-shank. [538.]

548. **TOTANUS MELANOLEUCUS** (GMEL.) VIEILL.
Greater Yellow-legs; Tell-tale. [539.]

549. **TOTANUS FLAVIPES** (GMEL.) VIEILL.
Yellow-legs. [540.]

550. **RHYACOPHILUS SOLITARIUS** (WILS.) CASS.
Solitary Sandpiper. [541.]

[551.] **RHYACOPHILUS OCHROPUS** (LINN.) RIDGW.
Green Sandpiper.

552. **SYMPHEMIA SEMIPALMATA** (GMEL.) HARTL.
Willet. [537.]

553. **HETEROSCELUS INCANUS** (GMEL.) COUES.
Wandering Tattler. [542.]

[554.] **MACHETES PUGNAX** (LINN.) CUV.
Ruff. [544.]

555. **BARTRAMIA LONGICAUDA** (Bechst.) Bp.
Bartram's Sandpiper; Field Plover. [545.]

556. **TRYNGITES RUFESCENS** (Vieill.) Caban.
Buff-breasted Sandpiper. [546.]

557. **TRINGOIDES MACULARIUS** (Linn.) Gray.
Spotted Sandpiper. [543.]

558. **NUMENIUS LONGIROSTRIS** Wils.
Long-billed Curlew. [549.]

559. **NUMENIUS HUDSONICUS** Lath.
Hudsonian Curlew. [550.]

560. **NUMENIUS BOREALIS** (Forst.) Lath.
Eskimo Curlew. [551.]

[561.] **NUMENIUS PHÆOPUS** (Linn.) Lath.
Whimbrel.

[562.] **NUMENIUS TAHITIENSIS** (Gmel.) Cass.
Bristle-thighed Curlew.

563. **PHALAROPUS FULICARIUS** (Linn.) Bp.
Red Phalarope. [521.]

564. **LOBIPES HYPERBOREUS** (Linn.) Cuv.
Northern Phalarope. [520.]

565. **STEGANOPUS WILSONI** (Sab.) Coues.
Wilson's Phalarope. [519.]

566. **RECURVIROSTRA AMERICANA** Gmel.
American Avocet. [517.]

567. **HIMANTOPUS MEXICANUS** (Müll.) Ord.
Black-necked Stilt. [518.]

568. **PARRA GYMNOSTOMA** Wagl.
Mexican Jacana.

569. **RALLUS ELEGANS** Aud.
Red-breasted Rail. [542.]

570. **RALLUS OBSOLETUS** Ridgw.
Californian Clapper Rail.

571 **RALLUS LONGIROSTRIS CREPITANS** (Gmel.) Ridgw.
Clapper Rail. [553.]

571*a*. **RALLUS LONGIROSTRIS SATURATUS** Hensh.
Louisiana Clapper Rail.

572. **RALLUS VIRGINIANUS** Linn.
Virginian Rail. [554.]

[573.] **PORZANA MARUETTA** (Leach.) Bp.
Spotted Crake.

574. PORZANA CAROLINA (LINN.) BAIRD.
Sora Rail. [555.]

575. PORZANA NOVEBORACENSIS (GMEL.) BAIRD.
Little Yellow Rail. [557.]

576. PORZANA JAMAICENSIS (GMEL.) BAIRD.
Little Black Rail. [556.]

576*a*. PORZANA JAMAICENSIS COTURNICULUS BAIRD.
Farallone Rail.

[577.] CREX PRATENSIS BECHST.
Corn Crake. [558.]

578. IONORNIS MARTINICA (LINN.) REICH.
Purple Gallinule. [561.]

579. GALLINULA GALEATA (LICHT.) BP.
Florida Gallinule. [560.]

580. FULICA AMERICANA GMEL.
American Coot. [559.]

581. ARAMUS PICTUS (BARTR.) COUES.
The Limpkin. [481.]

582. GRUS AMERICANA (LINN.) TEMM.
Whooping Crane. [478.]

583. GRUS CANADENSIS (LINN.) TEMM.
Sandhill Crane. [479.]

584. GRUS FRATERCULUS CASS.
Little Crane. [480.]

585. PHŒNICOPTERUS RUBER LINN.
American Flamingo. [502.]

[586.] OLOR CYGNUS (LINN.) BP.
European Swan.

[587.] OLOR MINOR (PALL.) BP.
Bewick's Swan.

588. OLOR AMERICANUS (SHARPLESS) BP.
Whistling Swan. [561*a*.]

589. OLOR BUCCINATOR (RICH.) WAGL.
Trumpeter Swan. [562.]

590. CHEN CÆRULESCENS (LINN.) RIDGW.
Blue-winged Goose. [564.]

591. CHEN HYPERBOREUS (PALL.) BOIE.
Snow Goose. [563.]

591*a*. CHEN HYPERBOREUS ALBATUS (CASS.) RIDG.
Lesser Snow Goose [563*a*.]

592. **CHEN ROSSII** (BAIRD) RIDGW.
Ross's Snow Goose.

[593.] **ANSER ALBIFRONS** GMEL.
European White-fronted Goose.

593*a*. **ANSER ALBIFRONS GAMBELI** (HARTL.) COUES.
American White-fronted Goose. [565, 566.]

594. **BERNICLA CANADENSIS** (LINN.) BOIE.
Canada Goose. [567.]

594*a*. **BERNICLA CANADENSIS HUTCHINSI** (SW. & RICH.) WOODH.
Hutchins's Goose. [569.]

594*b*. **BERNICLA CANADENSIS LEUCOPARIA** (BRANDT) CASS.
White-cheeked Goose. [568.]

594*c*. **BERNICLA CANADENSIS OCCIDENTALIS** (BAIRD) DALL & BANN.
Larger White-cheeked Goose. [567 *a*.]

595. **BERNICLA BRENTA** (PALL.) STEPH.
Brant. [570.]

596. **BERNICLA NIGRICANS** (LAWR.) CASS.
Black Brant. [571.]

[597.] **BERNICLA LEUCOPSIS** (TEMM.) BOIE.
Barnacle Goose. [572.]

598. **PHILACTE CANAGICA** (SEVAST.) BANNIST.
Emperor Goose. [573.]

599. **DENDROCYGNA AUTUMNALIS** (LINN.) EYT.
Black-bellied Tree Duck. [574.]

600. **DENDROCYGNA FULVA** (GMEL.) BURM.
Fulvous Tree Duck. [575.]

601. **ANAS BOSCAS** LINN.
Mallard. [576.]

602. **ANAS OBSCURA** GMEL.
Black Duck. [577.]

603. **ANAS FULVIGULA** RIDGW.
Florida Black Duck.

604. **CHAULELASMUS STREPERUS** (LINN.) GRAY.
Gadwall. [584.]

605. **DAFILA ACUTA** (LINN.) BONAP.
Pintail. [578.]

[606.] **MARECA PENELOPE** (LINN.) SELBY.
Widgeon. [586.]

607. **MARECA AMERICANA** (GMEL.) STEPH.
Baldpate. [585.]

608. **SPATULA CLYPEATA** (Linn.) Boie.
Shoveller. [583.]

609. **QUERQUEDULA DISCORS** (Linn.) Steph.
Blue-winged Teal. [581.]

610. **QUERQUEDULA CYANOPTERA** (Vieill.) Cass.
Cinnamon Teal. [582.]

[611.] **NETTION CRECCA** (Linn.) Kaup.
English Teal. [580.]

612. **NETTION CAROLINENSIS** (Gmel.) Baird.
Green-winged Teal. [579.]

613. **AIX SPONSA** (Linn.) Boie.
Wood Duck; Summer Duck. [587.]

614. **FULIX MARILA** (Linn.) Baird.
Scaup Duck. [588.]

615. **FULIX AFFINIS** (Eyt.) Baird.
Little Blackhead. [589.]

616. **FULIX COLLARIS** (Donov.) Baird.
Ring-billed Blackhead. [590.]

617. **AYTHYA VALLISNERIA** (Wils.) Boie.
Canvas-back. [592.]

618. **AYTHYA AMERICANA** (Eyt.) Bp.
Redhead. [591.]

619. **CLANGULA ISLANDICA** (Gmel.) Bp.
Barrow's Golden-eye. [594.]

620. **CLANGULA GLAUCIUM AMERICANA** (Bp.) Ridgw.
American Golden-eye. [593.]

621. **CLANGULA ALBEOLA** (Linn.) Steph.
Butterball; Bufflehead. [595.]

622. **HISTRIONICUS MINUTUS** (Linn.) Dresser.
Harlequin Duck. [596.]

623. **HARELDA GLACIALIS** (Linn.) Leach.
Long-tailed Duck; Old Squaw. [597.]

624. **CAMPTOLÆMUS LABRADORIUS** (Gmel.) Gray.
Labrador Duck. [600.]

625. **POLYSTICTA STELLERI** (Pall.) Brandt.
Steller's Duck. [598.]

626. **LAMPRONETTA FISCHERI** Brandt.
Fischer's Eider. [599.]

627. **SOMATERIA MOLLISSIMA** (Linn.) Boie.
Common Eider.

627*a*. **SOMATERIA MOLLISSIMA DRESSERI** (SHARPE) COUES.
American Eider. [606.]

628. **SOMATERIA V-NIGRA** GRAY.
Pacific Eider. [607.]

629. **SOMATERIA SPECTABILIS** (LINN.) BOIE.
King Eider. [608.]

630. **ŒDEMIA AMERICANA** SW. & RICH.
American Scoter. [604.]

[631.] **MELANETTA FUSCA** (LINN.) BOIE.
Velvet Scoter.

632. **MELANETTA VELVETINA** (CASS.) BAIRD.
American Velvet Scoter. [601.]

633. **PELIONETTA PERSPICILLATA** (LINN.) KAUP.
Surf Duck. [602.]

634. **ERISMATURA RUBIDA** (WILS.) BP.
Ruddy Duck. [609.]

635. **NOMONYX DOMINICUS** (LINN.) RIDGW.
Black Masked Duck. [610.]

636. **MERGUS MERGANSER AMERICANUS** (CASS.) RIDGW.
American Sheldrake. [611.]

637. **MERGUS SERRATOR** LINN.
Red-breasted Sheldrake. [612.]

638. **LOPHODYTES CUCULLATUS** (LINN.) REICH.
Hooded Sheldrake. [613.]

639. **TACHYPETES AQUILA** (LINN.) VIEILL.
Frigate Pelican. [619.]

640. **PELECANUS ERYTHRORHYNCHUS** GMEL.
American White Pelican. [615.]

641. **PELECANUS FUSCUS** LINN.
Brown Pelican. [616.]

642. **PHALACROCORAX CARBO** (LINN.) BP.
Common Cormorant. [620.]

643. **PHALACROCORAX DILOPHUS** (SW. & RICH.) NUTT.
Double-crested Cormorant. [623.]

643*a*. **PHALACROCORAX DILOPHUS FLORIDANUS** (AUD.) RIDGW.
Florida Cormorant. [624.]

643*b*. **PHALACROCORAX DILOPHUS CINCINNATUS** (BRANDT) RIDGW
White-crested Cormorant. [622.]

644. **PHALACROCORAX MEXICANUS** (BRANDT) RIDGW.
Mexican Cormorant. [625.]

645. **PHALACROCORAX PENICILLATUS** (Brandt) Heerm.
Brandt's Cormorant. [626.]

646. **PHALACROCORAX VIOLACEUS** (Gmel.) Ridgw.
Violet-green Cormorant. [627.]

646*a*. **PHALACROCORAX VIOLACEUS RESPLENDENS** (Aud.) Ridgw.
Baird's Cormorant.

647. **PHALACROCORAX BICRISTATUS** Pall.
Red-faced Cormorant.

648. **PHALACROCORAX PERSPICILLATUS** Pall.
Pallas's Cormorant. [621.]

649. **PLOTUS ANHINGA** Linn.
American Anhinga; Snake Bird. [628.]

650. **SULA BASSANA** (Linn.) Briss.
Gannet. [617.]

651. **SULA CYANOPS** Sundev.
Blue-faced Gannet.

652. **SULA LEUCOGASTRA** (Bodd.) Salv.
Booby Gannet. [618.]

653. **SULA PISCATOR** (Linn.) Bp.
Red-footed Booby.

654. **PHAËTHON FLAVIROSTRIS** Brandt.
Yellow-billed Tropic Bird. [629.]

655. **PHAËTHON ÆTHEREUS** Linn.
Red-billed Tropic Bird.

656. **RHYNCHOPS NIGRA** Linn.
Black Skimmer. [697.]

657. **PAGOPHILA EBURNEA** (Phipps) Kaup.
Ivory Gull. [676, 677.]

658. **RISSA TRIDACTYLA** (Linn.) Bp.
Kittiwake Gull. [672.]

658*a*. **RISSA TRIDACTYLA KOTZBUEI** (Bp.) Coues.
Pacific Kittiwake.

659. **RISSA BREVIROSTRIS** Brandt.
Red-legged Kittiwake. [674, 675.]

660. **LARUS GLAUCUS** Brünn.
Glaucous Gull; Burgomaster. [656.]

661. **LARUS LEUCOPTERUS** Faber.
White-winged Gull. [658.]

662. **LARUS GLAUCESCENS** Licht.
Glaucous-winged Gull. [657, 659.]

663. **LARUS MARINUS** Linn.
Great Black-backed Gull. [660.]

664. **LARUS OCCIDENTALIS** Aud.
Western Gull. [662.)

[665.] **LARUS AFFINIS** Reinh.
Siberian Gull.

666. **LARUS ARGENTATUS** Brünn.
Herring Gull.

666*a*. **LARUS ARGENTATUS SMITHSONIANUS** Coues.
American Herring Gull. [661.]

667. **LARUS CACHINNANS** Pall.
Pallas's Herring Gull.

668. **LARUS CALIFORNICUS** Lawr.
Californian Gull. [663.]

669. **LARUS DELAWARENSIS** Ord.
Ring-billed Gull. [664.]

670. **LARUS BRACHYRHYNCHUS** Rich.
Short-billed Gull. [664*a*, 665, 673.]

[671.] **LARUS CANUS** Linn.
Mew Gull.

672. **LARUS HEERMANNI** Cass.
Heermann's Gull. [666.]

673. **LARUS ATRICILLA** Linn.
Laughing Gull. [667.]

674. **LARUS FRANKLINI** Sw. & Rich.
Franklin's Gull. [668, 669.]

675. **LARUS PHILADELPHIÆ** (Ord) Gray.
Bonaparte's Gull. [670.]

676. **RHODOSTETHIA ROSEA** (Macgill.) Bruch.
Ross's Gull. [678.]

677. **XEMA SABINEI** (J. Sabine) Leach.
Sabine's Gull. [680.]

678. **CREAGRUS FURCATUS** (Neb.) Bp.
Swallow-tailed Gull. [679.]

679. **STERNA ANGLICA** Montag.
Gull-billed Tern. [681.]

680. **STERNA CASPIA** Pall.
Caspian Tern. [682.]

681. **STERNA REGIA** Camb.
Royal Tern. [683.]

682. **STERNA ELEGANS** Gamb.
Elegant Tern. [684.]

683. **STERNA CANTIACA ACUFLAVIDA** (Cabot) Ridgw.
Cabot's Tern. [685.]

684. **STERNA TRUDEAUI** Aud.
Trudeau's Tern. [687.]

685. **STERNA FORSTERI** Nutt.
Forster's Tern. [691, 686.]

686. **STERNA FLUVIATILIS** Naum.
Common Tern. [689.]

687. **STERNA MACRURA** Naum.
Arctic Tern. [690, 693.]

688. **STERNA DOUGALLI** Montag.
Roseate Tern. [692.]

689. **STERNA ALEUTICA** Baird.
Aleutian Tern.

690. **STERNA ANTILLARUM** (Less.) Coues.
Least Tern. [694.]

691. **STERNA FULIGINOSA** Gmel.
Sooty Tern. [688.]

692. **STERNA ANÆSTHETA** Scop.
Bridled Tern.

693. **HYDROCHELIDON LARIFORMIS SURINAMENSIS**(Gmel.)Ridgw.
Black Tern. [695.]

[694.] **HYDROCHELIDON LEUCOPTERA** (Weisn. & Schinz) Boie.
White-winged Black Tern.

695. **ANOUS STOLIDUS** Linn.
Noddy Tern. [696.]

696. **MEGALESTRIS SKUA** (Brünn.) Ridgw.
Skua Gull. [652.]

697. **STERCORARIUS POMATORHINUS** (Temm.) Vieill.
Pomarine Jaeger. [653.]

698. **STERCORARIUS PARASITICUS** (Linn.) Schæff.
Richardson's Jaeger. [654.]

699. **STERCORARIUS BUFFONI** (Boie) Coues.
Long-tailed Jaeger. [655.]

700. **DIOMEDEA NIGRIPES** Aud.
Black-footed Albatross.

701. **DIOMEDEA BRACHYURA** Temm.
Short-tailed Albatross. [631.]

[702.] **DIOMEDEA CULMINATA** Gould.
Yellow-nosed Albatross. [632.]

703. **PHŒBETRIA FULIGINOSA** (Gmel.) Bp.
Sooty Albatross. [633.]

704. **OSSIFRAGA GIGANTEA** (Gm.) Reich.
Giant Fulmar. [634.]

705. **FULMARUS GLACIALIS** (Linn.) Steph.
Fulmar Petrel. [635.]

705*a*. **FULMARUS GLACIALIS PACIFICUS** (Aud.) Bp.
Pacific Fulmar. [636.]

705*b*. **FULMARUS GLACIALIS RODGERSI** (Cass.) Coues.
Rodger's Fulmar.

706. **PRIOCELLA TENUIROSTRIS** (Aud.) Ridgw.
Slender-billed Fulmar. [637.]

707. **PRIOFINUS MELANURUS** (Bonn.) Ridgw.
Black-tailed Shearwater.

[708.] **PUFFINUS KUHLII** (Boie) Bp.
Cinereous Shearwater. [651.]

709. **PUFFINUS MAJOR** Faber.
Greater Shearwater. [647.]

710. **PUFFINUS CREATOPUS** Cooper.
Pink-footed Shearwater.

[711.] **PUFFINUS ANGLORUM** Temm.
Manx Shearwater. [649.]

712. **PUFFINUS AUDUBONII** Finsch.
Dusky Shearwater. [650.]

713. **PUFFINUS GAVIA** (Forst.) Finsch.
Black-vented Shearwater.

714. **PUFFINUS FULIGINOSUS** Strickl.
Sooty Shearwater. [648.]

715. **PUFFINUS GRISEUS** (Gm.) Finsch.
Dark-bodied Shearwater.

716. **PUFFINUS TENUIROSTRIS** Temm.
Slender-billed Shearwater.

717. **ŒSTRELATA HÆSITATA** (Temm.) Coues.
Black-capped Petrel. [638.]

[718.] **ŒSTRELATA BULWERI** (Jard. & Selby) Coues.
Bulwer's Petrel.

[719.] **DAPTION CAPENSIS** (Linn.) Steph.
Pintado Petrel; Cape Pigeon. [639.]

720. **HALOCYPTENA MICROSOMA** Coues.
Least Petrel.

721. **PROCELLARIA PELAGICA** Linn.
Stormy Petrel; Mother Carey's Chicken. [645.]

722. **OCEANITES OCEANICA** (Kuhl) Coues.
Wilson's Petrel. [644.]

723. **CYMOCHOREA LEUCORRHOA** (Vieill.) Coues.
Leach's Petrel. [642.]

724. **CYMOCHOREA MELANIA** (Bp.) Coues.
Black Petrel. [643.]

725. **CYMOCHOREA HOMOCHROA** Coues.
Ashy Petrel.

726. **OCEANODROMA FURCATA** (Gmel.) Bp.
Fork-tailed Petrel. [640.]

727. **OCEANODROMA HORNBYI** (Gray) Bp.
Hornby's Petrel. [641.]

728. **FREGETTA GRALLARIA** (Vieill.) Bp.
White-bellied Petrel. [646.]

729. **ÆCHMOPHORUS OCCIDENTALIS** (Lawr.) Coues.
Western Grebe. [704.]

730. **ÆCHMOPHORUS CLARKII** (Lawr.) Coues.
Clark's Grebe. [705.]

731. **PODICEPS HOLBÖLLI** Reinh.
American Red-necked Grebe. [702, 703*a*.]

732. **DYTES CORNUTUS** (Gm.) Kaup.
Horned Grebe. [706.]

[733.] **DYTES AURITUS** (Linn.) Ridgw.
Eared Grebe. [708.]

733*a*. **DYTES AURITUS CALIFORNICUS** (Lawr.) Ridgw.
American Eared Grebe. [707.]

734. **TACHYBAPTES DOMINICUS** (Linn.) Coues.
St. Domingo Grebe. [708*a*.]

735. **PODILYMBUS PODICEPS** (Linn.) Lawr.
Thick-billed Grebe. [709.]

736. **COLYMBUS TORQUATUS** Brünn.
Loon. [698.]

737. **COLYMBUS ADAMSI** Gray.
Great White-billed Loon.

738. **COLYMBUS ARCTICUS** Linn.
Black-throated Diver. [699.]

739. **COLYMBUS PACIFICUS** Lawr.
Pacific Diver. [700.]

740. **COLYMBUS SEPTENTRIONALIS** Linn.
Red-throated Diver. [701.]

741. **ALCA IMPENNIS** Linn.
Great Auk. [710.]

742. **UTAMANIA TORDA** (Linn.) Leach.
Razor-billed Auk. [711.]

743. **FRATERCULA ARCTICA** (Linn.) Steph.
Common Puffin. [715, 716.]

743*a*. **FRATERCULA ARCTICA GLACIALIS** (Leach) Ridgw.
Large-billed Puffin. [714.]

744. **FRATERCULA CORNICULATA** (Naum.) Gray.
Horned Puffin. [713.]

745. **LUNDA CIRRHATA** Pall.
Tufted Puffin. [712.]

746. **CERATORHINA MONOCERATA** (Pall.) Cass.
Horn-billed Puffin. [717, 718.]

747. **PHALERIS PSITTACULA** (Pall.) Temm.
Parrot Auk. [725.]

748. **SIMORHYNCHUS CRISTATELLUS** (Pall.) Merrem.
Crested Auk. [719, 720.]

749. **SIMORHYNCHUS PYGMÆUS** (Gmel.) Ridgw.
Whiskered Auk. [721.]

750. **CICERONIA PUSILLA** (Pall.) Ridgw.
Least Auk. [722, 723.]

751. **PTYCORHAMPHUS ALEUTICUS** (Pall.) Brandt.
Cassin's Auk. [724.]

752. **ALLE NIGRICANS** Link.
Sea Dove; Dovekie. [738.]

753. **SYNTHLIBORHAMPHUS ANTIQUUS** (Gm.) Coues.
Black-throated Guillemot. [736.]

754. **SYNTHLIBORHAMPHUS WURMIZUSUME** (Temm.) Coues.
Temminck's Guillemot. [737.]

755. **BRACHYRAMPHUS MARMORATUS** (Gm.) Brandt.
Marbled Guillemot. [732, 733.]

756. **BRACHYRHAMPHUS KITTLITZI** Brandt.
Kittlitz's Guillemot. [735.]

757. **BRACHYRHAMPHUS HYPOLEUCUS** Xantus.
Xantus's Guillemot.

758. **BRACHYRHAMPHUS CRAVERI** (SALVAD.) COUES.
Craver's Guillemot.

759. **BRACHYRHAMPHUS BRACHYPTERUS** BRANDT.
Short-winged Guillemot. [734.]

760. **URIA GRYLLE** (LINN.) BRÜNN.
Black Guillemot. [726.]

761. **URIA COLUMBA** (PALL.) CASS.
Pigeon Guillemot. [727.]

762. **URIA CARBO** (PALL.) GRAY.
Sooty Guillemot. [728.]

763. **LOMVIA TROILE** (LINN.) BRANDT.
Common Guillemot. [729, 730.]

763*a*. **LOMVIA TROILE CALIFORNICA** (BRYANT) COUES.
California Guillemot.

764. **LOMVIA ARRA** (PALL.) BP.
Thick-billed Guillemot.

764*a*. **LOMVIA ARRA BRUNNICHI** (SCH.) RIDGW.
Brunnich's Guillemot. [731.]

APPENDIX.

The following tables are intended as a condensed analysis of the changes which have taken place in North American ornithology since 1859, with other items of interest in the same connection.

a. Species eliminated from the catalogue of 1859.

Catalogue No.

4. Cathartes burrovianus, Cassin *Not North American?*
6. Falco nigriceps, Cassin = No. 414.
16. Accipiter mexicanus, Swains. = No. 431.
19. Buteo bairdii, Hoy = No. 442, *young.*
21. Buteo insignatus, Cassin = No. 442, *melanistic.*
24. Buteo montanus, Nuttall = No. 436*b*, *lighter phase.*
28. Buteo oxypterus, Cassin = No. 442, *young.*
30. Archibuteo lagopus, Gray = No. 447, *light phase.*
40. Haliaëtus pelagicus, Siebold. *Not North American.*
41. Haliaëtus washingtonii, Jard. = No. 451, *young female.*
56. Nyctale albifrons, Cassin = No. 401, *young.*
59. Athene cunicularia, Bon. The true *cunicularia* is a South American form.*
66. Crotophaga rugirostris, Sw. = No. 389.
73. Campephilus imperialis, Gray. *Not North American.*
88. Sphyropicus williamsonii, Baird = No. 370, *adult male.*
100. Lampornis mango, Swains. *Not North American.* [= *L. violicauda* (Bodd.) Ell.]
129. Tyrannus melancholicus, Vieill. *Not North American.*
167*a*. Var. Mniotilta longirostris, Baird.†
171. Geothlypis velatus, Cab. *Not North American.*
215. Myiodioctes bonapartei, Aud. = No. 127, *young.*
239. Collyrio elegans, Baird. An Asiatic species (*Lanius lahtora*, Sykes.).
242. Vireo virescens, Vieill. = No. 135?
253*a*. Var. Mimus caudatus, Baird. Not separable from *polyglottus.*
259*a*. Harporhynchus vetula, Baird = No. 15.
261*a*. Harporhynchus longicauda, Baird. Scarcely separable from *rufus.*
272. Troglodytes americanus, Aud. = No. 63.
289*a*. Var. Parus albescens, Baird = No. 41*a*.
309. Carpodacus haemorrhous, Wagl. *Not North American?*
311. Chrysomitris stanleyi, Bonap. *Not North American.* [= C. barbata (Mol.).]
312. Chrysomitris yarrelli, Bonap. *Not North American.*
324. Leucosticte arctous, Bonap. No sufficient evidence of occurrence in North America.
329. Plectrophanes melanomus, Baird = No. 189.
365. Melospiza gouldii, Baird = No. 231*c*.
405. Trupialis militaris, Bonap. *Not North American.*

*There appears to be but a single race inhabiting North America.

†While there is undoubtedly a very appreciable difference between specimens of *M. varia* from the West Indies and those from the *interior* of Eastern North America in the length of the bill, it is the small-billed form which should receive a new name, since Linnæus's name *varia* was based upon the bird of the South Atlantic States and West Indies. If to be regarded as separable, the name *borealis*, Nutt., may be applied to the western birds.

Catalogue No.

424. CORVUS CACALOTL, Wagl. = No. 280.
470. LAGOPUS AMERICANUS, Aud. = No. 475.
482. DEMIEGRETTA PEALII, Baird = No. 491, *white phase.*
486*a*. HERODIAS EGRETTA v. CALIFORNICA = No. 489.
488. ARDEA WURDEMANNII, Baird = No. 486, *colored phase.*
494. BUTORIDES BRUNNESCENS, Baird. *Not North American.*
514. HAEMATOPUS ATER, Vieillot. *Not North American.*
566. ANSER FRONTALIS, Baird = No. 593*a*, *young.*
603. PELIONETTA TROWBRIDGII, Baird = No. 633.
605. OIDEMIA BIMACULATA, Baird = No. 632, *young.*
630. DIOMEDEA EXULANS, Linn. *Not North American.*
659. LARUS CHALCOPTERUS, Lawr. = No. 662.
665. LARUS SUCKLEYI, Lawr. = No. 670, *young.*
669. CHROICOCEPHALUS CUCULLATUS, Br. = No. 674, *young, second year.*
671. CHROICOCEPHALUS MINUTUS, Bruch. *Not North American.*
673. RISSA SEPTENTRIONALIS, Lawr. = No. 670, *adult.*
675. RISSA NIVEA, Bruch = No. 659.
677. PAGOPHILA BRACHYTARSI, Hölb. = No. 657.
686. STERNA HAVELLI, Aud. = No. 685, *winter plumage.*
693. STERNA PIKEI, Lawr. = No. 687, *young.*
703. PODICEPS CRISTATUS, Lath. *Not North American?*
703*a*. PODICEPS COOPERI, Lawr. = No. 731, *young.*
716. SAGMATORHINA LABRADORIA, Cas. = No. 745, *young.*
718. CERORHINA SUCKLEYI, Cassin = No. 746, *young.*
720. PHALERIS TETRACULA, Stephens = No. 748, *winter dress.*
722. PHALERIS MICROCEROS, Brandt = No. 750, *summer dress.*
730. URIA RINGVIA, Brünnich = No. 763, *individual phase.*
733. BRACHYRHAMPHUS WRANGELII, Br. = No. 755, *winter dress.*

Seven of the above are included in Coues's "Check List of North American Birds" (1873), viz, numbers 88, 100, 309, 488, 563*a*, 603, 693, and 703; the equivalent numbers of the "Check List" being, respectively, 305, 274, 141*a*, 450, 480*a*, 518*a*, 568, and 609—some of them bearing a different name from that given in the Smithsonian catalogue. Besides the foregoing, there are given in the "Check List" the following untenable names:

146*a*. ÆGIOTHUS LINARIA (L.) Cab. *var.* FUSCESCENS, Cs. = No. 179, *midsummer dress.*
157*bis*. CENTRONYX OCHROCEPHALUS, Aiken = No. 191, *autumnal plumage.*
[187.] PASSER DOMESTICUS, Linn. *An introduced species.*
215*a*. ICTERUS SPURIUS (L.) Bp. *var.* AFFINIS, Lawr. Not separable from *I. spurius.*
[283.] AGYRTRIA LINNÆI (Bp.) ——. *Not North American.* [= *A. tobaci* (Gm.) Ell.]
374*a*. CHAMÆPELIA PASSERINA (L.) Sw. *var.* PALLESCENS, (Bd.) Cs. *Untenable race.*
445*ter* [appendix]. IBIS THALASSINUS, Ridg. = No. 504, *young.*

b. Species and races described or added to the North American fauna since 1859.*

6. *Turdus iliacus*, Linn.—*Cf.* REINHARDT, Ibis, 1861, 6. (Greenland; two examples.)
7*a*. MERULA MIGRATORIA PROPINQUA, Ridgw.—*Turdus migratorious propinquas*, Bull. Nutt. Orn. Club, ii. Jan. 1877, 9. (Western U. S.)
8. MERULA CONFINIS, Baird.—*Turdus confinis*, Review Am. B. i. 1864, 29. (Todos Santos, Cape St. Lucas.)
14. HARPORHYNCHUS CINEREUS, Xantus.—Proc. Philad. Acad. 1859, 298. (Cape St. Lucas.)
14*a*. HARPORHYNCHUS CINEREUS BENDIREI, Coues.—Am. Nat. vii. June, 1873, 330, fig. 69. (Tucson, Arizona; C. Bendire.)

* The new forms are in small capitals, the other additions in italics. In order to reduce the number of references to a minimum, only the original description, or the first North American record of a species is given. In some cases we have not been able to quote the first reference, but have done so whenever practicable.

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15*a*. HARPORHYNCHUS CURVIROSTRIS PALMERI, Ridgw.—*H. curvirostris*, var. *palmeri*, Ridgw. in Coues's Key, 1872, 351. (Arizona.)

18. HARPORHYNCHUS GRAYSONI, Baird.—*Cf.* LAWR. Ann. Lyc. N. Y. x. Feb. 1871, —. (Socorro I.)

20. *Cyanecula suecica* (Linn.) Brehm.—*Cf.* ADAMS, Ibis, 1878, 422. (St. Michael's, Alaska; seven examples.)

31. REGULUS OBSCURUS, Ridgw.—*R. calendula obscurus*, Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 184. (Guadalupe I., Lower California.)

33*a*. REGULUS SATRAPA OLIVACEUS, Baird.—*R. satrapa*, var. *olivaceus*, Baird, Review Am. Birds, i. July, 1864, 65 (in text). (Western United States.)

34. *Phylloscopus borealis* (Blas.) Dress.—*Phyllopneuste kennicotti*, Baird, Trans. Chicago Acad. i. 1869, 313, pl. 30, fig. 2. (St. Michael's, Alaska.)

44. *Parus cinctus*, Bodd.—*P. sibiricus* (Gm.) Ridgw. Bull. Nutt. Orn. Club, ii. Jan. 1878, 37. (St. Michael's, Alaska; L. M. Turner.)

46*a*. PARUS RUFESCENS NEGLECTUS, Ridgw.—*P. rufescens*, *β*, *neglectus*, Proc. U. S. Nat. Mus. i. Apr. 25, 1879, 485. (Coast California.)

57. CAMPYLORHYNCHUS AFFINIS, Xantus.—Proc. Philad. Acad. 1859, 298. (Cape St. Lucas.)

58*a*. SALPINCTES OBSOLETUS GUADALUPENSIS, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 185. (Guadalupe I., Lower California.)

59*a*. CATHERPES MEXICANUS CONSPERSUS, Ridgw.—*C. mexicanus*, var *conspersus*, Ridgw. Am. Nat. Oct. 1873, 602. (Middle Province of U. S.)

60*b*. THRYOTHORUS LUDOVICIANUS MIAMENSIS, Ridgw.—*T. ludovicianus* (Lath.) var. *miamensis*, Am. Nat. ix. Aug. 1875, 469. (Miami River, E. Florida.)

61*a*. THRYOMANES BEWICKI SPILURUS (Vig.) Baird.—Review Am. Birds, i. 1864, 126. (Pacific slope of United States.)

61*b*. THRYOMANES BEWICKI LEUCOGASTER, Baird.—Review Am. B. i. 1864, 127. (Southern border of U. S.)

62. THRYOMANES BREVICAUDA, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 186. (Guadalupe I., Lower California.)

64. TROGLODYTES INSULARIS, Baird.—*Cf.* LAWR. Ann. Lyc. N. Y. x. Feb. 1871, 3, (Socorro I.)

65*a*. ANORTHURA TROGLODYTES PACIFICUS, Baird.—*T. hyemalis*, var. *pacificus*, Review Am. B. i. 1864, 145. (Pacific coast U. S.)

66. ANORTHURA ALASCENSIS, Baird.—*Troglodytes alascensis*, Trans. Chicago Acad. i. 1869, 315, pl. 30, fig. 3. (St. George's Island, Alaska; W. H. Dall.)

67*a*. TELMATODYTES PALUSTRIS PALUDICOLA, Baird.—*Cistothorus palustris*, var. *paludicola*, Review Am. B. i. 1864, 148. (Pacific coast U. S.)

69. *Motacilla alba*, Linn.—*Cf.* REINHARDT, Ibis, 1861, 6. (Greenland.)

70. *Budytes flava* (Linn.) Gray.—*Cf.* BAIRD, Trans. Chicago Ac. i. 1869, 3, pl. 30, fig. 1. (St. Michael's, Alaska; Pease & Bannister.)

72. *Anthus pratensis* (Linn.) Bechst.—*Cf.* PAULSEN, ed. Hölboll, Faun. Grönl. 1846, 24; REINH. Ibis, 1861, 6 (Greenland); B. B. & R. Hist. N. Am. B. i. 1874, 173. (St. Michael's, Alaska.)

74*a*. *Miiotilta varia borealis* (Nutt.) Ridgw. [See p. 213, foot-note.]

80 HELMINTHOPHAGA LAWRENCEI, Herrick.—Proc. Philad. Acad. 1874, 220, pl. xv. (New Jersey.)

82. HELMINTHOPHAGA LEUCOBRONCHIALIS, Brewster.—Am. Sportsman, v. Oct., 1874; Bull. Nutt. Orn. Club, i. 1876, 1, plate. (Massachusetts.)

83. HELMINTHOPHAGA LUCIÆ, Cooper.—Proc. Calif. Acad. Sci. July, 1861, 120. (Ft. Mojave, California.)

86*a*. HELMINTHOPHAGA CELATA LUTESCENS, Ridgw.—*H. celata*, var. *lutescens*, Ridgw. Am. Jour. Sci. & Arts, third ser. iv. Dec. 1872, 457. (Pacific coast U. S.)

89. PARULA PITIAYUMI INSULARIS (Lawr.) Ridgw.—*Parula insularis*, LAWR. Ann. Lyc. N. Y. x. Feb. 1871. (Socorro I., N. W. Mexico.)

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89*a*. PARULA PITIAYUMI NIGRILORA, Coues.—*P. nigrilora*, Bull. U. S. Geol. & Geog Surv. Terr. iv. 1878, 11. (Hidalgo, Texas; G. B. Sennett.)

92. *Peucedramus olivaceus* (Giraud) Coues.—*Sylvia olivacea*, Giraud, Texan Birds, 1841, 14, pl. vii. fig. 2. ("Texas.")—*Dendræca olivacea*, HENSH. Am. Sportsman, v. 328, Feb. 20, 1875; Orn. Wheeler's Exp. 1875. 202. (S. Arizona.)

103*a*. DENDRŒCA DOMINICA ALBILORA, Baird.—*D. Dominica*, var. *albilora*, Am. Nat. vii. Oct. 1873, 605. (Mississippi Valley, south to Guatemala and Honduras.)

104. DENDRŒCA GRACIÆ, Coues.—*Cf.* BAIRD, Review Am. B. i. 1864, 210. (Ft. Whipple, Arizona; Coues.)

106. DENDRŒCA CHRYSOPARIA, Scl. & Salv.—*Cf.* BAIRD, Review Am. B. i. 1864, 185, foot-note. (San Antonio, Texas; Heermann.)

113*a*. DENDRŒCA PALMARUM HYPOCHRYSEA, Ridgw.—Bull. Nutt. Orn. Club, Nov. 1876, 84, 85. (Atlantic States.)

116*a*. SIURUS NÆVIUS NOTABILIS, Grinnell.—*Cf.* RIDGW. Proc. U. S. Nat. Mus. iii. March 27, 1880, 12. (Black Hills, Wyoming.)

125*a*. WILSONIA PUSILLA PILEOLATA (Pall.) Ridgw.—*Myiodioctes pusillus*, var. *pileolata*, RIDGW. Am. Jour. Sci. & Arts, iv. Dec. 1872, 457; Am. Nat. vii. Oct. 1873, 607. (Pacific coast N. Am.)

131. *Cardellina rubrifrons* (Giraud) Scl.—*Muscicapa rubrifrons*, Giraud, Texan Birds, 1841, pl. vii. fig. 1. ("Texas.")—*Cardellina rubrifrons*, Henshaw, Orn. Wheeler's Exp. 1875, 211. (Arizona.)

133. *Basileuterus culicivorus* (Licht.) Bp.—*Muscicapa brasicri*, Giraud, Texan Birds, 1841, pl. vi. fig. 2.

134. *Basileuterus bellii* (Giraud) Scl.—*Muscicapa belli*, Giraud, Texan Birds, 1841, pl. iv. fig. 1.

139*a*. VIREOSYLVIA GILVA SWAINSONI, Baird.—*Vireo swainsoni*, Baird, B. N. Am. 1858, 336, in text. (Pacific coast U. S.)

141*b*. LANIVIREO SOLITARIUS PLUMBEUS (Coues) Allen.—*Vireosylvia plumbea*, Coues, Proc. Philad. Acad. 1866, 73. (Ft. Whipple, Arizona.)

146. VIREO PUSILLUS, Coues.—Proc. Philad. Acad. 1866, 76. (Date Creek, Arizona.)

147. VIREO VICINIOR, Coues.—Proc. Philad. Acad. 1866, 75. (Ft. Whipple, Arizona.)

149*b*. LANIUS LUDOVICIANUS ROBUSTUS, Baird.—*Collurio Ludovicianus*, var. *robustus*, Am. Nat. vii. Oct. 1873, 608. (California?)

164*a*. PYRANGA ÆSTIVA COOPERI, Ridgw.—*Pyranga cooperi*, Proc. Philad. Acad. 1869, 130. (S. W. United States.)

167. PYRRHULA CASSINI, Baird.—*P. coccinea*, var. *cassini*, Trans. Chicago Acad. i. 1869, 316, pl. 29, fig. 1. (Nulato, Alaska; W. H. Dall.)

170*a*. *Carpodacus frontalis rhodocolpus* (Cabanis.) Ridgw.—*Cf.* Ridgw. Am. Jour. Sci. & Arts, v. Jan. 1873, 39. (Coast of California.)

171. CARPODACUS AMPLUS, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 187. (Guadalupe I., Lower Cal.; E. Palmer.)

175*a*. LEUCOSTICTE TEPHROCOTIS LITTORALIS (Baird) Ridgw.—*L. littoralis*, Baird, Trans. Chicago Acad. i. 1869, 318, pl. 28, fig. 1. (Sitka, Alaska.)

176. LEUCOSTICTE ATRATA, Ridgw.—Am. Sportsman, July 18, 1874, 241. (Colorado; C. A. Aiken.)

177. LEUCOSTICTE AUSTRALIS, Allen.—*L. tephrocotis*, var. *australis*, Allen. *Cf.* RIDGW. Bull. Essex Inst. v. Nov. 1873, 189. (Mt. Lincoln, Colorado.)

178*a*. ÆGIOTHUS CANESCENS EXILIPES (Coues) Ridgw.—*Ægiothus exilipes*, COUES, Proc. Philad. Acad. Nov. 1861, 385. (Arctic America.)

179*a*. *Ægiothus linaria holbölli* (Brehm) Ridgw.—*Linaria holbölli*, BREHM, Vög. Deutschl.

180. ÆGIOTHUS BREWSTERI, Ridgw.—*Ægiothus* (*flavirostris* var.) *brewsterii*, Ridgw. Am. Nat. July, 1872, 433. (Waltham, Mass.)

182*a*. ASTRAGALINUS PSALTRIA ARIZONÆ (Coues) Ridgw.—*C. mexicana*, var. *arizonæ*, Coues, Proc. Philad. Acad. 1866, 82. (Ft. Whipple, Arizona.)

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192. PASSERCULUS PRINCEPS, Maynard.—Am. Nat. vi. 1872, 637. (Ipswich, Mass.)

195. PASSERCULUS GUTTATUS, Lawr.—Am. Lyc. N. Y. viii. 1867, 473 (Cape St. Lucas). *Cf.* COOPER, Orn. Cal. i. 1870, 185.

197*a*. *Poaecetes gramineus confinis*. Baird.—*P. gramineus*, var. *confinis*, Baird, B. N. Am. 1858, 448, in text.. (Western U. S.)

198*a*. COTURNICULUS PASSERINUS PERPALLIDUS, Ridgw.—*C. passerinus*, var. *perpallidus*, Ridgw. in Coues's "Key", 1872, 137. (Western U. S.)

201*a*. AMMODROMUS CAUDACUTUS NELSONI. Allen.—Proc. Boston Soc. xvii. March, 1875, 93. (N. E. Illinois.)

203. AMMODROMUS NIGRESCENS, Ridgw.—*A. maritimus*, var. *nigrescens*, Ridgw. Bull. Essex Inst. Dec. 1873, 198. (Indian R., Florida.)

204*a*. *Chondestes grammica strigatus* (Sw.) Ridgw.

Mr. H. K. Coale, of Chicago, Ill., has lately called my attention to certain differences between eastern (typical) and western specimens of this species, which, upon examination of a large series, I find to be quite constant and sufficiently appreciable to warrant the recognition of a western race. Western birds being exactly like those from Mexico in those points in which they differ from eastern specimens, Swainson's name *strigatus* (*Chondestes strigatus*, Philos. Jour. i. 1827, 435), based upon the Mexican bird, is available for the western and southern race.

207*a*. ZONOTRICHIA GAMBELI INTERMEDIA, Ridgw.—*Z. leucophrys*, var. *intermedia*, RIDGW. Bull. Essex Inst. Dec. 1873, 198. (Middle Province of U. S., north to Alaska.)

211*a*. SPIZELLA SOCIALIS ARIZONÆ, Coues.—*S. socialis*, var. *arizonæ*, COUES, Key, 1872, 143. (Ft. Whipple, Arizona.)

216. JUNCO AIKENI, Ridgw.—*J. hyemalis*, var. *Aikeni*, RIDGW. Am. Nat. Oct. 1873, 612, 614. (Mts. of Colorado; C. E. Aiken.)

219. JUNCO ANNECTENS, Baird.—Orn. Cal. i. 1870, 564. (Rocky Mts., Ft. Bridger to Arizona and New Mexico.)

223. JUNCO INSULARIS, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 188. (Guadalupe I., Lower Cal.; E. Palmer.)

225*a*. AMPHISPIZA BELLII NEVADENSIS, Ridgw.—*Poospiza bellii*, var. *nevadensis*, Ridgw. Bull. Essex Inst. Nov. 1873, 191. (Middle Province of U. S.)

226*a*. PEUCÆA ÆSTIVALIS ILLINOENSIS, Ridgw.—*P. illinoensis*, Bull. Nutt. Orn. Club, Oct. 1879, 219. (Texas to S. Illinois.)

227. PEUCÆA ARIZONÆ, Ridgw.—*P. æstivalis*, var. *Arizonæ*, RIDGW. Am. Nat. Oct. 1873, 615. (S. Arizona.)

229. PEUCÆA CARPALIS, Coues.—Am. Nat. vii. June, 1873, 322. (Tucson, Arizona; C. Bendire.)

230*a*. PEUCÆA RUFICEPS BOUCARDI (Sel.) Ridgw.—*Cf.* HENSHAW, Orn. Wheeler's Exp. 1874, 117. (S. Arizona and S. New Mexico.)

231*d*. *Melospiza fasciata guttata* (Nutt.) Ridgw.

This is the "*M. rufina*" of the old catalogue. The true *M. rufina* (Brandt) is a larger and darker form from Sitka, rediscovered since the publication of "Birds of North America" (1858).

231*e*. *Melospiza fasciata rufina* (Brandt) Ridgw.—*Cf.* B. B. & R. Hist. N. Am. B. ii. 1874, 29. (British Columbia to Sitka.)

232. *Melospiza cinerea* (Gmel.) Ridgw.—"*M. insignis*". BAIRD, Trans. Chicago Acad. i. 1869, 319, pl. 29. fig. 2. (Kadiak, Alaska; F. Bischoff.)

237*a*. PIPILO ERYTHROPHTHALMUS ALLENI, Coues.—*P. alleni*, COUES, Am. Nat. v. Aug. 1871, 366. (Florida.)

238*c*. PIPILO MACULATUS CONSOBRINUS, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. ii. No. 2, Apr. 1, 1876, 189. (Guadalupe I., Lower Cal.)

238*d*. PIPILO MACULATUS CARMANI (Lawr.) Ridgw.—*Pipilo carmani*, LAWR. Ann. Lyc. N. Y. x. 1871. 7. (Socorro I., N. W. Mexico.)

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240*a*. PIPILO FUSCUS ALBIGULA (Baird) Ridgw.—*P. albigula*, BAIRD, Proc. Philad. Acad. Nov. 1859, 305. (Cape St. Lucas.)

242*a*. CARDINALIS VIRGINIANUS IGNEUS, Baird.—*C. igneus*, BAIRD, Proc. Philad. Acad. Nov. 1859, 305. (Cape St. Lucas.)

253. *Phonipara zena* (Linn.) Bryant.—*Cf.* B. B. & R. Hist. N. Am. B. ii. 1874, 93. (Key West, Florida; H. W. Henshaw.)

258*a*. *Molothrus ater obscurus* (Gmel.) Coues.—*M. obscurus*, CASS. Proc. Philad. 1866, 18. (Lower California.)

259. *Molothrus æneus* (Wagl.) Cab.—*Cf.* MERRILL, Bull. Nutt. Orn. Club, i. July, 1876, 88. (Ft. Brown, Texas.)

263*a*. STURNELLA MAGNA MEXICANA (Scl.) Ridgw.—*Cf.* BREWER, Bull. Nutt. Orn. Club, iii. July, 1878, 152. (Ft. Brown, Texas; J. C. Merrill.)

276. *Quiscalus palustris* (Swains.) Cassin.—"*Q. major*", GAMBEL, Jour. Philad. Acad. i. 1847, 47. (Gulf of California.)*

278*b*. QUISCALUS VERSICOLOR ÆNEUS, Ridgw.—*Q. æneus*, Ridgw. Proc. Philad. Acad. 1869, 134. (Mississippi Valley, Hudson's Bay Terr., Maine, etc.)

[279.] *Sturnus vulgaris*, Linn.—*Cf.* REINHARDT, Ibis, 1861, 7. (Greenland.)

290*a*. CYANOCITTA STELLERI FRONTALIS, Ridgw.—*Cyanura stelleri*, var. *frontalis*, RIDGW. Am. Jour. Sci. & Arts, third ser. v. Jan. 1873, 41, 43. (Sierra Nevada, California.)

290*b*. CYANOCITTA STELLERI ANNECTENS, Baird.—*Cyanura stelleri*, var. *annectens*, Baird, in B. B. & R. Hist. N. Am. Birds, ii. 1874, 281, in text. (Northern Rocky Mts.)

297*a*. PERISOREUS CANADENSIS CAPITALIS, Baird.—*P. canadensis*, var. *capitalis*, BAIRD, Bull. Essex Inst. v. Nov. 1873, 193. (Rocky Mountains.)

297*b*. PERISOREUS CANADENSIS FUMIFRONS, Ridgw.—Proc. U. S. Nat. Mus. iii. March 27, 1880, 5. (Coast of Alaska.)

298. PERISOREUS OBSCURUS, Ridgw.—*P. canadensis*, var. *obscurus*, RIDGW. Bull. Essex Inst. Nov. 1873, 194. (Northwest coast of U. S.)

[299.] *Alauda arvensis*, Linn.—*Cf.* DRESSER & SHARPE, Birds Eur. pt. —, and B. B. & R. Hist. N. Am. B. ii. 1874, 136. (Greenland and Bermuda.)

300*a*. EREMOPHILA ALPESTRIS LEUCOLÆMA, Coues.—Birds N. W. 1874, 38. (Interior plains N. Am.)

300*b*. *Eremophila alpestris chrysolæma* (Wagl.) ——.—*E. cornuta*, var. *chrysolæma*, BAIRD, B.N. Am. 1858, 403, in text. (Southwestern U. S.)

308. *Pitangus derbianus* (Kaup) Scl.—*P. derbyanus*, COUES, The Country, July 13, 1878, 184. (Lomita, Texas; G. B. Sennett.)

309. *Myiozetetes texensis* (Giraud) Scl.—*Muscicapa texensis*, GIRAUD, Texan Birds, 1841, pl. 1. ("Texas.")

310. *Myiodinastes luteiventris*, Bonap.—*Cf.* HENSHAW, Orn. Wheeler's Exp. 1875, 346, pl. xiv. (S. Arizona.)

319. *Contopus pertinax*, Cab. & Hein.—*Cf.* COUES, Proc. Philad. Acad. 1866, 60. (Ft. Whipple, Arizona.)

329. *Empidonax fulvifrons* (Giraud) Scl.—*Muscicapa fulvifrons*, GIRAUD, Texan Birds, 1841, pl. ii. ("Texas.")

329*a*. EMPIDONAX FULVIFRONS PALLESCENS (Coues) Ridgw.—*Mitrephorus pallescens*, COUES, Proc. Philad. Acad. 1866, 63. (Ft. Whipple, Arizona.)

331. *Ornithion imberbe* (Scl.) Coues.—"*O. incanescens*", COUES, The Country, July 13, 1878, 184. (Lomita, Texas; G. B. Sennett.)

334. *Eugenes fulgens* (Sw.) Gould.—*Cf.* HENSHAW, Am. Nat. Apr. 1874, 241; Orn. Wheeler's Exp. 1875, 379. (Mt. Graham, Arizona.)

341. SELASPHORUS ALLENI, Henshaw.—Bull. Nutt. Orn. Club, ii. 1877, 54. (Coast of California.)

* The National Museum possesses an example of what is apparently this species from the coast of Louisiana.

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342. *Atthis heloisæ* (Less. & Del.) Rich.—*Cf.* Elliot, Illustr. Am. B. i. 1869, xxi. xii. plate. (El Paso, Texas; J. H. Clarke.)

343. *Stellula calliope*, Gould.—*Calothorax calliope*, Xantus, Proc. Philad. Acad. 1859, 190. (Ft. Tejon, Cal.)

344. *Calothorax lucifer* (Sw.) Gray.—"*Doricha enicura*", Hensh. Am. Sportsman, v. 328, Feb. 20, 1875; Orn. Wheeler's Exp. 1875, 381. *Cf.* Lawr. Bull. Nutt. Orn. Club, ii. Oct. 1877, 108. (Camp Bowie, Arizona.)

345. *Amazilia fuscicaudata* (Fras.) Ridgw.—"*Pyrrophæna riefferi*", Merrill, Bull. Nutt. Orn. Club, i. Oct. 1876, 88. (Ft. Brown, Texas.) *Cf.* Ridgw. Proc. U. S. Nat. Mus. i. 1878, 147 (synonymy and diagnosis).

346. *Amazilia yucatanensis* (Cabot) Gould.—"*A. cerviniventris*", Merrill, Bull. Nutt. Orn. Club, ii. Jan. 1877, 26. (Ft. Brown, Texas.) *Cf.* Ridgw. Proc. U. S. Nat. Mus. i. 1878, 148 (synonymy and diagnosis).

347. Basilinna xantusi (Lawr.) Elliot.—*Amazilia xantusi*, Lawr. Ann. N. Y. Lyc. vii. April, 1860, 109 (= ♀).—*Heliopædica castaneocauda*, Lawr. t. c. 145 (= ♂). (Cape St. Lucas.)

348. *Iache latirostris* (Sw.) Elliot.—*Circe latirostris*, Hensh. Am. Sportsman, v. Feb. 20, 1875; Orn. Wheeler's Exp. 1875, 380. (Chiracahua Mts., S. Arizona.)

357*b*. *Chordeiles popetue minor* (Cab.) Ridgw.—*Cf.* B. B & R. Hist. N. Am. B. iii. 1874, 520. (Miami, Florida; C. J. Maynard.)

360*a*. *Picus villosus leucomelas* (Bodd.) Ridgw.—*Picus leucomelas*, Bodd. Tabl. P. E. 1783 (ex. Pl. Enlum. 345, fig. 1 = ♀ ad.).

363*a*. Picus scalaris lucasanus (Xant.) Coues.—*P. lucasanus*, Xantus, Proc. Philad. Acad. 1859, 293, 302. (Cape. St. Lucas.)

365. *Picus stricklandi*, Malh.—*Cf.* Henshaw, Am. Sportsman, v. 328, Feb. 20, 1875; Orn. Wheeler's Exp. 1875, 389. (S. Arizona.)

377*a*. Melanerpes formicivorus angustifrons, Baird.—*M. formicivorus*, var. *angustifrons*, Baird, Orn. Cal. i. 1870, 405. (Cape St. Lucas.)

380. Colaptes rufipileus, Ridgw.—*C. mexicanus rufipileus*, Bull. Geog. & Geol. Surv. Terr. ii. No. 2, Apr. 1, 1876, 191. (Guadalupe I., Lower Cal.)

390. *Crotophaga sulcirostris*, Swains.—*Cf.* Coues, The Country, July 13, 1878, 184. (Lomita, Texas; G. B. Sennett.)

393. Conurus holochlorus brevipes, Baird.—*Conurus holochlorus*, var. *brevipes*, "Baird, MS.", Lawr. Ann. Lyc. N. Y. x. 1871, —. (Socorro I.)

397*a*. Strix nebulosa alleni, Ridgw.—Proc. U. S. Nat. Mus. iii. March 27, 1880, —. (Clearwater, S. Florida.)

398. Strix occidentalis (Xant.) Ridgw.—*Syrnium occidentale*, Xantus, Proc. Philad. Acad. 1859, 193. (Ft. Tejon, Cal.)

399*a*. *Ulula cinerea lapponica* (Retz.) Ridgw.—*Syrnium lapponicum*, Ridgw. Bull. Nutt. Orn. Club, iii. Jan. 1878, 37. (St. Michael's, Alaska; L. M. Turner.)

402*a*. Scops asio floridanus, Ridgw.—*S. asio*, var. *Floridanus*, Ridgw. Bull. Essex Inst. Dec. 1873, 200. (Florida.)

402*c*. Scops asio maxwellie, Ridgw.—*S. asio*, ε, *maxwellia*, Ridgw. Field & Forest, June, 1877, 210, 213. (Boulder Co., Colorado.)

402*d*. Scops asio kennicottii, (Elliot) Coues.—*S. Kennicottii*, Elliot, Proc. Philad. Acad. 1867, 69; Illustr. Am. B. 1869, pl. 11. (Sitka, Alaska; F. Bischoff.)

403. *Scops trichopsis*, Wagl.—"*S. asio*, var. *maccalli*", B. B. & R. Hist. N. Am. B. iii. 1874, 52. (New Mexico.)

404. *Scops flammeolus* (Licht.) Sel.—*Cf.* Cooper, Orn. Cal. i. 1870, 422. (Ft. Crook, N. California.)

405*a*. *Bubo virginianus subarcticus* (Hoy) Ridgw.—*Bubo subarcticus*, Hoy, Proc. Philad. Acad. vi. 1852, 211. (Wisconsin.) [="var. *arcticus*" of Hist. N. Am. B. iii. 1874, 64.]

405*b*. *Bubo virginianus arcticus* (Swains.) Cass.—*Bubo arcticus*, Swains. F. B. A. ii. 1831, 86, pl. 30. (Interior of fur countries.)

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405*c*. BUBO VIRGINIANUS SATURATUS, Ridgw.—Orn. 40th Parallel, 1877, 572, foot-note. (Northern coast N. Am.) [="var. *pacificus*" of Hist. N. Am. B. iii. 65.]

407*a*. *Surnia funerea ulula* (Linn.) Ridgw.—*Cf.* RIDGW. Bull. Nutt. Orn. Club, iii. Jan. 1878, 38. (St. Michael's, Alaska; L. M. Turner.)

408*a*. SPEOTYTO CUNICULARIA FLORIDANA, Ridgw.—*S. cunicularia*, var. *floridana*, RIDGW. Am. Sportsman, iv. No. 14, July 4, 1874, 216. (Sarasota Bay, Florida.)

410. *Glaucidium phalænoides* (Daud.) Scl. & Salv.—*G. ferrugineum* (Max.) COUES, Am. Nat. vi. 1872, 370. (Tucson, Arizona; C. Bendire.)

411. MICRATHENE WHITNEYI (Cooper) Coues.—*Athene whitneyi*, COOPER, Proc. Cal. Acad. Sci. ii. 1863, 118. (Ft. Mojave, S. E. California.)

412*b*. *Hierofalco gyrfalco sacer* (Forst.) Ridgw.—*F. sacer*, FORSTER, Philos. Trans. lxii. 1772, 383, 423. (Hudson's Bay Terr.)

412*c*. *Hierofalco sacer obsoletus* (Gm.) Ridgw.—*Falco obsoletus*, Gmel. S. N. i. 1788, 268. (Hudson's Bay Terr.)

414*a*. FALCO PEREGRINUS PEALEI, Ridgw.—*F. communis*, var. *Pealei*, RIDGW. Bull. Essex Inst. Dec. 1873, 201. (Northwest coast N. Am.)

416. *Æsalon regulus* (Pall.) Blyth.—*Falco æsalon* NEWTON, Man. Nat. Hist. Greenl. 1875, p. 96. (At sea, near Greenland, lat. 57° 41′ N., long. 35° 23′ W.)

417*a*. ÆSALON COLUMBARIUS SUCKLEYI, Ridgw.—*Falco columbarius*, var. *Suckleyi*, RIDGW. Bull. Essex Inst. v. Dec. 1873, 201. (Northwest coast N. Am.)

418. ÆSALON RICHARDSONII, Ridgw.—*Falco* (*Hypotriorchis*) *richardsonii*, RIDGW. Proc. Philad. Acad. Dec. 1870, 145. (Interior of North America.)

421. *Tinnunculus sparverioides* (Vig.) Gray. (Florida.)*

422. *Tinnunculus alaudarius* (Gm.) Gray.—*Cf.* NEWTON, Man. Nat. Hist. Greenl. 1875, 96. (Off Cape Farewell, Greenland.)

424. POLYBORUS LUTOSUS, Ridgw.—Bull. U. S. Geol. & Geog. Surv. Terr. No. 6, 2d ser. Feb. 8, 1876, 459. (Guadalupe I., Lower California.)

433*a*. ASTUR ATRICAPILLUS STRIATULUS, Ridgw.—*A. palumbarius*, var. *striatulus*, Ridgw. in Hist. N. Am. B. iii. 1874, 240. (Western N. Am.)

435. *Buteo vulgaris*, Leach.—*Cf.* MAYNARD, Bull. Nutt. Orn. Club, i. No. 1, April, 1876, 2–6. (Pawpaw, Mich.)

436*a*. BUTEO BOREALIS KRIDERI.—"*B. borealis*, variety *kriderii*," Hoopes, Proc. Philad. Acad. 1873, 238, pl. v. (=juv.; Winnebago Co., Iowa.)

436*c*. BUTEO BOREALIS LUCASANUS, Ridgw.—*B. borealis*, var. *lucasanus*, Hist. N. Am. B. iii. 1874, 258, 285. (Cape St. Lucas.)

436*d*. BUTEO BOREALIS SOCORROENSIS.

In the "Proceedings" of the Boston Society of Natural History, 1871, p. 42, Mr. Lawrence refers to a "*Buteo borealis*, var. *montanus*, Nutt." as being very abundant on the island of Socorro, where it is the only species of hawk to be found, and where it is a "constant resident, rearing its young, and subsisting entirely on land crabs", etc. In the same paper, p. 10, Mr. Lawrence applies the same name to a hawk occurring abundantly on the Tres Marias Islands, and there subsisting "entirely upon the Iguana lizard and rabbits." In "History of North American Birds", vol. iii, p. 285 (1874), I referred the Tres Marias bird to *Buteo borealis* var *costaricensis*, and described our only specimen from that locality as the young of that form, although I had not, from want of specimens, been able to compare it with the corresponding age of the Central American bird. I now have strong doubts as to its being the same as *B. costaricensis*, while as to the hawk found on Socorro I regard it quite certain that it is, like the Caracara of Guadalupe (*Polyborus lutosus*), a species or race peculiar to that remote island, the birds of which are for the most part entirely local. I therefore propose to name, provisionally, the Socorro Hawk *B. borealis socorroensis*.

440. *Buteo abbreviatus*, Cabanis, in Schomb. Guiana, iii. 1848, 739.—"*B. zonocercus*, Scl.", COOPER, Orn. Cal. i. 1870, 479. (Coast of California, near San Diego.)

*There is a male of this species in my collection said to have been obtained in Florida. It was found with a collection of Florida birds, forming part of a dealer's stock, and was evidently the same "make" of skin as the rest of the lot.

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441. *Buteo albicaudatus* (Vieill.)—*B. albocaudatus*, Coues, The Country, i. 184, July 13, 1878. (Lomita, Texas; G. B. Sennett). *Cf.* Ridgw. Proc. U. S. Nat., Mus. i. Oct. 2, 1878, 154 (synonymy and descriptions).

444. *Urubitinga anthracina* (Licht.) Nitzsch.—*Cf.* Henshaw, Am. Sportsman. v. 328, Feb. 20, 1875; Orn. Wheeler's Exp. 1875, 420. (Arizona.)

446. Onychotes gruberi, Ridgw.—Proc. Philad. Acad. Dec. 1870, 149. (California.)

450. *Thrasaëtus harpyia.*

According to Dr. Felix L. Oswald, in the *American Naturalist*, 1878, p. 151, a specimen of the Harpy Eagle was shot at the "delta of the Rio Grande", in Texas, by Professor S. B. Buckley, State geologist of Texas. A full account of the circumstance is given in Dr. Oswald's interesting article. I have seen somewhere a record of the occurrence of this species in Louisiana, but cannot now lay hand on the reference. According to my recollection, the record may be found in an old number of the "Proceedings" of the Philadelphia Academy of Sciences, or else of the Zoölogical Society of London.

461. Zenædura graysoni, Baird.—*Cf.* Lawrence, Ann. Lyc. N. Y. x. 1871, 17; Proc. Boston Soc. xiv. 1871, 299. (Socorro I.)

463. *Engyptila albifrons* (Bp.) Coues.—*Æchmoptila albifrons*, Coues, Bull. U. S. Geol. & Geog. Surv. Terr. iv. No. 1. 1878, 48 (South Texas); Ridgw. Proc. U. S. Nat. Mus. i. Oct. 1878, 158 (synonymy).

471*a*. Canace obscura fuliginosa, Ridgw.—*C. obscura*, var. *fuliginosa*, Ridgw. Bull. Essex Inst. Dec. 1873, 199. (Northwest coast, Oregon to Sitka.)

471*b*. *Canace obscura richardsonii* (Dougl.) Ridgw.—*Tetrao richardsonii*, "Sabine, MSS.", Dougl. Linn. Trans. xvi. 1829, 141.

477*a*. Cupidonia cupido pallidicincta, Ridgw.—*C. cupido*, var. *pallidicincta*, Ridgw. Bull. Essex Inst. Dec. 1873, 199. (Southwestern prairies.)

478*a*. *Pediœcetes phasianellus columbianus* (Ord) Ridgw.—*Phasianus columbianus*, Ord, Guthrie's Geog. 2d Am. ed. ii. 1815, 317.—*Pediœcetes columbianus*, Elliot, Pr. Ac. Nat. Sci. Philad. 1862, 403.

480*a*. Ortyx virginiana floridana, Coues.—*O. virginianus*, var. *floridanus*, Coues, Key, 1872, 237. (Florida; J. A. Allen.)

481*a*. *Oreortyx picta plumifera* (Gould) Ridgw.—*Ortyx plumifera*, Gould, P. Z. S. 1837, 42.

488. *Ardea cinerea*, Linn.—*Cf.* Reinh. Ibis, 1861, 9. (Greenland.)

499. *Mycteria americana*, Linn.—*Cf.* Coues, Check List, 1873, 135. (Austin, Texas.)

506. *Hæmatopus ostralegus*, Linn.—*Cf.* Reinh. Ibis, 1861, 9. (Greenland.)

512. *Vanellus cristatus* (Linn.) Meyer.—*Cf.* Reinh. Ibis, 1861, 9. (Greenland.)

514. *Charadrius pluvialis*, Linn.—*Cf.* Newton, Man. Nat. Hist. Greenl. 1875, 101. (Greenland.)

515*a*. *Charadrius dominicus fulvus* (Gmel.) Ridgw.—*C. fulvus*, Coues, Elliott's Prybilov Islands, 1875, 179; Birds N. W. 1874, 450, foot-note. (Prybilov Islands, Alaska.)

518. *Ægialitis hiaticula* (Linn.) Boie.—*Cf.* Newton, Man. Nat. Hist. Greenl. 1875, 101. (Greenland.)

519. *Ægialitis curonica* (Gmel.) Gray.—Introduced as *Æ. microrhynchus*, Ridgw., n. s., Am. Nat. viii. Feb. 1874, 109. ("San Francisco, Cal.")

520*a*. Ægialitis meloda circumcincta, Ridgw.—*Æ. melodus*, var. *circumcinctus*, Am. Nat. viii. Feb. 1874, 109. ("Plains between Missouri River and Rocky Mountains.")

524. *Scolopax rusticula*, Linn.—*Cf.* Baird, Am. Jour. Arts & Sciences, xli. May, 1866, 25. (Newfoundland.)

526. *Gallinago media*, Leach.—*Cf.* Reinh. Ibis, 1861, 11. (Greenland.)

531. Arquatella couesii, Ridgw.—Bull. Nutt. Orn. Club, July, 1880, 160. (Aleutian islands and contignous coast of Alaska.)

532. Arquatella ptilocnemis (Coues) Ridgw.—"*Tringa crassirostris*", Dall, Am. Nat. viii. 1873, 635 (St. Paul's I., Alaska).—*Tringa ptilocnemis*, Coues, Elliott's Prybilov Islands, 1875, foot-note.

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533. *Actodromas acuminata* (Horsf.) Ridgw.—Obtained at St. Michael's, Alaska, by Mr. E. W. Nelson, U. S. Signal Service.

The single example forwarded by Mr. Nelson is without date or exact locality, and I have been unable to get from him the desired information, my letter to him on the subject having doubtless miscarried. The species is so important an addition to the fauna, however, that it cannot be overlooked in the present connection, reluctant as we are to publish a note of its occurrence without being able to furnish those data from the pen of Mr. Nelson himself, which would do him full justice, as the first discoverer of this Indian species on this continent.

537. ACTODROMAS BAIRDII, Coues.—Proc. Philad. Acad. 1861, 194. (Arctic America.)

539. *Pelidna alpina* (Linn.) Boie.—*Tringa alpina*, NEWTON, Man. Nat. Hist. Greenl. 1875, 103. (Greenland.)

541*a*. EREUNETES PUSILLUS OCCIDENTALIS (Lawr.) Coues.—*E. occidentalis*, LAWR. Proc. Philad. Acad. 1864, 107. (Pacific coast U. S.)

544. *Limosa lapponica novæ-zealandiæ*, Gray.—*L. uropygialis*, BAIRD, Trans. Chicago Acad. i. 1869, 320, pl. 32. (Alaska.)

546. *Limosa ægocephala* (Linn.) Leach.—*Cf.* REINH. Ibis, 1861, 11. (Greenland.)

551. *Rhyacophilus ochropus* (Linn.) Ridgw.—*Cf.* BREWER, Bull. Nutt. Orn. Club, iii. Jan. 1878, 49. (Nova Scotia.)

561. *Numenius phæopus* (Linn.) Lath.—*Cf.* REINH. Ibis, 1861, 10. (Greenland.)

562. *Numenius tahitiensis* (Gmel.) Cass.—"*Numenius femoralis*, PEALE", RIDGW. Am. Nat. July, 1874, 435. (Kadiak, Alaska; F. Bischoff.)

568. *Parra gymnostoma*, Wagl.—*Cf.* MERRILL, Bull. Nutt. Orn. Club, i. Nov. 1876, 88 (Ft. Brown, Texas); RIDGW. Proc. U. S. Nat. Mus. i. 1878, 167, pl. iii. (synonymy and descriptions).

570. RALLUS OBSOLETUS, Ridgw.—*R. elegans*, var. *obsoletus*, RIDGW. Am. Nat. viii. Feb. 1874, 111. (Coast California.)

571*a*. RALLUS LONGIROSTRIS SATURATUS, Hensh.—*Cf.* RIDGW. Bull. Nutt. Orn. Club, July, 1880, 140. (Louisiana.)

573. *Porzana maruetta* (Leach) Bp.—"*Ortygometra porzana* (Linn.)", REINH. Ibis, 1861, 12. (Greenland.)

576*a*. PORZANA JAMAICENSIS COTURNICULUS, Baird.—*P. jamaicensis*, var. *coturniculus*, BAIRD, Am. Nat. viii. Feb. 1874, 111. (Farallone Islands, California.)

586. *Olor cygnus* (Linn.) Bp.—"*Cygnus ferus*, RAY", REINH. Ibis, 1861, 13. (Greenland.)

587. *Olor minor* (Pall.) Bp.—"*Cygnus bewickii*", Sw. & Rich. F. B. A. ii. 1831, 465. ("Igloolik [Arctic America], lat. 66°, June 19, 1823." Said to breed "on the sea-coast within the Arctic circle." The description, from specimens killed at locality quoted above, is of the true *O. minor*, or Bewick's Swan.)

592. CHEN ROSSII (Baird) Ridgw.—*Anser rossii*, "BAIRD, MSS.", Cass. Proc. Philad. Acad. 1861, 73. (Arctic America.)

593. *Anser albifrons* (Gm.) ——.—*Cf.* REINH. Ibis, 1861, 12. (Greenland.)

603. ANAS FULVIGULA, Ridgw.—*A. obscura*, var. *fulvigula*, Am. Nat. viii. Feb. 1874, 111. (Florida.)

627*a*. SOMATERIA MOLLISSIMA DRESSERI (Sharpe) Coues.—*S. dresseri*, SHARPE, Ann. Mag. N. H. July, 1871, 51, figs. 1, 2.

This bird has been called by all American writers *S. mollissima*. The true Eider, however, has only lately been detected in America, it being the form found by Mr. Kumlien breeding abundantly on the west side of Cumberland Gulf.

631. *Melanetta fusca* (Linn.)—*Cf.* REINHARDT, Vid. Medd. Nat. För. Kjobenhavn, 1879, 1. (South Greenland.)

646*a*. *Phalacrocorax violaceus resplendens* (Aud.) Ridgw.—*Graculus bairdii*, "GRUBER, MSS.", COOPER, Proc. Philad. Acad. Jan. 1865, 5. (Farallone Islands.)

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647. *Phalacrocorax bicristatus*, Pallas.—"*Graculus bicristatus*, Pallas", Baird, Trans. Chicago Acad. i. 1869, —, pl. 33. (St. George's I., Alaska; W. H. Dall.)

651. *Sula cyanops*, Sundev.—*Cf.* Lawr. Proc. Boston Soc. xiv. 1871, 302. (Socorro I.)

653. *Sula piscator* (Linn.) ——.—*Cf.* Lawr. Proc. Boston Soc. xiv. 1872, 303. (Socorro I.)

655. *Phaëthon æthereus*, Linn.—*Cf.* Freke, Sci. Proc. Roy. Dubl. Soc. 1879.* (Banks of Newfoundland, August, 1876.)

665. *Larus affinis*, Reinh.—Vid. Medd. Nat. För. Kjobenhavn, 1853, 78. (Greenland.)

666*a*. Larus argentatus smithsonianus, Coues.—*L. smithsonianus*, Coues, Proc. Philad. Acad. 1862, 296. (North America.)

667. *Larus cachinnans*, Pall.—"*Larus borealis*, Brandt", Baird, Trans. Chicago Acad. i. 1869, 305. (St. Michael's, Alaska; Bischoff.)

671. *Larus canus*, Linn.—*Cf.* Brewer, Bull. Nutt. Orn. Club, iii. Jan. 1878, 50. (Labrador; Coues.)

689. Sterna aleutica, Baird.—Trans. Chicago Acad. i. 1869, 321, pl. 31, fig. 1. (Kadiak, Alaska; Bischoff.)

692. *Sterna anæstheta*, Scopoli.—*Sterna* (*Haliplana*) *anosthata*, Coues, Key, 1872, 322. (Florida.)

694. *Hydrochelidon leucoptera* (Meisn.) Boie.—*Cf.* Brewer, Am. Nat. March, 1874, 188. (Lake Koshkonong, Wisconsin; T. Kumlien.)

705*b*. Fulmarus glacialis rodgersi (Cass.) Coues.—*F. rodgersii*, Cass. Proc. Philad. Acad, 1862, 290 (North Pacific); Baird, Trans. Chicago Acad. i. 1869, 323, pl. 34, fig. 1 (St. Georges I., Alaska).

710. Puffinus creatopus, Cooper.—*Cf.* Coues, Proc. Philad. Acad. 1864, 131. (Coast California.)

713. *Puffinus garia* (Forst.) Finsch.—*P. opisthomelas*, Coues, Proc. Philad. Acad. 1864, 139. (Coast California.)

715. *Puffinus griseus* (Gmel.) Finsch.—*Nectris amaurosoma*, Coues, Proc. Philad. Acad. 1864, 124.

716. *Puffinus tenuirostris*, Temm.—*Nectris tenuirostris*, Dall & Bannister, Trans. Chicago Acad. i. 1869, 303. (Kotzbue Sound.)

718. *Æstrelata bulweri* (Jard.) Gigl. & Salvad.—*Thalassidroma bulweri*, Newton, Man. Nat. Hist. Greenl. 1875, 108.

720. Halocyptena microsoma, Coues.—Proc. Philad. Acad. 1864, 78. (Coast of California.

725. Cymochorea homochroa, Coues.—Proc. Philad. Acad. 1864, 77. (Coast of California.)

737. *Colymbus adamsi*, Gray.—Proc. Zoöl. Soc. Lond. 1859, 167. (Alaska.)

763*a*. Lomvia troile californica (Bryant) Coues.—*Cataractes californicus*, Bryant, Proc. Boston Soc. N. H. (Farallone Islands.)

764. *Lomvia arra*, Pall.—*Cephus arra*, Pall. Zoög. Rosso-As. ii. 1811, 347. (Alaska.)

c. List of North American genera which have been described or added to the fauna since 1859, together with those whose names or orthography have been changed since that date.

1. Hylocichla, Baird, Review Am. B. i. June 2, 1864, 12 (type, *Turdus mustelinus*, Gmel.).

The *Turdus musicus* of Europe is a strict congener of *T. mustelinus*, and it is possible that some generic name may have been based upon it previous to the imposition of *Hylocichla*.

6. *Turdus*, Linnæus, S. N. ed. 10. i. 1758, 168 (type, *T. viscivorus*, Linn.).

The *T. iliacus*, although not agreeing strictly with *T. viscivorus* in details of external structure, is still hardly different enough to entitle it to separation. It is much more like true *Turdus* than either of the other American genera (*Hylocichla* and *Mervla*).

* We cannot cite the page of the "Proceedings", but the record appears on p. 44 of separate pamphlet entitled "A Comparative List of Birds found in Europe and North America. By Percy Evans Freke."

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7. *Merula*, "Leach, 1816" (type, *Turdus merula*, Linn.).

The proper generic division of the typical thrushes is a matter of considerable difficulty. Of the North American generic groups, *Hyloeichla* and *Hesperocichla* of Baird are sufficiently isolated, the latter being represented by a single species only, the former by all the smaller spotted species, besides the Song Thrush (*Turdus musicus*, Linn.) of Europe. I find no American species agreeing at all closely with *Turdus viscivorus* (the type of *Turdus*) in form; and a generic division based wholly or chiefly on coloration being out of the question, I find no other alternative than to adopt for the Robin and other American thrushes usually referred to "*Planesticus*" of Bonaparte (1854) the name *Merula*, Leach (1816), there being no essential difference in form between the type of the latter, *Turdus merula*, Linn. (*Merula nigra*, Leach) and our Robin (*T. migratorius*, Linn.); while a number of the Neotropical species exhibit the same sexual difference in coloration as *T. merula*. I would also refer to *Merula* the following Old World forms: *Turdus pilaris*, Linn. (type of *Arceuthornis*, Kaup, 1829), *Turdus atrogularis*, Temm. (type of *Cichloides*, Kaup, 1829), *Turdus torquatus*, Linn. (type of *Thoracocincla*, Reich., 1850), with perhaps some others.

9. HESPEROCICHLA, Baird, Review Am. B. i. July, 1864, 32 (type, *Turdus nævius*, Gmel.).

12. *Galeoscoptes*, Cabanis, Mus. Hein. i. 1850, 82 (type, *Muscicapa carolinensis*, Linn.).

19. *Cinclus*, Bechstein, Gemein. Naturg. 1802 (type, *Sturnus cinclus*, Linn.). [*Cf.* BAIRD, Review Am. B. i. 1864, 59, foot-note.]

20. *Cyanecula*, Brehm, Vög. Deutschl. 1828 (type, *Motacilla suecica*, Linn.).

34. *Phylloscopus*, Boie, Isis, 1826, 792 (type ?)

50. AURIPARUS, Baird, Review Am. B. i. Aug. 1864, 85 (type, *Ægithalus flaviceps*, Sundev.).

61. THRYOMANES, Sclater, Cat. Am. B. 1861, 22 (type, *Troglodytes bewicki*, Aud.).

65. *Anorthura*, Rennie, Montagu's Orn. Dict. 2d ed. 1831, 570 (type, *A. communis*, Rennie = *Motacilla troglodytes*, Linn.).

67. *Telmatodytes*, Cabanis, Mus. Hein. i. 1850, 78 (type, *Certhia palustris*, Wils.).

69. *Motacilla*, Linnæus, S. N. 1735 (type, *M. alba*, Linn.).

70. *Budytes*, Cuvier, Règ. An. i. 1817, 371 (type, *Motacilla flava*, L.).

76. *Helonaa.—Helinaia*, Audubon, Synop. 1839, 66 (type, *Sylvia swainsoni*, Aud.). [Orthography emended by AGASSIZ, Nomencl. 1847. *Cf.* NEWTON, P. Z. S. 1879, 552.]

90. PERISSOGLOSSA, Baird, Review Am. B. i. 1864, 180 (type, *Motacilla tigrina*, Gm.).

92. PEUCEDRAMUS, Coues, in Henshaw's Orn. Wheeler's Survey, 1875, 201 (type, *Sylvia olivacea*, Giraud).

115. *Siurus.—Cf.* COUES, Bull. Nutt. Orn. Club.

124. *Wilsonia*, Bonaparte, Comp. List. 1838, 23 (type, *Sylvia mitrata*, Aud.?). [*Cf.* COUES, Bull. Nutt. Orn. Club, April, 1880, 95.*]

131. *Cardellina*, "Dubus", Bonap. Consp. i. 1850, 312 (type, *Cardellina amicta*, Dubus = *Muscicapa rubrifrons*, Giraud).

132. ERGATICUS, Baird, Review Am. B. i. May, 1865, 264 (type, *Setophaga rubra*, Swains.).

133. *Basileuterus*, Cabanis, in Schomb. Guiana, iii. 1848, 666 (type, *Sylvia vermivora*, Vieill.).

135. *Vircosylvia*, Bonaparte, Comp. List. 1838, 26 (type, *Muscicapa olivacea*, Linn.).

140. LANIVIREO, Baird, Review Am. B. i. May 23, 1866, 345 (type, *Vireo flavifrons*, Vieill.?).

*It is exceedingly doubtful whether *Wilsonia*, Bp., should displace *Myiodioctes*, Aud. Bonaparte's name occurs first in a mere list, is used only as a heading for a subgeneric group, and is unaccompanied either by a diagnosis or an indication of type. Audubon, however, only a year later, in designating the same group of birds by the new generic term *Myiodioctes*, gave an excellent diagnosis of the generic characters. It appears to us that the slight difference of date in favor of Bonaparte's name is greatly overbalanced by the pains which Audubon took to duly characterize his genus, thus conforming to the requirements of nomenclatural laws, which Bonaparte failed to do.

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148. *Lanius*, Linnæus, S. N. ed. 10, 1758, 93 (type, *L. excubitor*, Linn.). [*Cf.* Coues, Birds Colorado Val. i. 1878, 539.]

153. *Petrochelidon*, Cabanis, Mus. Hein. i. 1850, 47 (type, *Hirundo melanogaster*, Sw. = *P. swainsoni*, Scl.).

155. *Tachycineta*, Cabanis, Mus. Hein. i. 1850, 48 (type, *Hirundo thalassina*, Sw.).

157. *Cotile*, Boie.—*Cf.* Wharton, The Ibis, Oct. 1879; Coues, Bull. Nutt. Orn. Club, April, 1880, 96.

158. *Stelgidopteryx*, Baird, B. N. Am. 1858, 312, in text (type, *Hirundo serripennis*, Aud.).

167. *Pyrrhula*, Brisson, Orn. 1760 (type, *Loxia pyrrhula*, Linn. = *Emberiza coccinea*, Sandb.).

172. *Loxia*, Linnæus, S. N. ed. 10, i. 1758, 171 (type, *L. curvirostra*, Linn.).

181. *Astragalinus*, Cabanis, Mus. Hein. i. 1851, 159 (type, *Fringilla tristis*, Linn.).

187. *Centrophanes*, Kaup, Ent. Gesch. Eur. Thierw. 1829 (type, *Emberiza lapponica*, Linn.).

190. *Rhynchophanes*, Baird, B. N. Am. 1858, 432, in text (type, *Plectrophanes maccowni*, Lawr.).

224. *Amphispiza*, Coues, Birds N. W. 1874, 234 (type, *Emberiza bilineata*, Cass.).

244. Zamelodia, Coues, Bull. Nutt. Orn. Club, v. April, 1880, 98 (type, *Loxia ludoviciana*, Linn.).

247. *Passerina*, Vieillot, Analyse, 1816, 30 (type, *Tanagra cyanea*, Linn.). [*Cf.* Coues, l. c. 96.]

253. *Phonipara*, Bonaparte, Consp. i. 1850, 494 (type, *Loxia canora*, Gmel.).

254. *Spiza*, Bonaparte, Obs. Wils. Orn. 1825 (part); Specc. Comp. 1827, 47 (type, *Emberiza americana*, Gmel.!). [See anteâ, 3.]

279. *Sturnus*, Linnæus, S. N. ed. 10, i. 1758, 167 (type, *S. vulgaris*, Linn.).

285. *Gymnocitta*.—*Cf.* Coues, Bull. Nutt. Orn. Club, April, 1880, 98.

289. *Cyanocitta*, Strickland, Ann. Mag. N. H. xv. 1845, 260 (type, *Corvus cristatus*, Linn.). [*Cf.* Coues, Bull. Nutt. Orn. Club, April, 1880, 98.]

291. *Aphelocoma*, Cabanis, Mus. Hein. i. 1851, 221 (type, *Garrulus californicus*, Vig.).

299. *Alauda*, Linnæus, S. N. ed. 10, i. 1758, 165 (type, *A. arvensis*, Linn.).

308. *Pitangus*, Swainson, Zool. Jour. iii. 1827, 165 (type ?).

309. *Myiozetetes*, Sclater, ex. Schiff.—*Myiozeta*, "Schiff.", Bp. Compt. Rend. xxxviii. 1854, — (type ?).—*Myiozetetes*, Scl. P. Z. S. 1859, 46.

310. *Myiodinastes*, Bonaparte, Compt. Rend. xxxviii. 1854, 657 (type ?).

331. *Ornithion*, Hartlaub, Jour. für Orn. 1853, 35 (type, *O. inerme*, Hartl.).

332. *Pachyrhamphus*, "Gray, 1838" (type, *Pachyrhynchus curieri*, Spix = *Tityra viridis*, Vieill.).

333. Hadrostomus, Cabanis, Mus. Hein. ii. Oct. 24, 1859, 84 (type, *Tityra atricapilla*, Vieill.).

334. *Eugenes*, Gould, Mon. Troch. pt. xii. 1856 (type, *Trochilus fulgens*, Swains.).

337. Calypte, Gould, Introd. Troch. oct. ed. 1861, 87 (type, *Ornismya costæ*, Bourc.).

342. *Atthis*, Reichenbach, Anfz. der Colib. 1853, 12 (type, *Ornismya heloisæ*, Less. & Delattr.).

343. *Stellula*, Gould, Introd. Troch. oct. ed. 1861, 90 (type, *Trochilus calliope*, Gould).

344. *Calothorax*, Gray, Gen. B. 1840, 13 (type, *Cynanthus lucifer*, Swains.).

345. *Amazilia*, Lesson.—*Amazilis*, Less. Ind. Gen. et Syn. du Gen. Troch. 1832, p. xxvii. (type, *Orthorhynchus amazili*, Less.).—*Amazilia*, Reich. Av. Syst. Nat. 1849, pl. 39.

347. *Basilinna*, Boie, Isis, 1831, 546 (type, *Trochilus leucotis*, Vieill.).

348. Iache, Elliot, Synop. Troch. March, 1879, 234 (type, *Cynanthus latirostris*, Swains.).

349. *Cypselus*, Illiger, Prodr. 1811, 229 (type, *C. apus*, Linn.). [*Cf.* anteâ, 6.]

350. *Cypseloides*, Strenbel, Isis, 1848, 366 (type, *Cypselus fumigatus*, Natt.). [*Cf.* Sclater, P. Z. S. 1865, 614.]

354. *Caprimulgus*, Linnæus, S. N. ed. 10, i. 1858, 193 (type, *C. europæus*, Linn.). [*Cf* Proc. U. S. Nat. Mus. i. 1878, 143; ib. iii. 1880, 5.]

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355. PHALÆNOPTILUS, Ridgway, Proc. U. S. Nat. Mus. iii. March 27, 1880, 5 (type, *Caprimulgus nuttalli*, Aud.).

366. *Xenopicus*, Baird, B. N. Am. 1858, 83, in text (type, *Leuconerpes albolarratus*, Cass.).

394. *Aluco*, Fleming, Phil. Zool. ii. 1828, 236 (type, *Strix flammea*, Linn.). [*Cf.* NEWTON, Yarrell's Brit. B. ed. 4, i. 150; Ibis, v. 94–105.]

395. *Asio*, Brisson, Orn. i. 1766, 28 (type, *Strix otus*, Linn.).

397. *Strix*, Linnæus, S. N. ed. 10, i. 1758, 92 (type, *S. stridula*, Linn.). [*Cf.* NEWTON, Ibis, ser. iii. vi. 94–105.]

399. *Ulula*, Cuvier, Règ. An. i. 1817, 329 (type, *Strix uralensis*, Pall.).

In *History of North American Birds* (vol. iii, pp. 28–30) I adopted for the Great Gray Owl (*Strix cinerea*, Gmel.) the subgeneric name *Scotiaptex*, Swains., based upon this species, and on p. 8 of these Proceedings raised the same name to generic rank. A subsequent examination of *Strix uralensis*, Pallas, however, reveals the fact that the latter is strictly congeneric with *S. cinerea* and *S. lapponica*, and having been made the type of a genus *Ulula* by Cuvier, in 1817, the latter name must take precedence over *Scotiaptex*, which was not founded until 1831.

408. *Speotyto*, Gloger, Handb. Naturg. 1842, 226 (type, *Strix cunicularia*, Mol.).

411. MICRATHENE, Coues, Proc. Philad. Acad. 1866, 51 (type, *Athene whitneyi*, Cooper.).

412. *Hierofalco*, Cuvier, Règ. An. i. 1817, 312 (type, *Falco candicans*, Gm.).

416. *Æsalon*, Kaup, Natürl. Syst. 1829, 40 (type, *Falco æsalon*, Gmel. = *F. regulus*, Pall.)

419. RHYNCHOFALCO, Ridgway, Proc. Boston Soc. 1873, 46 (type, *Falco femoralis*, Temm. = *F fusco-carulescens*, Vieill.).

426. *Elanoides*, Vieillot, Nouv. Dict. xxiv. 1818, 101 (type, *Falco furcatus*, Linn.).

434. ANTENOR, Ridgway, Proc. Boston Soc. Nat. Hist. May, 1873, 63 (type, *Falco unicinctus*, Temm.).

444. *Urubitinga*, Lesson, Rev. Zool. 1839, 132 (no type!); Lafr. in d'Orb. Dict. Hist. Nat. ii. 1842, 786 (type, *Falco urubitinga*, Gm. = *F. zonurus*, Shaw).

446. ONYCHOTES, Ridgway, Proc. Philad. Acad. Dec. 1870, 142 (type, *O. gruberi*, Ridgw.).

450. *Thrasaëtus*, Gray, Proc. Zool. Soc. Lond. 1837, 108 (type, *Falco harpyia*, Linn.).

451. *Haliaëtus*, Savigny.—This is the original and correct orthography. [*Cf.* GRAY, Handb. i. 1869, 16; COUES, Bull. Nutt. Orn. Club, Apr. 1880, —.]

453. PSEUDOGRYPHUS, Ridgway, in B. B. & R. Hist. N. Am. B. iii. Jan. 1874, 337, 338 (type, *Vultur californianus*, Shaw).

455. *Catharista*, Vieillot, Analyse, 1816, 21 (type, *Vultur urubu*, Vieill. = *V. atrata*, Bartr. *Cf.* RIDGW. Bull. Nutt. Orn. Club, April, 1880, 80).

463. ENGYPTILA, Sundevall, Met. Nat. Av. Disp. Tent. 1872, 156 (type, *Columba rufaxilla*, Rich. & Bern.).

467. GEOTRYGON, Gosse, Birds Jam. 1847, 316, foot-note (type, *G. sylvatica*, Gosse = *Columba cristata*, Temm.).

469. *Ortalis.*—*Cf.* WHARTON, The Ibis, Oct. 1879, 450. [= *Ortalida*, Merrem (false orthography).]

471. *Canace*, Reichenbach, Av. Syst. Nat. 1851 (type, *Tetrao canadensis*, Linn.).

491. DICHROMANASSA, Ridgway, Bull. U. S. Geol. & Geog. Surv. Terr. iv. No. 1, Feb. 5, 1878, 246 (type, *Ardea rufa*, Bodd.).

492. HYDRANASSA, Baird, B. N. Am. 1858, 660, in text (type, *Ardea ludoriciana*, Gmel. = *A. tricolor*, Müll.).

499. *Mycteria*, Linnæus, S. N. i. 1758, 140 (type, *M. americana*, Linn.).

501. *Eudocimus*, Wagler, Isis, 1832, 1232 (type, *Scolopax rubra*, Linn.). [*Cf.* ELLIOT, Ibis, 1877, 482.]

503. *Plegadis*, Kaup, Skizz. Ent. Gesch. 1829, 82 (type, *Tantalus falcinellus*, Linn.). [*Cf.* SCLATER & SALVIN, Ibis, 1878, 112.]

505. *Ajaja*, Reichenbach, Handb. 1851, p. xvi. (type, *Platalea ajaja*, Linn. = *P. rosea*, Briss.). [*Cf.* RIDGWAY, Proc. U. S. Nat. Mus. iii. 1880, 10.]

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512. *Vanellus*, Meyer, Vög. Deutschl. i. 1810, 10 (ex. Linn. 1735; type, *Tringa vanellus* Linn.).

516. *Oxyechus*, Reichenbach, Av. Syst. 1853, Introd. p. xviii. (type, *Charadrius vociferus*, Linn.).

522. *Ochthodromus*, Reichenbach, l. c. (type, *Charadrius wilsonius*, Ord).

523. PODASOCYS, Coues, Proc. Philad. Acad. 1866, 96 (type, *Charadrius montanus*, Towns.).

524. *Scolopax*, Linnæus, S. N. ed. 10, i. 1758, 145 (type, *S. rusticula*, Linn.).

530. *Arquatella*, Baird, B. N. Am. 1858, 717 (type, *Tringa maritima*, Brünn.).

533. *Actodromas*, Kaup, Sk. Ent. Eur. Thierw. 1829, 37 (type, *Tringa minuta*, Leisl.).

539. *Pelidna*, Cuvier, Règ. An. 1817, 490 (type, *Tringa alpina*, Linn.).

547. *Totanus*, Bechstein, Nat. Deutschl. 1803 (type, *Scolopax calidris*, Linn.).

554. *Machetes*, Cuvier, Règ. An. 1817 (type, *Tringa pugnax*, Linn.). [*Cf.* COUES, Bull. Nutt. Orn. Club, Apr. 1880, 100.]

555. *Bartramia*, Lesson, Traité Ois. 1831, 553 (type, *B. laticauda*, Less. = *Tringa longicauda*, Bechst.). [*Cf.* Coues, l. c.]

564. *Lobipes*, Cuvier, Règ. An. 1817 (type, *Tringa hyperborea*, Linn.).

565. *Steganopus*, Vieillot, Enc. Mèth. 1823 (type, *S. tricolor*, Vieill. = *Phalaropus wilsoni*, Sab.).

568. *Parra*, Linnæus, S. N. i. ed. 12, 1766, 259 (type, *P. jacana*, Linn.). [For generic characters and illustrations, see these Proceedings, vol. i. pp. 166, 167, pl. iii.]

578. *Ionornis*, Reichenbach, Av. Syst. 1853, 21 (type, *Fulica martinica*, Linn.).

586. *Olor*, Wagler, Isis, 1832, 1234 (type, *Cygnus musicus*, Bechst. = *Anas cygnus*, Linn.).

590. *Chen*, Boie, Isis, 1822 (type, *Anas hyperborea*, Pall.).

598. PHILACTE, Bannister, Proc. Philad. Acad. Nov. 1870, 131 (type, *Anas canagicus*, Sewast.).

619. *Clangula*, Fleming, Philos. Jour. 1828 (type, *Anas clangula*, Linn.). [*Cf.* DRESSER, B. Eur. pt. xlvi. Dec. 1875; COUES, Bull. Nutt. Orn. Club, April, 1880, 101.]

635. NOMONYX, Ridgway, Proc. U. S. Nat. Mus. iii. March 27, 1880, 15 (type, *Anas dominica*, Linn.).

642. *Phalacrocorax*, Brisson, Orn. 1760 (type, *Pelecanus carbo*, Linn.). [*Cf.* SHARPE, Cat. B. Brit. Mus. iii. 1877, 146, foot-note.]

696. *Megalestris*, Bonaparte, Consp. ii. 1856, 206 (type, *Larus catarractes*, Linn. = *Catharacta skua*, Brünn.). [*Cf.* COUES, B. N. W. 1874, 603, 604, where, however, *Buphagus*, Mœhring, is adopted; but Mœhring's names being inadmissible,* *Megalestris*, Bp., "strictly its only synonym" seems the only one available.

703. *Phœbetria*, Reichenbach, Av. Syst. Nat. 1853, pl. 26, fig. 348 (type, *Diomedea fuliginosa*, Gmel.).

704. *Ossifraga*, Hombron & Jacquinot, Compt. Rend. xviii. 1844, 356 (type, *Procellaria gigantea*, Gmel.).

706. *Priocella*, Hombron & Jacquinot, Compt. Rend. xviii. 1844, 357 (type, *Procellaria glacialoides*, Smith = *P. tenuirostris*, Aud.).

707. *Priofinus*, Hombron & Jacquinot, Compt. Rend. xviii. 1844, 355 (type, *Procellaria cinerea*, Gmel. (?) = *P. melanura*, Bonn.).

717. *Œstrelata*, Bonaparte, Consp. ii. 1855, 188 (type, *Procellaria hæsitata*, Temm.).

720. HALOCYPTENA, Coues, Proc. Philad. Acad. 1864, 78 (type, *H. microsoma*, Coues).

721. *Procellaria*, Linnæus, S. N. ed. 12, i. 1766, 212 (type, *P. pelagica*, Linn.).

722. *Oceanites*, Keyserling & Blasius, Wirb. Eur. 1840, 238 (type, *Procellaria oceanica*, Kuhl.).

Cf. COUES, Bull. Nutt. Orn. Club, April, 1880, p. 100, sp. 437, *Machetes pugnax*.

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723. *Cymochorea*, Coues, Proc. Philad. Acad. 1864, 75 (type, *Procellaria leucorrhoa*, Vieill.).

726. *Oceanodroma*, Reichenbach, Av. Syst. 1853, xviii. (type, *Procellaria furcata*, Gmel.).

730. *Æchmophorus*, Coues, Proc. Philad. Acad. 1862, 229 (type, *Podiceps occidentalis*, Lawr.).

732. *Dytes*, Kaup, Syst. Ent. Eur. Thierw. 1829 (type, *Colymbus cornutus*, Gmel.).

734. *Tachybaptes*, Reichenbach, Syst. Nat. Av. 1853, pl. 2 (type, *Colymbus minor*, Gmel.).

742. *Utamania*, Leach, Syst. Cat. 1816 (type, *Alca torda*, Linn.). [*Cf.* COUES, Proc. Philad. Acad. 1868, 18, 19.]

743. *Fraterecula*, Brisson, Orn. 1760 (type, *Alca arctica*, Linn.). [*Cf.* COUES, Proc. Philad. Acad. 1868, 21.]

745. *Lunda*, Pallas, Zorgr. Rosso-As. 1811, 363 (type, *Alca cirrhata*, Pall.). [*Cf.* COUES, Proc. Philad. Acad. 1868, 26.]

746. *Ceratorhina.*—*Cf.* COUES, Key, 1872, 341. [= *Cerorhinca*, Bonap. Ann. Lyc. N. Y. ii. 1828, 428 (false orthography).]

748. *Simorhynchus*, "Merrem, ——, 1819 (type, *Alca cristatella*, Pall. *fide* G. R. Gray)". [*Cf.* COUES, Proc. Philad. Acad. 1868, 35.]

750. *Ciceronia*, Reichenbach, Av. Syst. Nat. 1853, — (type, *Phaleris microceros*, Brandt = *Uria pusilla*, Pall.).

752. *Alle*, Link, Beschr. Natur.-Samml. Univ. Rostock, 1806, 17 (type, *A. nigricans*, Link = *Alca alle*, Linn.). [*Cf.* COUES, Bull. Nutt. Orn. Club, iv. Oct. 1879, 244.]

753. *Synthliborhamphus*, BRANDT, Bull. Acad. St. Petersb. ii. 1837 (type, *Alca antiqua*, Gmel.).

763. *Lomvia*, Brandt, Bull. Acad. St. Petersb. ii. 1837, 345 (type, *Colymbus troille*, Linn.). [*Cf.* COUES, Proc. Philad. Acad. 1868, 75.]

d. Species included in the catalogue which have not yet (according to the records) actually been taken within the prescribed limits.

[The following species enumerated in the catalogue have not, to this date, been taken within the United States; but all are known to occur so near our southern border as to render it quite certain that their capture within our limits is but a question of time and investigation. There are also included in this category all the species which are peculiar to the islands of Socorro and Guadalupe and the peninsula of Lower California.]

8. MERULA CONFINIS. (Cape St. Lucas.)
14. HARPORHYNCHUS CINEREUS. (Cape St. Lucas.)
18. HARPORHYNCHUS GRAYSONI. (Socorro.)
31. REGULUS OBSCURUS. (Guadalupe.)
43. PARUS MERIDIONALIS. (Highlands of Mexico.)
49. PSALTRIPARUS MELANOTIS.* (Highlands of Mexico.)
55*a*. CERTHIA FAMILIARIS MEXICANA. (Highlands of Mexico.)
57. CAMPYLORHYNCHUS AFFINIS. (Cape St. Lucas.)
58*a*. SALPINCTES OBSOLETUS GUADALUPENSIS. (Guadalupe.)
62. THRYOMANES BREVICAUDA. (Guadalupe.)
89. PARULA PITIAYUMI INSULARIS. (Socorro.)
171. CARPODACUS AMPLUS. (Guadalupe.)
195. PASSERCULUS GUTTATUS. (Cape St. Lucas.)
223. JUNCO INSULARIS. (Guadalupe.)
238*c*. PIPILO MACULATUS CONSOBRINUS. (Guadalupe.)
238*d*. PIPILO MACULATUS CARMANI. (Socorro.)
240*a*. PIPILO FUSCUS ALBIGULA. (Cape St. Lucas.)

*Probably seen by me in August, 1868, in the East Humboldt Mts., Nevada. (*Cf.* Orn. 40th Parallel Exp. 1877, p. 415.)

Catalogue No.
267. Icterus wagleri. (Mexico.)
288. Psilorhinus morio. (E. Mexico.)
291. Aphelocoma ultramarina couchii. (E. Mexico.)
347. Basilinna xantusi. (Cape St. Lucas.)
363*a*. Picus scalaris lucasanus. (Cape St. Lucas.)
377*a*. Melanerpes formicivorus angustifrons. (Cape St. Lucas.)
380. Colaptes rufipileus. (Guadalupe.)
381. Momotus cæruleiceps. (E. Mexico.)
384. Trogon ambiguus. (Mexico.)
393. Conurus holochlorus brevipes. (Socorro.)
415. Falco albigularis. (Whole of tropical America.)
424. Polyborus lutosus. (Guadalupe.)
653. Sula piscator. (Socorro.)
655. Phlethon æthereus. (Newfoundland banks; Socorro?)
460. Zenædura graysoni. (Socorro.)

Of the following species given in the catalogue no specimens are known to have been taken within the limits of the United States, with the exception of those described and figured in Giraud's "Sixteen Species of Texan Birds" (1841).*

59. Catherpes mexicanus (=*Certhia albifrons*, Giraud).
130. Setophaga miniata (=*Muscicapa derhami*, Giraud).
132. Ergaticus ruber (=*Parus leucotis*, Giraud).
133. Basileuterus culicivorus (=*Muscicapa brasieri*, Giraud).
134. Basileuterus bellii (=*Muscicapa bellii*, Giraud).
160. Euphonia elegantissima (=*Pipra galericulata*, Giraud).
182*b*. Astragalinus psaltria mexicanus (=*Fringilla texensis*, Giraud).
309. Myiozetetes texensis (=*Muscicapa texensis*, Giraud).
314. Myiarchus lawrencei (=*Tyrannula lawrencii*, Giraud).
329. Empidonax fulvifrons (=*Muscicapa fulvifrons*, Giraud).

e. Species (chiefly Palæarctic) which occur only as stragglers or visitants in Eastern North America, or which occur regularly only in Greenland and adjacent portions of the continent.†

[6.] Turdus iliacus. Accidental in Greenland.
[69.] Motacilla alba. Accidental in Greenland.
[178.] Ægiothus canescens. Resident in Greenland.
[279.] Sturnus vulgaris. Accidental in Greenland.
[412*a*.] Hierofalco gyrfalco islandus. Resident in South Greenland.
[416.] Æsalon regulus. Accidental in Greenland.
[422.] Tinnunculus alaudarius, Accidental in Greenland.
[435.] Buteo vulgaris. Accidental in Michigan? [*Cf.* Maynard, Bull. Nutt. Orn. Club, i. 18.]
452. Hallæëtus albicilla. Resident in Greenland.
[488.] Ardea cinerea. Accidental in Greenland.
[506.] Hæmatopus ostralegus. Accidental in Greenland.
[514.] Charadrius pluvialis. Accidental in Greenland.
518. Ægialitis hiaticula. Breeding in Greenland and west of Cumberland Gulf.
[524.] Scolopax rusticula. Accidental in Newfoundland and Eastern United States.
[526.] Gallinago media. Casual in Greenland and Bermudas.

* These specimens are now in the collection of the United States National Museum.

† Strictly pelagic birds, which are more or less numerous off the coast, are excluded from this and the following lists.

Catalogue No.

[539.] Pelidna alpina. Breeds in Greenland and Hudson's Bay Territory.
[540.] Pelidna subarquata. Casual in Eastern North America (several records).
[546.] Limosa ægocephala. Accidental in Greenland.
[547.] Totanus glottis. Accidental in Florida.
[551.] Rhyacophilus ochropus. Accidental in Nova Scotia.
[554.] Machetes pugnax. Casual in Eastern North America (several records).
[561.] Numenius phæopus. Accidental in Greenland.
[573.] Porzana maruetta. Accidental in Greenland.
[577.] Crex pratensis. Casual in Eastern North America, including Greenland.
[586.] Olor cygnus. Accidental in Greenland.
[587.] Olor minor. Casual (?) in fur countries.
[593.] Anser albifrons. Breeds in South Greenland.
[597.] Bernicla leucopsis. Casual in Eastern North America.
[611.] Nettion crecca. Casual in Eastern North America.
627. Somateria mollissima. Resident in Greenland and west side of Cumberland Gulf.
[631.] Melanetta fusca. Accidental in Greenland.
[665.] Larus affinis. Accidental in Greenland.
[694.] Hydrochelidon leucoptera. Accidental in Wisconsin.
[711.] Puffinus anglorum. Casual (?) off Atlantic coast.
[717.] Œstrelata hæsitata. Accidental off Atlantic coast of U. S.
[718.] Œstrelata bulweri. Accidental near Greenland.
728. Fregetta grallaria. Accidental off coast of Florida.
[733.] Dytes auritus. Breeds in South Greenland.
743*a*. Fratercula arctica glacialis. Resident in Greenland.

f. Palæarctic and oceanic species occurring only in Alaska and other parts of the Pacific coast.

[20.] Cyanecula suecica. St. Michael's, Alaska, June 5, 1850. (See p. 215.)
[34.] Phylloscopus borealis. Breeds in Alaska.
[44.] Parus cinctus. Abundant resident in Alaska.
[70.] Budytes flava. Breeds abundantly in Alaska.
[167.] Pyrrhula cassini. Resident (?) in Alaska.
[399*a*.] Ulula cinerea lapponica. Casual (?) in Alaska (St. Michael's).
[407*a*.] Surnia funerea ulula. Casual (?) in Alaska (St. Michael's).
511. Aphriza virgata. Casual along entire Pacific coast of America.
[515*a*.] Charadrius dominicus fulvus. Regular autumnal visitant to Alaska.
[519.] Ægialitis curonica. Accidental in California (?).
[533.] Actodromas acuminata. Accidental on coast of Alaska.
544. Limosa lapponica novæ-zealandiæ. Abundant visitant to Alaska.
553. Heteroscelus incanus. Whole Pacific coast. (Breeds.)
[562.] Numenius tahitiensis. Accidental in Alaska (Kadiak).
[702.] Diomedea culminata. Accidental off mouth of Columbia River (Audubon).
[703.] Phœbetria fuliginosa. Casual off Pacific coast.
[704.] Ossifraga gigantea. Accidental off Pacific coast of U. S.
706. Priocella tenuirostris. Casual (?) off Pacific coast.
707. Priofinus melanurus. Accidental off coast of California.
710. Puffinus creatopus. Accidental (?) off coast of California.
713. Puffinus gavia. Casual (?) off coast of Lower California.
715. Puffinus griseus. Casual (?) off coast of Lower California.
716. Puffinus tenuirostris. North Pacific (casual?).
[719.] Daption capensis. Accidental off coast of California.

g. Palæarctic species occurring both in Greenland and Alaska, but not recorded from any intermediate point in North America.

Catalogue No.

[21.] SAXICOLA ŒNANTHE. Breeds in Greenland and on west side of Cumberland Gulf.

[72.] ANTHUS PRATENSIS. Accidental (?) in Greenland and Alaska.

[512.] VANELLUS CRISTATUS. Accidental in Greenland (and Alaska?).

[606.] MARECA PENELOPE. Occurs in various parts of North America, south to North Carolina, and San Francisco.

h. Tropical American species occurring only in southern portions of United States.

EASTERN PROVINCE, INCLUDING FLORIDA AND COAST OF TEXAS.*

137. VIREOSYLVIA CALIDRIS BARBATULA. (South Florida.) *Hab.* Cuba.

159. CERTHIOLA BAHAMENSIS. (Indian Key.) *Hab.* Bahamas.

184. CHRYSOMITRIS NOTATA. (Accidental in Kentucky, *fide* AUDUBON.) *Hab.* highlands of Mexico and Guatemala.

253. PHONIPARA ZENA. (Key West.) *Hab.* West Indies in general.

265. ICTERUS VULGARIS. (South Carolina, etc.) *Hab.* Jamaica and northern South America.

302. *Milvulus tyrannus.* (Accidental in Mississippi, New Jersey, etc.) *Hab.* whole of tropical South America east of the Andes, Atlantic coast region of Central America (and Mexico?).

303. TYRANNUS DOMINICENSIS. (Florida.) *Hab.* whole of West Indies.

357*b*. CHORDEILES POPETUE MINOR. (Florida.) *Hab.* Cuba and Jamaica.

386. COCCYZUS SENICULUS. (Florida, Louisiana?) *Hab.* West Indies and parts of northern South America.

389. CROTOPHAGA ANI. (Tortugas; near Philadelphia!) *Hab.* West Indies and parts of northern South America.

420*a*. TINNUNCULUS SPARVERIUS ISABELLINUS.

421. TINNUNCULUS SPARVERIOIDES. (Florida.) *Hab.* Cuba.

429. ROSTRHAMUS SOCIABILIS PLUMBEUS. (Florida.) *Hab.* Tropical America in general.

458. COLUMBA LEUCOCEPHALA. (Florida Keys.) *Hab.* West Indies; Honduras.

462. ZENÆDA AMABILIS. (Florida Keys.) *Hab.* Greater Antilles.

467. GEOTRYGON MARTINICA. (Florida Keys.) *Hab.* West Indies.

468. STARNŒNAS CYANOCEPHALA. (Florida Keys.) *Hab.* Cuba.

502. EUDOCIMUS RUBER. (Louisiana?) *Hab.* Northern South America; Jamaica.

503. PLEGADIS FALCINELLUS. (Florida, straggling northward.) *Hab.* Eastern Hemisphere chiefly.

578. IONORNIS MARTINICA. (Southern portions in general, straggling northward.) *Hab.* whole of tropical America.

581. ARAMUS PICTUS. (Florida.) *Hab.* West Indies and Atlantic coast of Central America.

585. PHŒNICOPTERUS RUBER. (Florida Keys.) *Hab.* West Indies and shores of Gulf of Mexico and Caribbean Sea; Galapagos.

635. NOMONYX DOMINICUS. (Accidental on Lake Champlain and in Wisconsin.) *Hab.* whole of tropical America.

692. STERNA ANÆSTHETA. (Florida.) *Hab.* tropics generally.

734. TACHYBAPTES DOMINICUS. (Lower Rio Grande, in Texas.) *Hab.* Tropical America in general.

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*Excluding species peculiar to Florida.

SOUTHWESTERN BORDER—TEXAS TO CALIFORNIA.

[The species of this list which are *peculiar* to the more elevated portions of Mexico and Guatemala (including the contiguous southern border of the United States) are distinguished by an asterisk (*) prefixed to the number. The avi-fauna of temperate Mexico is decidedly more nearly related to that of the Western Province of North America than to the tropical fauna of the Mexican *tierra caliente* or hot coast-region. The genera of Neotropical affinities are printed in italics.]

Catalogue No.

* 13*a*. HARPORHYNCHUS RUFUS LONGIROSTRIS. (Lower Rio Grande.)
* 15. HARPORHYNCHUS CURVIROSTRIS. (Lower Rio Grande.)
* 26. PHAINOPEPLA NITENS. (Texas to California.)
* 37. LOPHOPHANES ATROCRISTATUS. (Lower Rio Grande.)
* 39. LOPHOPHANES WOLLWEBERI. (New Mexico; Arizona.)
* 49. PSALTRIPARUS MELANOTIS. (Nevada?)
* 50. AURIPARUS FLAVICEPS. (Texas to Arizona.)
* 56. *Campylorhynchus brunneicapillus*. (Texas to California.)
* 59. CATHERPES MEXICANUS. (Lower Rio Grande?)
* 60*a*. THRYOTHORUS LUDOVICIANUS BERLANDIERI. (Lower Rio Grande.)
* 61*b*. THRYOMANES BEWICKI LEUCOGASTER. (Lower Rio Grande to Arizona.)
* 83. HELMINTHOPHAGA LUCIÆ. (Arizona.)
* 89*a*. PARULA INSULARIS NIGRILORA. (Lower Rio Grande.)
* 92. PEUCEDRAMUS OLIVACEUS. (Lower Rio Grande? Arizona.)
*104. DENDRŒCA GRACIÆ. (Arizona.)
*105. DENDRŒCA CHRYSOPARIA. (Texas.)
*129. SETOPHAGA PICTA. (Lower Rio Grande? Arizona.)
*130. SETOPHAGA MINIATA. (Lower Rio Grande?)
*131. CARDELLINA RUBRIFRONS. (Lower Rio Grande? Arizona.)
*132. ERGATICUS RUBER. (Lower Rio Grande?)
133. *Basileuterus culicivorus*. (Lower Rio Grande?)
*134. *Basileuterus bellii*. (Lower Rio Grande?)
*136. VIREOSYLVIA AGILIS FLAVO-VIRIDIS. (Lower Rio Grande?)
*142. VIREO ATRICAPILLUS. (Texas.)
*147. VIREO VICINIOR. (Arizona; Southern California.)
160. *Euphonia elegantissima*. (Lower Rio Grande?)
*163. PYRANGA HEPATICA. (New Mexico; Arizona.)
*164*a*. PYRANGA ÆSIVA COOPERI. (New Mexico; Arizona.)
*182*a*. ASTRAGALINUS PSALTRIA ARIZONÆ. (Upper Rio Grande to Arizona.)
182*b*. ASTRAGALINUS PSALTRIA MEXICANUS. (Lower Rio Grande?)
*215. SPIZELLA ATROGULARIS. (Lower Rio Grande to Lower California.)
*222. JUNCO CINEREUS. (Arizona.)
*227. PEUCÆA ARIZONÆ. (Lower Rio Grande to Arizona.)
*230*a*. PEUCÆA RUFICEPS BOUCARDI. (Arizona.)
*236. *Embernagra rufivirgata*. (Lower Rio Grande.)
*241. PIPILO ABERTI. (Arizona.)
*242*a*. CARDINALIS VIRGINIANUS IGNEUS. (Arizona; Lower California.)
*243. PYRRHULOXIA SINUATA. (Lower Rio Grande to Lower California.)
250. PASSERINA VERSICOLOR. (Lower Rio Grande.)
252. *Spermophila moreletii*. (Lower Rio Grande.)
*258*a*. MOLOTHRUS ATER OBSCURUS. (Texas to Lower California.)
259. MOLOTHRUS ÆNEUS. (Lower Rio Grande.)
263*a*. STURNELLA MAGNA MEXICANA. (Lower Rio Grande.)

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* Accidental in Michigan!

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*266. Icterus audubonii. (Lower Rio Grande.)
*268. Icterus parisorum. (Texas to Lower California.)
*269. Icterus cucullatus. (Texas to Lower California.)
*275. Quiscalus macrurus. (Lower Rio Grande.)
*276. Quiscalus palustris. (Head of Gulf of California? coast of Louisiana.)
*295. Aphelocoma sordida arizonæ. (Arizona.)
*296. *Xanthura luxuosa.* (Lower Rio Grande.)
*334. Eugenes fulgens. (Arizona.)
*342. Atthis heloisæ. (Texas.)
*344. Calothorax lucifer. (Arizona.)
345. *Amazilia fuscicaudata.* (Lower Rio Grande.)
*346. *Amazilia yucatanensis.* (Lower Rio Grande.)
*348. Iache latirostris. (Arizona.)
356. Nyctidromus albicollis. (Lower Rio Grande.)
*358. Chordeiles acutipennis texensis. (Texas to Lower California.)
*363. Picus scalaris. (Texas to Arizona.)
*365. Picus stricklandi. (Arizona.)
*373. Centurus aurifrons. (Lower Rio Grande.)
*374. Centurus uropygialis. (Arizona.)
383. Ceryle americana cabinisii. (Texas to Arizona.)
390. Crotophaga sulcirostris. (Lower Rio Grande.)
*391. Rhynchopsitta pachyrhyncha. (Rio Grande Valley?)
*402*b*. Scops asio maccalli. (Texas.)
*403. Scops trichopsis. (New Mexico; Stockton, Cal.?)
*404. Scops flammeolus. (North to about 40° in higher western mountains.)
410. Glaucidium phalænoides. (Texas and Arizona.)
*411. Micrathene whitneyi. (Arizona; S. E. California.)
419. Rhyncofalco fusco-cærulescens. (Texas; New Mexico.)
434. Antenor unicinctus harrisi. (Louisiana to Lower California.)
440. Buteo abbreviatus. (Arizona; Southern California.)
441. Buteo albicaudatus. (S. Texas.)
444. *Urbitinga anthracina.* (Arizona.)
445. Asturina nitida plagiata. (Arizona.*)
450. Thrasætus harpyia. (Lower Rio Grande; Louisiana?)
457. Columba erythrina. (S. Texas.)
*463. *Engyptila albifrons.* (S. Texas.)
464. Melopelia leucoptera. (Texas to Lower California.)
*466. Scardafella inca. (Southern Texas.)
*469. *Ortalis vetula maccalli.* (S. Texas.)
*470. Meleagris gallopavo. (New Mexico; Upper Rio Grande in Texas.)
483. Lophortyx gambeli. (W. Texas to Arizona.)
484. Callipepla squamata. (W. Texas to Arizona.)
485. Cyrtonyx massena. (W. Texas to Arizona.)
499. *Mycteria americana.* (Southern Texas.)

ENTIRE SOUTHERN BORDER.

423. Polyborus cheriway.
427. Elanus glaucus.
455. Catharista atrata.
465. Chamæpelia passerina.

* Accidental in Southern Illinois (only once observed).

i. Supposed valid species described by Audubon and Wilson, which have not since been met with, and of which no specimens are known to exist in collections.

Catalogue No.

32. REGULUS CUVIERI, AUD. Orn. Biog. i. 1832, 288, pl. 55 ("Banks of Schuylkill River, Pa., June, 1812").—BAIRD, B. N. Am. 1858, 228; Review, i. 1864, 66.—B. B. & R. Hist. N. Am. B. i. 1874, 75, pl. 5, fig. 7.

91. PERISSOGLOSSA CARBONATA (Aud.) Ridgw.—*Sylvia carbonata*, AUD. Orn. Biog. i. 1831, 308, pl. 60 (Kentucky).—*Dendroica carbonata*, BAIRD, B. N. Am. 1858, 287; Review, i. 1865, 207.—*Perissoglossa carbonata*, B. B. & R. Hist. N. Am. B. i. 1874, 214, pl. 12, fig. 3.

112. DENDRŒCA MONTANA (Wils.) Baird.—*Sylvia montana*, WILS. Am. Orn. v. 1812, 113, pl. xliv. fig. 2 ("Blue Mts. of Pennsylvania").—AUD. Orn. Biog. v. 294 ("California").—*Dendroica montana*, Baird, B. N. Am. 1858, 279; Review, i. 1865, 190.—*Dendrœca montana*, B. B. & R. Hist. N. Am. B. i. 1874, 271.

126. WILSONIA MINUTA (Wils.) Bp.—*Muscicapa minuta*, WILS. Am. Orn. vi. 1812, 62, pl. l. fig. 5.—AUD. Orn. Biog. v. pl. 434, fig. 3; B. Am. i. pl. 67.- *Myiodioctes minutus*, Baird, B. N. Am. 1858, 293; Review, 1865, 241.—B. B. & R. Hist. N. Am. B. i. 1874, 316, pl. 16, fig. 2.

l. List of untenable species and races of North American birds described since 1858.

1. *Helminthophaga ruficapilla* var. *ocularis*, B. B. & R. Hist. N. Am. B. i. 1874, 191. (Chicago, Ill.) = No. 85.

(?) 2. *Helminthophaga ruficapilla* var. *gutturalis*, B. B. & R. Hist. N. Am. B. i. 1874, 191. (East Humboldt Mts., Nevada; Ft. Tejon, Cal.) = No. 85?

3. *Helminthophaga celata* var. *obscura*, B. B. & R. Hist. N. Am. B. i. 1874, 192. (Georgia and Florida.) = No. 86.

4. *Hirundo bicolor* var. *vespertina*, COOPER, Am. Nat. x. Feb. 1876, 91. (California.) = No. 155.

5. *Collyrio chemungensis*, GREGG, Proc. Elmira Acad. i. 1870, 9. (New York.) = No. 148, juv.

6. *Hesperiphona vespertina* var. *montana*, RIDGW. in B. B. & R. Hist. N. Am. B. i. 1874, 449, pl. 22, fig. 4. (Southern Rocky Mts. and mountain regions of Mexico.) = No. 165.

(?) 7. *Loxia atrata*, von HOMEYER, Jour. für Orn. 1879, 179. (North America.) = No. 173??*

8. *Leucosticte campestris*, BAIRD, Orn. Cal. i. 1870, 163. (Colorado.) = No. 175*a* (individual variation).

(?) 9. *Linaria brunnescens*, von HOMEYER, Jour. für Orn. 1879, 184. ("Lapland, Grönland, Schweden.")† = No. 179*a*?

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* "Somewhat smaller than *L. leucoptera*, but with about the same length of wing, the tail at least 10^{mm} shorter. Distinguished by its coloration. The red in ground tone is nearest that of the "Hakengimpel" [*Pinicola enucleator*] but everywhere darker, and saturated, as it were, with black, this color extending indefinitely both on the back as well as on the middle of the belly to the breast, as also on the lower tail-coverts. The feet are even darker colored than in *leucoptera*. The wing-bands are unaffected for the most part, although not quite so broad. This is especially seen in the first or terminal band, which begins, scarcely visible, at the edge of the wing, and remains very inconsiderable to the middle, then quickly expands to a great rounded spot. The extent of the second band is everywhere much more limited than in *leucoptera*."

"This is decidedly not a melanism, as is shown, not alone by the character of the coloration, but by the ocurrence of two old males exactly alike."

"My two birds came from North America."—[*Translation.*]

† "The dark Linnet is nearest to this species in size, but it is easily distinguished by many features. The whole upper parts are blackish brown, with very narrow margins to the feathers of whitish and rusty yellow, which, on the rump, return to the ground color; on the sides of the head the feathers also have very fine, rusty white margins; the throat-spot is very large; the entire under parts to the middle of the belly are densely covered with many large, dark brown longitudinal streaks. Two birds killed in Lapland, June–July (sexes not determined), show a tender red on the side of the head. The

Catalogue No.

10. *Ægiothus fuscescens*, COUES, Proc. Philad. Acad. 1861, 222. (Labrador.) =No. 179 (midsummer plumage).
11. *Ægiothus rostratus*, COUES, l. c. (Greenland.) =No. 179*a* (midsummer plumage).
12. *Centronyx ochrocephalus*, AIKEN, Am. Nat. vii. 1873, 237. (El Paso Co., Colorado.) =No. 191 (autumnal plumage).
13. *Passerculus caboti*, B. B & R. Hist. N. Am. B. iii. 1874, pl. xlvi. fig. 9. (Nahant, Massachusetts.) =No. 233. [*Not described!*]
14. *Spizella evura*, COUES, The Ibis, 1865, 118, 164. (Ft. Whipple, Ariz.) =No. 215, *young*.
15. *Passerella obscura*, VERRILL, Proc. Boston Soc. ix. 1862, 153. (Anticosti I.) =No. 235, *young*.
16. *Hedymeles melanocephalus* var. *capitalis*, B. B. & R. Hist. N. Am. B. ii. 1874, 74. (Pacific coast of Mexico and United States.) =No. 245.
17. *Guiraca cærulea* var. *eurhyncha*, COUES, Am. Nat. viii. 1874, 563. (Mexico.) =No. 246.
18. *Dolichonyx oryzivorus* var. *albinucha*, RIDGW. Bull. Essex Inst. v. Nov. 1873, 192. (Missouri plains to Salt Lake Valley.) =No. 257.
19. *Empidonax pygmæus*, MINOT, Land and Game Birds New England, 1877, —. (Near Boston, Mass.) [*Avis fictita!*]
20. *Dryobates hyloscopus*, CAB. & HEINE, Mus. Hein. iv. June 25, 1863, 69. (San José, Cal.) =No. 360*b*.
21. *Dryobates homorus*, CAB. & HEIN. Mus. Hein. iv. June 25, 1863, 65. (California.) =No. 361*a*.
22. *Picus cavieri*, MALH. Mon. Pic. i. 1861, 85, pl. 22, fig. 3. (North America.) =No. 360, ♀ *ad*.
23. *Picus turati*, MALH. Mon. Pic. i. 1861, 125, pl. 29, figs. 5, 6, 7. (California and Rocky Mountains.) =No. 361, ♀ *ad*.
24. *Chamæpelia passerina* var. *pallescens*, BAIRD, Proc. Philad. Acad. 1859, 305. (Cape St. Lucas.) =No. 465.
25. *Pediocætes kennicotti*, SUCKL. Proc. Philad. Acad. 1861, 361. =No. 478.
26. *Bonasa jobsii*, JAYCOX, Am. Nat.
27. *Ibis thalassinus*, RIDGW. Am. Nat. viii. Feb. 1874, 110. (Pacific coast of America, from California to Chili.) =No. 504, *juv*.
28. *Ardea cyanirostris*, CORY, Birds of the Bahama Islands, 1880, —. (Bahamas.) =No. 492, breeding plumage.
29. *Cygnus passmorei*, HINCKS, Pr. Linn. viii. 1864, 1. (Toronto, Canada.) =No. 589, *juv*.
30. *Bernicla barnstoni*, ROSS, Canad. Nat. vii. April, 1862, —. =594, var. ?
31. *Bernicla leucolæma*, MURRY, Edinb. Phil. Jour. April, 1859, 226, pl. 4, fig. 1. =594, var.
32. *Pelecanus occipitalis*, RIGDW. Am. Sportsman, iv. 1874, 297. (Nevada.) =No. 640, adult, breeding plumage, after loss of occipital crest, the latter replaced by dusky-grayish patch.
33. *Thalasseus caspius* var. *imperator*, COUES, Proc. Philad. Acad. 1862, 538, in text. (North America.) =No. 680.
34. *Sterna portlandica*, RIDGW. Am. Nat. viii. 1874, 433. (Portland, Maine.) =No. 687, *juv., second year*
35. *Sterna fuliginosa* var. *crissalis*, BAIRD, Pr. Boston Soc. xiv. 1872, 285. (Socorro I., N. W. Mexico.) =No. 681.

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wing-bands are merely indicated. The bill is very characteristic. It is somewhat weaker at the base than in *L. hornemanni*, but longer and remarkably darker in all seven specimens.

"The bird figured by Dresser on the second plate (lower figure) belongs here, and is by no means the young of *L. hornemanni*, as supposed by Dresser."

[This description accords well in every particular with the dark summer stage of *Ægiothus linaria holbölli*, described in 1861 by Dr. Coues as *Æ. rostratus*, the type of which came from Greenland.—R. R.]

*k. List of exotic species which have been attributed to North America by various authors, but apparently without sufficient evidence of their occurrence.**

1. ANTHUS CERVINUS, Pall.—ZANDER, Jour. für Orn. Extraheft i. 1853, 64. (Aleutian Islands.)
2. *Geothlypis æquinoctialis* (Gmel.) Caban.—*Sylvia delafieldii*, AUD. Orn. Biog. v. 1839, 307 ("Oregon").—*Trichas delafieldii*, AUD. B. A. Am. ii. 1841, 81, pl. 103.—*Geothlypis velatus*, BAIRD, B. N. Am. 1859, 243; Cat. 1859, No. 171.
3. LANIUS LAHTORA, Sykes.—*Lanius elegans*, SWAINS. Faun. Bor. Am. ii. 1831, 122 (fur countries).—NUTT. Man. ii. 1832, 566. [Not *Collurio elegans*, Baird.]
4. *Progne leucogastra*, Baird.—*P. chalybea*, CASS. Illustr. 1856, 246 (California, *fide* J. G. Bell).
5. *Astragalinus yarrelli* (Aud.) Caban.—*Carduelis yarrelli*, AUD. Synop. 1839, 117 ("California"); B. Am. iii. 1841, 136, pl. 184.—*Chrysomitris yarrelli*, BAIRD, B. Am. 1858, 421; Cat. 1859, No. 312.
6. *Astragalinus barbatus* (Mol.) ——.—*Carduelis stanleyi*, AUD. Synop. 1839, 118 ("California"); B. Am. iii. 1841, 137, pl. 185.—*Chrysomitris stanleyi*, BAIRD, B. N. Am. 1858, 420; Cat. 1859, No. 311.
7. HYPOLIA ARCTOA (Pall.) Ridgw.—*Leucosticte arctoa*, CABAN. Mus. Hein. i. 1851, 154 ("Russich-America").—*Leucosticte arctous*, BAIRD, B. N. Am. 1858, 430; Cat. 1859, No. 324.
8. CARPODACUS HÆMORRHOUS (Licht.) Scl.—BAIRD, B. N. Am. 1858, 417, foot-note (North America?); Cat. 1859, No. 309.
9. LOXIA PITYOPSITTACUS, Bechst.—*Cf.* NUTTALL, Man. Orn. Land Birds, ed. 1832, 537 ("high northern regions of America", *fide* TEMMINCK).
10. "*Zonotrichia*" *pilcata* (Bodd.) ——.—*Fringilla mortonii*, AUD. Orn. Biog. v. 312; B. Am. iii. 1841, 152, pl. 190 ("North California").
11. *Cynchramus schœniclus* (Linn.) Boie.—*Emberiza schœniclus*, NUTT. Man. Orn. Land Birds, ed. 1832, ii. 586 ("vicinity of Harrisburg in Pennsylvania", *fide* Audubon).
12. *Melanocorypha calandra* (Linn.) Boie.—*Alauda calandra*, LINN., SW. & RICH. F. B. A. ii. 1831, 244 ("fur countries"; spec. presented by the Hudson's Bay Co. said to be in the British Museum).—NUTT. Man. ii. 1832, 580.
13. *Trupialis militaris* (Linn.) Bp.—BAIRD, B. N. Am. 1858, 533 ("California"); Cat. 1859, No. 405.
14. ICTERUS MELANOCEPHALUS (Wagl.) Gray.—CASS. Illustr. 1856, 137, pl. 21 (Texas and New Mexico).—BAIRD, B. N. Am. 1858, 543 (not given as North American!); Cat. 1859, No. 410.
15. CALOCITTA COLLIEI (Vig.) Finsch.—"*Pica bullockii*, Wagl.", AUD. B. Am. iv. 1842, 105, pl. 229 ("woody portions of North California").—*Garrulus bullockii*, NUTT. Man. i. 1832, 230 ("Columbia R.").
16. *Tyrannus melancholicus*, Vieill.—BAIRD, B. N. Am. 1858, 176 (not given as North American); Cat. 1859, No. 129.
17. *Lampornis violicauda* (Bodd.) Elliot.—"*Trochilus mango*, Linn.", AUD. Orn. Biog. ii. 480; B. Am. iv. 1842, 186, pl. 251 ("Florida Keys").—*Lampornis mango*, BAIRD, B. N. Am. 1858, 130; Cat. 1859, No. 100.
18. CAMPEPHILUS IMPERIALIS (Gould) Gray.—*Picus imperialis*, AUD. Orn. Biog. v. 313; B. Am. iv. 1842. 212 ("Rocky Mountains and North California).—CASS. Illustr. 1856, 285, pl. 49.—BAIRD, B. N. Am. 1858, 82; Cat. 1859, No. 73.

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* This list does not include American species wrongly supposed by authors to be the same as European species, and so named, *e. g. Circus* "*cyaneus*" for *C. hudsonius*, *Regulus* "*cristatus*" for *R. satrapa*, *Troglodytes* "*parvulus*" or *T.* "*europæus*" for *T. hyemalis*, etc., etc., but only those which were through actual error (as it appears) wrongly attributed to North America. Species which are most likely to have occurred in North America are printed in small capitals; those whose occurrence would in any case be purely accidental are printed in italics.

19. HYLOTOMUS SCAPULARIS (Vig.) Ridgw.—"*Picus lineatus*, LINN.", AUD. Orn. Biog. v. 315; B. Am. iv. 1842, 233 ("Columbia River").
20. STRIX STRIDULA, Linn.—*S. aluco*, NUTT. Man. i. 1832, 135 (Newfoundland and Hudson's Bay).
21. CARINE NOCTUA (Scop.) Kaup.—"*Strix passerina*, LINN.", AUD. Orn. Biog. v. 269.—"*Surnia passerina*, Linn.", AUD. B. Am. i. 1840, 116 ("Pictou, Nova Scotia").
22. *Spcotyto cunicularia* (Mol.) ——.—*Athene cunicularia*, CASS. in Baird's B. N. Am. 1858, 60 ("North America, west of Rocky Mountains").
23. THALASSOÆTUS PELAGICUS (Pall.) Kaup.—*Aquila pelagica*, PALL. Zoögr Rosso-As. i. 1811, 343 (Russian America, *fide* Steller).—*Haliaëtus pelagicus*, CASS. Illustr. 1856, 31, pl. 6; in Baird's B. N. Am. 1858; BAIRD, Cat. 1859, No. 40.
24. *Sarcorhamphus gryphus* (Linn.) Dum.—*Cathartes gryphus*, BONAP. Am. Orn. iv. 1833, 318, pl. 22.—NUTT. Man. i. 1832, 35.
25. GYPARCHUS PAPA (Linn.) Glog.—*Cathartes papa*, NUTT. Man. i. 1832, 40 ("from the 30th degree of north latitude to the 32d in the southern hemisphere").
26. CATHARTES BURROVIANUS, CASS. in Baird's B. N. Am. 1858, 6 ("Lower California"); BAIRD, Cat. 1859, No. 4. [*Cf.* RIDGWAY, Bull. Nutt. Orn. Club, v. April, 1880, 83.]
27. LOPHORTYX ELEGANS (Less.) Nutt.—*Ortyx elegans*, NUTT. Man. ed. 1840, i. 792 ("Upper California", *fide* Lesson).
28. BUTORIDES BRUNNESCENS (Gundl.) Baird.—BAIRD, B. N. Am. 1858, 677 (in text); Cat. N. Am. B. 1859, No. 494.
29. *Hæmatopus ater*, Vieill.—*Hæmatopus townsendii*, AUD. Orn. Biog. v. 1839, 247, pl. 427; B. Am. v. 1842, 245, pl. 326.—*Hæmatopus ater*, BAIRD, B. N. Am. 1858, 700; Cat. 1859, No. 514.
30. "TRINGA" PLATYRHYNCHA, Temm.—NUTT. Man. ii. 1832, 114 (Arctic America, *fide* Temminck and Bonaparte).
31. ACTODROMAS MINUTA (Linn.) Kaup.—*Tringa minuta*, SW. & RICH. F. B. A. ii. 1831, 385 (Nelson and Hayes Rivers; "seen abundantly in the autumn").—NUTT. Man. ii. 1834, 119.
32. ACTODROMAS TEMMINCKI (Leisl.) Ridgw.—*Tringa temmincki*, NUTT. Man. ii. 1832, 119 (Arctic America).
33. TOTANUS CALIDRIS (Linn.) Bechst.—SW. & RICH. F. B. A. ii. 1831, 391 ("Hudson's Bay"; spec. in British Museum).—NUTT. Man. ii. 1834, 155.
34. *Heliornis fulica* (Bodd.) ——.—*H. surinamensis*, NUTT. Man. ii. 1832, 510 ("accidental visitor in the Middle States of the Union").
35. ANSER SEGETUM (Gmel.) Bonap.—NUTT. Man. ii. 1832, 348 (Canada and Hudson's Bay).
36. CAIRINA MOSCHATA (Linn.) Caban.—*Anas moschata*, NUTT. Man. ii. 1832, 403 Lower Mississippi and Gulf coast of U. S.).
37. ŒDEMIA NIGRA (Linn.) Hen.—*Fuligula nigra*, NUTT. Man. ii. 1832, 423 ("coast of the United States").
38. MERGELLUS ALBELLUS (Linn.) Selby.—*Mergus albellus*, WILS. Am. Orn. iii. pl. lxxi. fig. 4 (New England and New York; numerous).—NUTT. Man. ii. 1832, 467.—AUD. Orn. Biog. iv. 350; B. Am. vi. 1843, 408, pl. 414 ("Lake Barataria, not far from New Orleans").
39. PHALACROCORAX GRACULUS (Linn.) Leach.—NUTT. Man. ii. 1832, 484 ("South of Greenland"; United States in winter).
40. *Phalacrocorax pygmæus*, Pall.—NUTT. Man. ii. 1832, 487 (Northern North America, *fide* Bonaparte).
41. *Phalacrocorax africanus* (Gmel.) Dumont.—NUTT. Man. ii. 1832, 488 ("United States", *fide* Audubon).
42. LARUS FUSCUS, Linn.—NUTT. Man. ii. 1832, 302 (Greenland, Newfoundland, and Hudson's Bay).

43. LARUS CAPISTRATUS, Temm.—NUTT. Man. ii. 1832, 290 (Delaware R. and Chesapeake Bay).
44. LARUS MINUTUS, Pall.—SW. & RICH. F. B. A. ii. 1831, 426 (given on Sabine's authority).—NUTT. Man. ii. 1832, 289.—*Chroicocephalus minutus*, LAWR. in Baird's B. N. Am. 1858, 853.—BAIRD, Cat. 1859, No. 671.
45. DIOMEDEA EXULANS, Linn.—NUTT. Man. ii. 1832, 340 ("accidentally to the coasts of the central part of the Union").—LAWR. in Baird's B. N. Am. 1858, 821.—BAIRD, Cat. 1859, No. 630.
46. PODICEPS CRISTATUS (Linn.) Lath.—SW. & RICH. F. B. A. ii. 1831, 410 (throughout fur countries).—NUTT. Man. ii. 1832, 250.—LAWR. in Baird's B. N. Am. 1858, 893.—BAIRD, Cat. 1859, No. 703.
47. TACHYBAPTES MINOR (Linn.) Coues.—*Podiceps minor*, NUTT. Man. ii. 1832, 257 (Hudson's Bay).

l. Partial list of foreign birds which have been introduced to the United States, and those which have been captured after escape from confinement.

SPECIES INTRODUCED WITH A VIEW TO THEIR NATURALIZATION.*

1. PASSER DOMESTICUS (Linn.) Leach. European House Sparrow. The attempted naturalization of this bird has proved decidedly successful. The case is so notorious that further comment is unnecessary.
2. PASSER MONTANUS (Linn.) Stephens. European Tree Sparrow. Has become naturalized in the vicinity of Saint Louis, Mo., but the history of its introduction is unknown. (See MERRILL, Bull. Nutt. Orn. Club.)
4. ALAUDA ARVENSIS, Linn. Skylark. Partially naturalized in the vicinity of Cincinnati, on Long Island, and perhaps other localities.
5. COTURNIX COMMUNIS (Linn.) Bonn. European Quail. Introduced to various localities in the Eastern United States, and partially naturalized.

SPECIES WHICH HAVE BEEN CAPTURED AFTER ESCAPE FROM CONFINEMENT.†

1. AMADINA RUBRO-NIGRA, ——. Brunswick, Maine, March, 1879; Leslie A. Lee. (ALLEN, Bull. Nutt. Orn. Club, April, 1880, 119.) *Hab.* India.
2. CRITHAGRA BUTYRACEA, ——. South Scituate, Mass., in midwinter. (BREWER, Proc. Bost. Soc. xx. 271.) *Hab.* South Africa.
3. LIGURINUS CHLORIS (Linn.) Koch. Lowville, Lewis Co., N. Y., March 19, 1878; R. B. Hough. (*Cf.* Bull. Nutt. Orn. Club, Apr. 1880, 119.) *Hab.* Europe.
4. CARDUELIS ELEGANS, Steph. Eastern Massachusetts, many captures. (ALLEN, Bull. Nutt. Orn. Club, Apr. 1880, 120.) *Hab.* Europe.
5. SERINUS MERIDIONALIS, Brehm. Western Massachusetts, in winter. (ALLEN, l. c.) *Hab.* Europe.
6. CORVUS FRUGILEGUS, Linn. Washington, D. C., August, 1879.

   An example of this species was seen by me in August, 1879, in the grounds of the Agricultural Department in Washington. It was perched in a maple tree near one of the outbuildings, was very tame, and flew laboriously, as if very recently escaped from confinement. I am, as yet, ignorant of the history of this specimen, nor have I since seen it.

7. CONURUS XANTHOGENIUS, Bp. *Hab.* St. Thomas, West Indies.

   An example of this species, shot in a grove near Washington, by Dr. D. W. Prentiss, is in the National Museum collection. Of course it was an escaped cage-bird.

8. CHENALOPEX ÆGYPTIACA (Linn.) Steph. Carnarsie, Long Island, Jan. 3, 1877. (AKHURST, Bull. Nutt. Orn. Club, ii. Apr. 1877, 52.) *Hab.* Southern Europe and Africa.

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* This list does not include domesticated birds.

† This list is, of course, very incomplete; it includes merely a few species, the records of whose capture I happen to have at hand. A more complete list would be desirable, but want of time forbids its compilation in the present connection.

*Table of families of North American birds, showing number of genera and species of each according to the foregoing catalogue.**

	Number of the catalogue.	Number of genera.	Number of species.†
1. Turdidæ	1–18	8	18 + 8 = 26
2. Cinclidæ	19	1	1
3. [Luscinidæ]	20	1	1
4. Saxicolidæ	21–24	2	4
5. PTILOGONATIDÆ	25–26	2	2
6. Sylviidæ	27–34	3	8 + 1 = 9
7. *Chamæidæ*	35	1	1
8. Paridæ	36–50	4	15 + 3 = 18
9. Sittidæ	51–54	1	4 + 1 = 5
10. Certhiidæ	55	1	1 + 1 = 2
11. Troglodytidæ	56–68	9	13 + 9 = 21
12. Motacillidæ	69–73	4	5
13. MNIOTILTIDÆ	74–134	18	61 + 8 = 69
14. VIREONIDÆ	135–147	3	13 + 3 = 16
15. Laniidæ	148–149	1	2 + 2 = 4
16. Ampelidæ	150–151	1	2
17. Hirundinidæ	152–158	6	7 + 1 = 8
18. CÆREBIDÆ	159	1	1
19. TANAGRIDÆ	160–164	2	5 + 1 = 6
20. Fringillidæ	165–256	36	91 + 35 = 126
21. ICTERIDÆ	257–278	8	22 + 5 = 27
22. [Sturnidæ]	279	1	1
23. Corvidæ	280–298	9	19 + 7 = 26
24. [Alaudidæ]	299–300	2	2 + 2 = 4
25. TYRANNIDÆ	301–331	11	31 + 2 = 33
26. COTINGIDÆ	332–333	2	2
27. TROCHILIDÆ	334–348	10	15
28. Cypselidæ	349–352	3	4
29. Caprimulgidæ	353–358	5	6 + 2 = 8
30. Picidæ	359–380	10	22 + 10 = 32
31. MOMOTIDÆ	381	1	1
32. Alcedinidæ	382–383	1	2
33. Trogonidæ	384	1	1
34. Cuculidæ	385–390	3	6
35. Psittacidæ	391–393	2	3
36. Strigidæ	394–411	12	18 + 11 = 29
37. Falconidæ	412–452	23	41 + 12 = 53
38. CATHARTIDÆ	453–455	3	3
39. Columbidæ	456–468	10	13
40. CRACIDÆ	469	1	1
41. MELEAGRIDÆ	470	1	1 + 1 = 2
42. Tetraonidæ	471–479	6	9 + 7 = 16
43. Perdicidæ	480–485	5	6 + 3 = 9
44. Ardeidæ	486–498	11	13
45. Ciconiidæ	499–500	2	2
46. Ibididæ	501–504	2	4
47. Plataleidæ	505	1	1
48. Hæmatopodidæ	506–508	1	3
49. Strepsilidæ	509–511	2	3
50. Charadriidæ	512–523	7	12 + 2 = 14
51. Scolopacidæ	524–562	21	39 + 4 = 43
52. Phalaropodidæ	563–565	3	3
53. Recurvirostridæ	566–567	2	2
54. Parridæ	568	1	1
55. Rallidæ	569–580	6	12 + 2 = 14
56. ARAMIDÆ	581	1	1
57. Gruidæ	582–584	1	3

*Families peculiar to America in small capitals; peculiar to North America in italics. Palæarctic families not represented by a peculiar species in America are placed in brackets.

†The figures following the sign + denote the number of recognized races not distinguished by a separate number in the catalogue; those in the last column the total of species and races.

Table of families of North American birds—Continued.

	Number of the catalogue.	Number of genera.	Number of species.
58. Phœnicopteridæ	585	1	1
59. Anatidæ	586–638	30	53 + 6 = 59
60. Tachypetidæ	639	1	1
61. Pelecanidæ	640–641	1	2
62. Phalacrocoracidæ	642–648	1	7 + 3 = 10
63. Plotidæ	649	1	1
64. Sularidæ	650–653	1	4
65. Phaëthontidæ	654–655	1	2
66. Rhynchopsidæ	656	1	1
67. Laridæ	657–695	9	39 + 2 = 41
68. Stercorariidæ	696–699	2	4
69. Procellariidæ	700–728	15	29 + 2 = 31
70. Podicipitidæ	729–735	5	7 + 1 = 8
71. Colymbidæ	736–740	1	5
72. Alcidæ	741–764	14	24 + 3 = 27

SUMMARY.

Number of genera	379
Number of species	764
Number of subspecies	160

CONCORDANCE.

No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.
1	454	35	427	69	387	102	336	135	315	167	74
2	453	36	428	70	388	103	340	136	316	167*a*	74*a*
3	455	37	429	71	386	104	339	137	318	168	88
4	—	38	430	72	359	105	338	138	321	169	75
5	414	39	449	73	—	106	337	139	320	170	122
6	414	40	—	74	360	107	349	140	325*a*	171	—
7	417	41	451	75	360*b*	108	350	141	325	172	120
8	415	42	452	76	361	109	351	142	326	173	121
9	419	43	451	77	361*a*	110	352	143	324	174	118
10	413	44	425	78	364	111	353	144	322	175	119
11	412	45	423	79	363	112	354	144*a*	323	176	123
12	412*a*	46	434	80	362	113	355	145	327	177	123*a*
13	420	47	394	81	366	114	357	146	328	178	77
14	433	48	405	82	367	115	357*a*	147	330	179	76
15	431	49	402	83	368	116	358	148	1	180	79
16	431	50	402*b*	84	368*a*	116*a*	356	149	5*b*	181	81
17	432	51	395	85	369	117	382	149*a*	5*a*	182	78
18	442	52	396	86	369*a*	118	383	150	5	183	85
19	442	53	399	87	369*b*	119	381	151	2	183*a*	84
20	436*b*	54	397	88	370	120	333	152	4	184	86
21	442	55	400	89	370	121	332	153	4*a*	185	87
22	438	56	401	90	371	122	302	154	3	186	115
23	436	57	401	91	372	123	301	155	7	187	116
24	436*b*	58	408	92	373	124	304	156	9	188	117
25	439	59	408	93	374	125	303	157	21	189	107
26	439*a*	60	409	94	375	126	306	158	22	190	109
27	443	61	406	95	377	127	307	159	23	191	108
28	442	62	407	96	376	128	305	160	24	192	105
29	437	63	392	97	378	129	—	161	30	193	94
30	447	64	391	98	378*b*	130	312	162	33	194	95
31	447	65	384	98*a*	378*a*	131	313	163	32	195	96
32	448	66	389	99	379	132	311	164	19	196	102
33	445	67	389	100	—	133	314	165	71	197	100
34	426	68	385	101	335	134	317	166	73	198	111

Concordance—Continued.

No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.
199	112	259	15	318	172	378	254	440	295	500	503
200	99	259*a*	15	318*a*	172*a*	379	255	441	294	500*a*	504
201	98	260	13*a*	319	173	380	244	442	296	501	505
202	101	261	13	320	179	381	245	443	297	502	—
203	93	261*a*	13	321	178	382	246	444	288	503	515
204	97	262	56	322	175	383	247	445	456	504	516
205	110	263	59*a*	323	174	384	251	446	457	505	523
206	90	264	58	324	—	385	250	447	458	506	522
207	91	265	60	325	186	386	249	448	459	507	517
208	113	266	60*a*	326	187	387	248	449	462	508	520
209	103	267	61	327	188	388	252	450	464	509	521
210	114	268	67	328	189	389	243	451	460	510	513
211	124	269	68	329	189	390	244	452	466	511	511
212	126	270	63	330	190	391	237	453	465	512	507
213	125	271	63*a*	331	191	392	238*b*	454	467	513	508
214	127	272	63	332	193*a*	393	238	455	468	514	—
215	127	273	65	333	193	394	238*a*	456	469	515	509
216	132	274	35	334	194	395	241	457	470*a*	516	510
217	128	275	55	335	193*b*	396	240*b*	458	470	517	566
218	129	276	55*a*	336	196	397	240	459	471	518	567
219	130	277	51	337	197	398	239	460	472	519	565
220	161	278	51*a*	338	198	399	257	461	472*a*	520	564
221	164	279	52	339	199	400	258	462	479	521	563
222	163	280	53	340	200	401	261	463	478*a*	522	525
223	162	281	54	341	201	402	261*a*	464	477	523	526*a*
224	160	282	27	342	202	403	262	465	473	524	527
225	154	283	28	343	231*c*	404	260	465*a*	473*a*	525	527*a*
226	153	284	29	344	204	405	—	466	473*b*	526	529
227	155	285	36	345	206	406	263	467	474	527	535
228	156	286	37	346	207*a*	407	264	468	475	528	530
229	157	287	38	347	208	408	265	469	476	529	540
230	158	288	39	348	205	409	266	470	475	530	539*a*
231	152	289	41*a*	349	209	410	—	471	480	531	534
231*a*	152*a*	289*a*	41*a*	350	222	411	268	472	480*b*	532	538
232	150	290	41	351	221	412	267	473	481	533	536
233	151	291	41*b*	352	218	413	269	474	482	534	542
234	26	292	43	353	220	414	270	475	483	535	541
235	25	293	42	354	217	415	271	476	484	536	528
236	148	294	40	355	224	416	272	477	485	537	552
237	149	295	46	356	225	417	273	478	582	538	547
238	149*a*	296	45	357	210	418	274	479	583	539	548
239	—	297	49	358	214	419	275	480	584	540	549
240	135	298	47	359	211	420	277	481	581	541	550
241	136	299	48	360	212	421	278	482	491	542	553
242	—	300	50	361	213	422	278*a*	483	491	543	557
243	137	301	159	362	215	423	280	484	492	544	554
244	138	302	300	363	331	424	280	485	490	545	555
245	139	303	165	364	231*b*	425	281	486	489	546	556
246	145	304	166	365	231*c*	426	282	486*a*	489	547	553
247	142	305	168	366	231*d*	427	282*a*	487	487	548	545
248	143	306	168*a*	367	231*a*	428	282*b*	488	486	549	558
249	144	307	169	368	234	429	283	489	486	550	559
250	141	308	170	369	233	430	284	490	493	551	560
251	141*a*	209	—	370	226	431	285	491	498	552	569
252	140	301	184	371	228	432	286	492	497	553	571
253	11	311	—	372	230	433	287	493	494	554	572
253*a*	11	312	—	373	236	434	289	494	—	555	574
254	12	313	181	374	235	435	290	495	495	556	576
255	10	314	182	375	235*a*	436	290*c*	496	496	557	575
256	16	315	182*a*	376	235*c*	437	293	497	500	558	577
257	16*a*	316	183	376*a*	235*b*	438	292	498	502	559	580
258	17	317	185	377	256	439	291	499	501	560	578

Concordance—Continued.

No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.	No. of old catalogue.	No. of new catalogue.
561	578	589	615	620	642	651	706	681	679	710	741
561*a*	588	590	616	621	648	652	696	682	680	711	742
562	589	591	618	622	643*b*	653	697	683	681	712	745
563	591	592	617	623	643	654	698	684	682	713	744
563*a*	591*a*	593	620	624	643*a*	655	699	685	683	714	743*a*
564	590	594	619	625	644	656	660	686	685	715	743
565	593*a*	595	621	626	645	657	662	687	684	716	745
566	593*a*	596	622	627	646	658	661	688	681	717	746
567	594	597	623	628	649	659	662	689	686	718	746
567*a*	594*c*	598	625	629	654	660	663	690	687	719	748
568	594*b*	599	626	630	—	661	664*a*	691	685	720	748
569	594*a*	600	624	631	701	662	664	692	688	721	749
570	595	601	632	632	702	663	668	693	687	722	750
571	596	602	633	633	703	664	669	694	690	723	750
572	597	603	633	634	704	664*a*	670	695	693	724	751
573	598	604	630	635	705	665	670	696	695	725	747
574	599	605	632	636	705*a*	666	672	697	656	726	760
575	600	606	627*a*	637	706	667	673	698	736	727	761
576	601	607	628	638	717	668	674	699	738	728	762
577	602	608	629	639	719	669	674	700	739	729	763
578	605	609	634	640	726	670	675	701	740	730	763
579	612	610	635	641	727	671	—	702	731	731	764
580	611	611	636	642	723	672	658	703	—	732	755
581	609	612	637	643	724	673	674	703*a*	731	733	755
582	610	613	638	644	722	674	659	704	729	734	759
583	608	614	—	645	721	675	659	705	730	735	756
584	604	615	640	646	728	676	657	706	732	736	753
585	607	616	641	647	709	677	657	707	733*a*	737	754
586	606	617	650	648	714	678	676	708	733	738	752
587	613	618	652	649	711	679	678	708*a*	734		
588	614	619	639	650	712	680	677	709	735		

INDEX TO THE GENERA.

[The numbers refer to the first species of each genus in the catalogue.]

ON THE IDENTITY OF THE GENUS LEURYNNIS, LOCKINGTON, WITH LYCODOPSIS, COLLETT.

By THEODORE GILL.

In the Proceedings of the Zoological Society of London for 1879 (at pp. 380–381) Mr. Robert Collett has published a communication "On a fish of the genus *Lycodes* from the Pacific." The article was read at the meeting held April 1, 1879, and published in the part (II) issued August 1, 1879.

In this article Mr. Collett describes at length the species referred to, under the name *Lycodes pacificus*, and gives a figure of the head and anterior part of the body. The diagnosis is as follows:

"Vomerine and palatine teeth none. Coloration uniform yellowish grey. The body is scaly, the head and pectorals naked. The head is contained four and six-tenths, the height of the body nine times, in the total length. Lateral line very indistinct.

"M. B. 6; D. (circa) 92; A. 71; C. (circa) I, 1; P. 18.

"*Hab.*—Japan (*Mus. Berol.*)."

At the end of the description Mr. Collett expresses the following opinion:

"The absence of vomerine and palatine teeth, a character quite peculiar to the species, will perhaps necessitate its removal to a separate genus, for which I propose the name *Lycodopsis*."

In the Proceedings of the United States National Museum for 1879 (at pp. 326–332) Mr. W. N. Lockington has given "Descriptions of new genera and species of fishes from the coast of California." The signature in which it appears was issued March 25, 1880.

In this article Mr. Lockington describes what is considered to be a new generic type, under the name *Leurynnis paucidens*. The diagnosis of the genus is as follows:

"*Generic characters.*—Family *Zoarcidæ*, allied to *Lycodes*. Ventral fins present, short; no teeth on vomer and palatines; dorsal and anal fins continued without interruption around the tail; scales small, but evident. The name is from λευρὸς—smooth; ὄυνις—vomer, in allusion to the character which chiefly distinguishes the genus from *Lycodes*."

Selecting characters to compare with those mentioned in Mr. Collett's diagnosis, we have the following:

"No vomerine or palatine teeth.—Color olivaceous, the scales lighter than the skin; the color formed by numerous dark points, which are continued also upon the head. Upper surface of head darker, abdominal surface lighter than other portions. Vertical fins margined with black.—Scales roundish, smooth, separate, imbedded in the skin, uniform over the whole of the body, except upon an area on the upper surface in front of the dorsal, where they are smaller, and region near base of pectorals scaleless. Head scaleless—the ridges somewhat prominent.—

Length of head $4\frac{1}{3}$–$4\frac{2}{3}$ times in the total length.—Greatest depth of body from a little more than ten to a little less than eleven times.—No lateral line."

M. B. 6; D. 90; A. 70; P. 18.

As will be thus seen, the two fishes are certainly congeneric, and are evidently very closely related. Even the slight discrepancies are apparently such (as in the case of the color) as result from difference of interpretation of the same characters. The vertical fins in the Californian form, however, are distinctly said to be "margined with black," while in the Japanese form it is at least implied that they are not. It is quite probable, nevertheless, that even these alleged differences may be found to be rather of degree than of kind. In view, however, of the difference of distribution, it is reasonable to suppose that the two forms will be found to be distinct, and, as the genus appears to be perfectly valid, they will rank as species, with the following names:

1. LYCODOPSIS PACIFICUS.

Lycodes pacificus Collett, Proc. Zool. Soc. London, 1879, p. 381.

Hab.—Japan.

2. LYCODOPSIS PAUCIDENS.

Leurynnis paucidens Lockington, Proc. U. S. Nat. Mus. 1879, p. 326.

Hab.—California.

DESCRIPTION OF A NEW CHIROID FISH, MYRIOLEPIS ZONIFER, FROM MONTEREY BAY, CALIFORNIA.

By W. N. LOCKINGTON.

Myriolepis, gen. nov. (*Chiridæ*).

Body oblong, rather stout; mouth moderate; cardiform teeth in both jaws, slightly larger anteriorly; no canines; teeth on vomer and palatines; preopercle entire; no spines about the head. Gill-openings separated by a narrow isthmus; gill-rakers short. Branchiostegals seven. Pseudobranchiæ present. Dorsal fins two, united at base, the first with about 14 rather stiff spines, the second with as many soft rays. Anal short, of about 13 rays, without distinct spine. Scales very small, ctenoid, covering the whole surface of the body and head and the greater portion of all the fins except the first dorsal. Lateral line single.

Etymology: μυρίον, myriad; λεπίς, scale.

This genus bears little resemblance to any of the previously known *Chiridæ*, its general appearance being quite *Serranoid*. It has, however, a bony stay connecting the suborbital and preoperculum, and possesses the technical characters of the *Chiridæ*, in which group it should form a distinct subfamily, differing especially in the shorter anal fin without distinct spines.

Myriolepis zonifer, sp. nov.

Lower jaw slightly projecting; snout to summit of ascending process of premaxillary inclined backwards at about 45°; forehead slightly con-

cave longitudinally; dorsal outline, from occiput to caudal peduncle, regularly arched, the highest point at anterior part of first dorsal; mandible straight; abdominal outline regularly curved.

Greatest depth $3\frac{8}{13}$ times, depth of caudal peduncle 12, length of head $3\frac{9}{10}$, length of pectoral $4\frac{11}{12}$ in total length to extremity of caudal fin; orbit (longitudinal diameter) $5\frac{1}{5}$, mandible $2\frac{1}{8}$, interorbital width about $2\frac{9}{10}$ in length of head.

Gape straight, maxillary extending to a little in front of the center of the pupil, its upper edge received in a groove below the preorbital for most of its length.

Teeth of mandibles and intermaxillaries slender, sharp, recurved; in several rows in front, gradually diminishing laterally to a single row; front teeth slightly longer than lateral teeth. A few similar but smaller teeth on vomer and palatines. Upper pharyngeals with a cushion of similar teeth; lower pharyngeals slender, with a patch of similar teeth in the form of a very obtuse triangle, the internal row largest.

Gill-rakers short, ciliated, those on the anterior aspect of the first pair of gill-arches longer than the others.

Branchiostegals seven; gill-membranes continuous below, but attached to an isthmus throughout the entire length of their junction except the posterior margin.

Nostrils just above a line joining the upper margin of the orbit with the tip of the snout, simple, elliptical, the posterior far the larger.

Eyes lateral, subelliptical, the upper margin of the orbit less curved than the lower; interorbital space wide, slightly convex transversely.

Longitudinal diameter of orbit $1\frac{1}{3}$ in length of snout.

Opercular bones without spines or denticulations.

Pectoral base vertical; pectoral broadly lanceolate, the upper margin curved; 5th ray longest; 4th, 6th, 7th, and 8th only slightly shorter, thence diminishing rapidly downwards. Tip of pectoral about vertical with base of 11th ray of spinous dorsal, but considerably short of the vent. Rays twice branched.

Ventrals inserted a little behind pectorals, their length $1\frac{2}{5}$ in that of the pectorals. Rays twice bifurcate.

Spinous dorsal commencing about opposite 20th scale of lateral line; first spine very short; 2d and 3d rapidly increasing; 4th longest; thence diminishing regularly to 12th; 13th and 14th directed backwards, horizontal, their points only free; 15th spine at base of 1st soft ray.

Third ray of soft dorsal longest, thence diminishing regularly; rays split up at tips.

Anal commencing about opposite base of 7th ray of 2d dorsal, and preceded by two weak spines hidden in membrane. First soft ray longest; rays split at tips.

Caudal with many accessory rays and about sixteen principal rays, so that its lateral margins are convex; posterior border somewhat emarginate; rays much divided at tips.

Lateral line continuous to end of caudal peduncle, not very conspicuous; tubes simple. From its origin to above the pectoral it curves downwards, thence follows parallel to the dorsal outline till it reaches the caudal peduncle, along which it is median.

Scales of body small, strongly ctenoid, larger upon hinder part of trunk and on caudal peduncle than anteriorly, and smallest on head and under pectoral base. Scales elongate, almost rectangular, but with the free margin convex, imbedded portion striated. Entire surface of gill-covers, branchiostegal rays, mandibles, maxillaries, preorbitals, and snout scaly, the only scaleless portions being the lips and the portions of the gill-membrane folded up between the rays. A shallow, scaleless groove at sides of 1st dorsal.

The vertical fins, except the spinous dorsal, covered almost to the tips of the rays with similar but smaller scales, and the paired fins similarly covered on their exterior surfaces.

A band of small scales along some of the anterior spines of the 1st dorsal.

Dorsal region and head, to the level of the upper margin of maxillary and of pectoral fin, black; four broad transverse black stripes between pectorals and caudals.

The spaces between these bands, the abdomen, and the lower part of the head white.

The 1st band is at about the center of the length of the pectoral, and fades out level with the lower margin of that fin; the 2d is anterior to the vent, and almost encircles the body; the 3d continues to the anal base, but is much lighter on its lower portion; while the 4th encircles the caudal peduncle.

A 5th but narrower black band encircles the caudal base, and two black bands cross the caudal, the posterior one broadest; rest of caudal white. All the other fins banded or blotched irregularly with black and white, the former predominating. The ctenoid tips of the scales are white.

I have only seen a single specimen of this fish. Before the description was written it was exposed to alcohol for about two months.

It was obtained in San Francisco market August, 1879, and was taken in Monterey Bay.

In appearance it somewhat resembles some of the small-scaled *Serranidæ* or *Rhypticidæ*. The presence of a suborbital stay, however, shows that its affinities are really with the *Chiridæ*.

Dimensions of type (*No.* *United States National Museum*).

	Inches.
Total length, to tip of caudal	11.75
Greatest depth, about	3.25
Greatest thickness, at opercles	1.72
Depth of caudal peduncle, about	.98
Length of head	3.02
Interorbital width	1.05
Length of snout	.77

	Inches.
Longitudinal diameter of orbit	.58
Length of lower jaw, in straight line	1.42
Length of upper jaw, in straight line	1.15
Tip of snout to insertion of pectoral, about	3.00
Tip of snout to origin of dorsal, along axis of fish	3.62
Tip of snout to origin of dorsal, along dorsal profile	4.03
Tip of snout to origin of anal, along axis of fish	6.45
Tip of lower jaw to insertion of ventrals, along abdominal profile	3.32
Width of pectoral base	.90
Length of pectorals	2.40
Length of ventrals	1.50
Length of base of 1st dorsal to XIIth spine	2.08
Height of longest (4th) dorsal spine	1.25
Length of base of 2d dorsal	2.60
Height of longest (3d) ray of dorsal	1.44
Length of base of anal	1.62
Height of longest (1st) ray of anal	1.38

Fin formula.—B. 7; D. XII + 11, $\frac{1}{15}$; A. $\frac{2}{11}$; P. 18; V. $\frac{1}{5}$; C. lat. line circa 128–134.

DESCRIPTION OF A NEW SPECIES OF RAY, RAIA RHINA, FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Raia rhina, sp. nov.

Disk rather broader than long, the snout very sharp and long-acuminate. Outer angle of pectoral sharp; posterior edge of pectoral nearly straight. Region from pectoral angle to snout slightly convex, then almost uniformly and *strongly concave* to near the tip of the snout, which tapers to a sharp point. A straight line from the snout to the tip of the pectoral passes far from the edge of the disk. Length of snout nearly four times the interorbital width.

Interorbital space quite narrow, very little concave, somewhat depressed in the middle. Nasal ridges separated for more than half their length. Supraocular ridges slightly elevated. Eyes larger and much longer than spiracles. Ventral fins deeply emarginate. Caudal fin reduced to a small fold. Dorsal fins moderate, rather close together, the interspace less than the base of the fin.

Female with the spines on the body moderately strong, arranged as follows:

Five or six rather strong spines above the eyes. Two in front of the center of the back. None along the middle line of the back until opposite the *posterior end of the ventrals*, where a median series begins on the tail. A lateral caudal series on each side, and two or three long sharp spines between the dorsal fins.

Roughnesses on the skin above rather large, sharp-pointed, and evidently stellate. Those on the snout especially conspicuously stellate and larger than the others. These prickles are *everywhere present* on the

upper parts of the body, but they are not evenly distributed, and in most regions they are placed quite wide apart. They are largest and most numerous on the nasal ridges, interorbital space, middle region of back and tail, and anterior part of pectorals. On the base and edges of the pectorals and on the ventrals the prickles are few and small. On the middle portion of the pectorals they are rather numerous. Underside of disk everywhere prickly except along the edges of the fins; the prickles largest under the snout.

Male not seen, probably differing, as in the other species, in the sparser prickles above, in the absence of a lateral caudal series, and in the presence of stouter prickles on the anterior part of the pectorals and of claw-like spines on the posterior part. Mouth somewhat arched. Teeth about $\frac{46}{40}$. Nasal flap rather less than half the width of the mouth.

Coloration essentially as in *Raia binoculata*. Light brown above, vaguely mottled with paler; the usual dark ring at the base of the pectorals most distinct in fresh examples, and probably in the young.

This species is known to us from three examples. Adult females, 26 to 29 inches in length. One from Monterey Bay and two from San Francisco Bay. The one from Monterey was referred to in our description of *Raia stellulata* as a long-nosed form or variety of *Raia binoculata*.

Raia rhina, is related to *Raia cooperi* and *Raia binoculata*. From the latter it differs in the much sharper and longer snout, in the less concave interorbital space, and in the much greater roughness of the body, the small prickles, even in the female of *R. binoculata*, being confined to the snout, interocular space, and a portion of the median region of the back and the tail, the fins being perfectly smooth. The male has the usual patches on the pectoral fins, and the back almost or quite smooth.

From *Raia cooperi*, *Raia rhina* differs in the much smaller size in length, the adult of *Raia cooperi* reaching at least a length of more than six feet. It also differs in form, color, interorbital width, armature, &c., as will appear from the following description of a young male example of *Raia cooperi*, 27½ inches in length, from San Francisco.

Disk broad, its *widest part much behind the middle*, the pectoral angle rather sharp, and the posterior edge very little convex. The anterior margin of the pectoral is at first slightly convex, then concave, then, opposite the eyes, again very slightly convex, then again slightly concave; the snout itself not very sharp, although long.

Interorbital space very broad and almost flat (deeply concave in *R. binoculata*), only slightly depressed in the middle, the nasal ridges well separated for usually two-thirds their length. Supraocular ridge not at all elevated. *Eyes quite small*, shorter than the spiracles.

Ventral fins not deeply emarginate (becoming more deeply emarginate in the adult). Caspers, in this example (which, although larger than the adults of the other species, is evidently immature), very small, scarcely exserted beyond the ventral edge. Claw-like pectoral spines not yet developed. Caudal fin wanting. Dorsal fins moderate, not far

apart, the interspace less than the length of the base. Tail with a slight lateral fold.

Spines on body small and few. Two or three very small ones over the eye, one at the center of the back, with a minute one in front of it. None along the median line of the back, the median caudal series beginning at the base of the ventrals. These spines are quite small, but grow larger backward.

Asperities above in the form of minute prickles, somewhat stellate. These are very minute, except along the median line of the back and tail, and there they are smaller than in *R. stellulata* or *R. rhina*. Tail entirely prickly above. A broad band of prickles along back to interorbital space. Entire pectoral fin minutely prickly, rather coarsely so anteriorly. Nasal ridges prickly.

Ventrals mostly covered with minute prickles, as is the under side of the snout and the region around the mouth. A row of rather coarser prickles along the edge of the disk anteriorly, on the under side.

Jaws rather strongly curved. Teeth somewhat tricuspid, $\frac{48}{38}$.

Length of nasal flap about half the width of the upper jaw.

Body light brown, with many rather large, faint, round whitish spots, which are very distinct in the young. A vague blackish ring at base of pectoral.

Raia cooperi is rather common from Monterey Bay to Vancouver's Island, and probably north to Alaska. It is often brought into the markets of San Francisco with the *binoculata*. We have seen examples of all sizes from six inches to six feet in length. A skin of an individual six feet in length was obtained by us at Victoria. In its stomach were two specimens of *Cottus polyacanthocephalus*, each a foot long. Thus far no examples of any of the other species over $2\frac{1}{2}$ feet in length have been noticed.

Table of measurements.	*R. rhina* ♀, Monterey.	*R. rhina* ♀, San Francisco.	*R. cooperi* ♂, juv., San Francisco.	*R. binoculata* ♂, Monterey.	*R. binoculata* ♀.	*R. binoculata* ♂, San Francisco.	*R. stellulata* ♀, Monterey.
Extreme length, in inches	28.80	26.25	27.65	21.6	23.45	24	17.45
Length of disk, in inches=100	18.40	16.85	17.3	13	14.90	13.65	10.10
Disk, greatest width	103	111	119	106	113	113	121
Width midway between snout and mouth	14	.....	.....	16.7	.....	.....	41
Width at front of eyes	41	.....	.....	45.5	.....	.....	58
Distance from snout to pectoral angle	.....	77.5	86.5	.....	78.5	77	.....
Distance from snout to first gill-opening	.....	.....	.....	50.5	.....	.....	.....
Distance from snout to mouth	30	29.5	24	2.5	25	21	24
Distance from first to last gill-opening	12	17	13.5	12.8	.....	.....	14
Width of mouth	15.5	14.5	15.5	15	15.5	15.5	18
Distance between nostrils	.....	13.2	15	.....	13.5	12.5	.....
Diameter of orbit	5.5	6	5	5.5	7.5	7	8
Length of snout from eye	31	30.5	28.5	23	27.3	23.5	23
Length of nasal flap	.....	7	.....	.....	8.5	8	.....
Distance between first gill-openings	26.3	25.5	.....	25.5	26.5	25	31.5
Distance between last gill-openings	16.5	17	17.5	14.3	16.5	15	18
Interorbital width	8	8	10.5	8	7.5	7.8	8
Tail, length	57	55	60	67	56.5	80	71.5
Distance between dorsals	3	3.5	3	3.8	.....	10.5	5

NEEAH BAY, WASH., *May* 31, 1880.

DESCRIPTION OF A NEW SPECIES OF PARROT OF THE GENUS CHRYSOTIS, FROM THE ISLAND OF DOMINICA.

By GEORGE N. LAWRENCE.

Chrysotis nichollsi.

MALE ?—The general color of the plumage is grass-green, darker above and on the breast and abdomen tinged with yellow; the feathers of the hind neck and back are bordered rather narrowly with black, those of the wing coverts are without the black borders; the feathers of the lower part of the throat, of the upper part of the breast, and of the sides of the neck change to verditer-green on a side view and are edged with black; the bases of some of the feathers of the breast and abdomen are dull red, and they are just perceptibly edged with black; the sides are dark green; the fore part of the head as far as upon a line with the anterior angle of the eye, lores, sides of the head, and the throat are of a medium shade of ultramarine-blue, lighter in color on the throat; in some lights the blue color has a grayish cast; the feathers of the top of the head are varied with bright green and azure blue and are narrowly bordered with black; the primaries have their inner webs black, the first primary is entirely black, the second and third have their outer webs dark blue for three-quarters their length, terminating with black, the other primaries have their outer webs green for most of their length, passing into dark blue for a short space, and ending with black; the extreme ends are narrowly margined with whitish ash; the wing speculum is of a bright scarlet red, occupying a space on the outer webs of the first three secondaries of about three inches; there is a small yellow mark where the red joins the terminal dark blue of these feathers, which have the outer webs green at their bases; the other secondaries have their outer webs green, with a subterminal blue spot, and ending with black; the fourth secondary has an elongated yellow mark on the middle of the outer web; all the secondaries have their inner webs black; the outer webs of the tertiaries are green, the inner are black with their ends green; the wing coverts are of the same color as the back, but the concealed portions of the inner webs of the greater coverts are black; the outer edge of the wing is dull light yellow; the quills underneath have the basal two-thirds of their length dull verditer-blue, the terminal portion is black; the under wing coverts are green; the first outer tail feather has the outer web dark blue for two-thirds its length, the terminal third is greenish yellow; the inner web is scarlet at the base for nearly half its length, which color is separated from the yellowish end by a space of dull green; the second, third, and fourth feathers differ from the first only in having the basal parts of their outer webs green; the central tail feathers are dark green, ending with dark yellowish green; upper tail coverts dark green, with their ends yellowish; the under tail coverts are yellowish green; the upper mandible is whitish-

horn color, with the sides yellowish, the under is grayish-horn color, yellowish at the base; feet blackish.

Length (skin) from end of upper mandible over the culmen, 20 inches; from top of head, 18 inches; wing, $9\frac{3}{4}$; tail, $6\frac{3}{4}$; tarsus, 1.

Habitat.—Dominica, West Indies.

Type in National Museum, Washington, received from Dr. H. A. Alford Nicholls.

Dr. Nicholls sent a second specimen in spirits, which was made into a skin, and on dissection proved to be a female. It does not differ materially in plumage from the other specimen, the blue of the face only appearing a little duller. It is rather smaller; the bill and feet are weaker. From a comparison of the two I think the specimen specially described is a male.

This new species in some respects resembles *C. cyanopis* (Vieill.), said to be from the Antilles, but the precise locality not known, and *C. bouqueti* (Bechat), from St. Lucia, all having blue heads. The first, *C. cyanopis*, is described as having the face dark ultramarine-blue, but it differs from the new species more especially in the top of the head and the chin being dark blue, the throat and entire under surface wine-red, and the larger wing coverts dark indigo-blue, besides minor differences. In dimensions they are much the same.

I have a fine specimen of *C. bouqueti* before me belonging to the Museum of Comparative Zoology, Cambridge, and kindly loaned by Professor Allen. In this the blue is nearly of the same shade as in the new species; it is a little lighter in color on the front, but the blue does not extend so far down on the throat, the lower part of which is scarlet; the breast and abdomen are vinous red intermixed somewhat with green; the color above is a lighter green; the black borders to the feathers of the hind neck and back are broader; the colors generally are much brighter; it is a smaller species, with weaker feet and a blackish bill; it measures from the end of the upper mandible $16\frac{1}{2}$ inches, though the wings and tail fully equal in size those of *C. nichollsi*.

I have named this fine species as a well-merited compliment to Dr. Nicholls for his assiduous endeavors to supplement Mr. Ober's work in Dominica.

The specimens of *Chrysotis* were sent in March, 1879, with some other species, to Martinique, to be forwarded to the Smithsonian, but they remained there for about twelve months, and were not received in Washington until May of this year. Dr. Nicholls wrote Professor Baird at that time concerning the parrot as follows:

"The '*Ciceru*' (not '*Cicero*') parrot.

"The bird was shot at Campbell, and was bought in the market, where it was exposed for sale as food. The feathers were off the neck when bought. Skin was firmly adherent to a thick layer of fat. The specimen is scarcely worth sending. I do so, however, as the feathers near the head are a different color to those of the *Cicero* parrot."

The other birds sent were as below, to which are added Dr. Nicholls's notes:

1. EUPHONIA FLAVIFRONS (Sparm.).

"Bird caught at head of Roseau Valley; never seen in the island until lately. Feathers of breast curl up over the wings when the bird is at rest, and during sleep the bird is rolled up like a ball."

2. MYIADESTES GENIBARBIS, Sw

"Sifflem montagne."

3. ELAINEA MARTINICA (Linn.).

"Caught in Roseau; white feathers on head very conspicuous when bird at rest."

4. EREUNETES PETRIFICATUS (Ill.).

"'Bécass;' common at the mouths of the rivers during the hurricane months."

5. CHARADRIUS VIRGINICUS, Borkh.

"'Oiseau marine.' Shot in plowed land near to Roseau in November, 1878."

6. TRINGA MACULATA, Vieill.

"'Bat-ma.' Caught in December, 1878, near to the mouth of the Roseau River."

Professor Baird has lately received from Dr. Nicholls a letter, dated 25th May, 1880, with another consignment of birds, of which I give the names and the notes of Dr. Nicholls thereon:

1. CHRYSOTIS NICHOLLSI, Lawr.

"The green parrot which I have been so long trying to obtain. It is now scarce and is seldom seen away from the deepest woods of the widest part of the island. It builds its nest in the forks of the highest forest trees, and it is usually seen in flocks. It is called by the natives 'perroquet,' which is simply French for parrot. As an example of the difficulty in obtaining this parrot I may mention that although I offered a good reward for a dead specimen I failed to get one. The specimen now sent was shot by a friend of mine; it was evidently a bird which had strayed from a flock."

Dr. Nicholls says of it in his letter: "It may possibly turn out to be the 'green parrot' which Mr. Ober failed to obtain."

I infer from the above that Dr. Nicholls considered this to be different from those sent a year ago, as in his letter of that date he says: "I am sorry to say that I have been unable to obtain specimens of the green parrot, but I hope to be successful before long."

This specimen, however, only differs from the type of *C. nichollsi* in being smaller, with a weaker bill, which is quite dusky in color.

Dr. Nicholls may be correct in his suggestion that it is the "parrot" No. 33 of the Dominica catalogue. If so, Mr. Ober must have been misled as to its size, which he states to have been that of the Carolina parrot.

2. NYCTIARDEA VIOLACEA (Linn.).

"'Crabier montagne.' Caught in a dark ravine in the mountains near Roseau and brought to me alive. I kept it for more than a week, feeding it on cray-fish and land-crabs, which it devoured with avidity. It died suddenly."

3. CHARADRIUS VIRGINICUS, Borkh.

"Golden plover. Shot on sea-beach."

4. ANOUS STOLIDUS (Linn.).

"'Twa-oo.' Brought to me alive when very young and I kept it alive for nearly a year, when it was choked by a careless child. It became very tame. It used to fly on to the roof of my house and bathe in a duck-pond in the garden. I gave it fish cut into small pieces."

5. STRIX FLAMMEA var NIGRESCENS, Lawr.

"Owl. It is, I think, different in plumage and certainly smaller than one I had some years ago. This bird was caught in the town of Roseau and brought to me. I kept it alive for several weeks, when it died suddenly. It woke up usually just before dark and then partook of its meal of five or six small lizards or a mouse. On introducing a live lizard into its cage it darted down upon it with great quickness; it seemed to be more of a spring and a drop than anything else; it then held the animal in its claw for a minute or so and regarded it intently, then with its sharp beak it divided the spinal column just behind the head. This occurred once and again, and it would thus appear that the owl is endued with the instinct of the easiest and surest way of killing its prey. The lizard when dead was seized by the head, and by a series of jerks or turnings up of the head the owl actually threw it down its throat. If the lizard was rather large the owl would rest for a while with the tail of the reptile hanging out of its mouth."

I think this specimen is a male; the larger one spoken of was probably a female.

6. TRINGA MINUTILLA, Vieill.

"'Bécass.' Caught near to the mouth of Roseau River."

NEW YORK, *June* 15, 1880.

THE EULACHON OR CANDLE-FISH OF THE NORTHWEST COAST.

By JAMES G. SWAN.

This paper I have prepared from my own notes made during a cruise on the United States revenue-steamer Oliver Wolcott to Alaska, during the summer of 1873, as special commissioner to procure articles of Indian manufacture for the National Museum, to be exhibited at the Centennial celebration at Philadelphia, and from information derived from Mr. Robert Tomlinson, clerk to Kincoleth Mission, Nass River, British Columbia; from Mr. Charles F. Morrison, chief trader Hudson's Bay

Company, at Fort Simpson, British Columbia; and from reports of Rev. Mr. Duncan, of Metlakatla Mission, British Columbia, made to the Church Missionary Society, at London, and to Messrs. Langley & Co., Victoria, to whom I am indebted for the copy of Professor Redwood's report, which I give entire. The description of the Eulachon by Sir John Richardson is, I believe, the earliest, and but little can be added to it. As I have no copy of his works at hand I cannot give his description, which I regret.

JAMES G. SWAN.

NEAH BAY, *Clallam County, Wash., January* 31, 1880.

This fish, known to scientists as the *Thaleichthys pacificus*, and also as *Osmerus pacificus*, resembles the common smelt in size and general outward appearance, and is found on Puget Sound occasionally with the sand-smelt *Hypomesus olidus*.

The Eulachon, however, differs from all other varieties of the smelt family by having its entire body permeated with a peculiar fat, which, on being extracted, is of the consistence and color of soft lard, and is used largely by the natives as an article of food.

By a rectifying and deodorizing process, Messrs. Langley & Co., chemists, of Victoria, British Columbia, have succeeded in preparing an oil which appears to possess the remedial qualities of cod-liver oil in a remarkable degree, and is more agreeable to both palate and stomach. The quantity of this fatty substance is so considerable that when the fish is dried it can be set on fire like a torch and will consume its whole length like a candle, from which fact its common name of "Candle-fish" is derived. This adipose matter when first extracted, even when fresh caught, has a strong, disagreeable odor and a peculiar taste which is very unpalatable to most white persons. The fresh fish, however, has no unpleasant smell about it. It has somewhat of the same cucumber odor as the smelt, or rather an odor which resembles that of the bruised leaves of the wild syringa, *Philadelphus* L., which is a somewhat common shrub on the shores of Puget Sound and other portions of the northwest coast. When fried, like the smelt it is a most delicious pan-fish, or even when simply boiled, as the natives usually cook it, or toasted on a stick before the fire, it is most excellent and nutritious food.

The Eulachon are found in limited numbers at certain seasons in the Columbia River, Shoal-water Bay, Gray's Harbor, and at the mouth of the various small streams of the coast, and also in the waters of Puget Sound, where they are taken in seines and nets with smelt and other varieties of small fish, but they are thin and poor, and not to be compared to the same varieties further north. Even those taken in Fraser's River, near the boundary line between Washington Territory and British Columbia, are superior to those taken further south, and are sold in the Victoria market, where their excellence is highly prized. The few secured on Puget Sound are sold by the fishermen as smelts. The best

kinds are caught further north, and great quantities are salted by the Hudson's Bay Company, at their trading post at Fort Simpson, British Columbia, and either sold in the Victoria market or shipped direct to London in tierces, barrels, and kits.

As an article of food and for the grease or fat contained in them, the Eulachon are highly prized by the Indians of Northern British Columbia and Southern Alaska, where they abound; particularly at the Nass River, British Columbia, where they are annually taken in enormous quantities, and where they seem to attain their very finest condition.

The Nass River flows into Portland Inlet near the fifty-fifth parallel of north latitude, near the southern boundary of Alaska, and 30 miles north-northeast of Fort Simpson, British Columbia. At its mouth it widens out into a bay called Nass Bay or Strait, in which are various shoals favorable for the Eulachon spawning grounds.

There are other rivers and streams in British Columbia and Alaska at the mouths of which Eulachon are taken, but as the Nass River fishery exceeds them all, and is, in fact, the principal place where the business is carried on by both whites and Indians, a description of that fishery will suffice.

The principal run of the fish reaches Nass River in the latter part of March, generally from the 16th to the 22d, varying in exceptional years from the 28th to April 4. When the season approaches the Indians assemble in great numbers; not only the Nishka, or natives of the Nass country, but from hundreds of miles distant, some in canoes and some overland. In former years quarrels and fights among the different tribes were common, but of late years the influences of the missions at Metlakatla, Kincoleth, and Fort Simpson have produced a favorable change, not only in inducing them to be more peaceful, but to lay aside their old heathen superstitions, one of which was that all the fish eaten for the first four or five days after they commence to arrive must be either fried or toasted; no one was allowed to boil any, as they believed that if any were boiled the fish would immediately leave the river; they were also strictly forbidden to drink water after a meal of fish, lest there should be rain which would hinder the drying. These ceremonies are now abandoned in a great measure, and but seldom practiced at the present time.

The Eulachon only travel up the Nass River as far as the flood tides reach, which is from 15 to 20 miles from its mouth. For about 7 miles from Nass Strait the river is unsuited for fishing operations. From thence to the Nass Village, at the head of tide-water, is a succession of sand-bars, and these form the spawning beds of the fish. Every available spot along the banks of the river is occupied by the Indians during the fishing season, who erect temporary wigwams for themselves.

As the fishing season approaches the arrival of the fish is anxiously watched by the natives, as it is a season of the year in which they are generally out of food.

The fish usually swim in deep water till they reach the mouth of the river, and during their passage up the strait are followed by innumerable enemies. Porpoises, seals, dog-fish, ground-sharks, and halibut harass them in the strait, and if they rise to the surface they are attacked by clouds of gulls, ducks, and other sea-fowl.

The bishop of British Columbia, who visited the Nass River in 1863, writes concerning the fisheries:

"Such a scene of life—man life, bird life, fish life—I had never before conceived. Over the fish was an immense cloud of innumerable gulls; so many and so thick were they as they hovered about looking for the fish that the sight resembled a heavy fall of snow. The fish are caught in vast quantities. I saw hundreds of tons collected together, and the nets hauled in bushels at a time."

When the fish reach the mouth of the river they generally rise to the surface of the water, and are caught by the natives with a pole about 18 feet long, slightly flattened into an oar-shape at the lower end. Into one edge of this flattened blade are stuck a row of wooden pins or pieces of wire sharpened. This implement is thrust down and with both hands drawn rapidly through the water, and the fish are impaled on the pins and are shaken off into the canoe in the same manner as the Indians about Puget Sound take herrings. The number of Eulachon caught in this way form a good estimate of the probable run of the fish for the season, whether they will be plentiful or not.

As soon as the fish make their appearance at the sand-bars fishing operations begin in earnest. In former years a sort of large landing net, called by the natives *Bānak*, was used, but of late these have been discarded for purse-nets. About an hour after the tide has begun to ebb two strong poles are driven into the sand at the bottom of the river about 12 feet apart; to these the net is attached, the mouth being kept open by inserting two small sticks across it. It is then depressed in the water until the under rim rests on the sand; the fish are drawn into the aperture by the force of the current.

The nets are generally six or eight fathoms long. A long crooked stick is used for raising the narrow end of the net. If it contains fish it is hauled into the canoe and, by loosening a string, its contents are easily shaken out. Sometimes the net for its whole length becomes blocked with fish. The greatest care and skill are then necessary to prevent its being carried away by the current.

Another difficulty, and the cause of much damage to the nets, is the loose ice. The fish first come about the time the ice begins to break up. Of course, there are exceptions to this rule. Some years the ice remains solid until after the fish are caught, in which case holes have to be cut in the ice to put down the nets; other years, again, the ice has all disappeared before the fish arrive.

When the tide begins to flow, the nets are all taken in and all the fish caught are thrown in heaps on the ground close to the wigwams. With

a good run of fish, each net ought to catch about two tons each tide. When a sufficient supply of fish has been obtained they are not boiled down at once, but are left on the ground in heaps from six to ten days, according to the state of the weather. This is done to facilitate the boiling, as the grease separates more rapidly from the fish after a partial decomposition than when fresh. The perfume which permeates the atmosphere at this time is certainly not to be found among the extracts and essences of Lubin or Rimmel. As has been said of the odor of the skunk, "it may be healthy, but is very offensive, and a little of it goes a great way." As an Irishman once remarked to me of a similar stench, "the smell of it would kill flies," which is saying a great deal for its energetic power.

After the fish have remained exposed on the ground five or six days a portion of them are strung up for drying by having their heads interwoven with thin strips of bark; they are then washed and hung on racks to dry; they are not covered up, but are thus exposed to the atmosphere in all weathers for three or four weeks and get perfectly dried and firm, and form a chief article of food for the Indians, who either toast them over the fire or boil them. They also use them as torches. It is only necessary to set them on fire and they will continue to burn until consumed.

In extracting the grease from the fish the Indians place them in large wooden boxes and boil them by means of red-hot stones. As the grease rises to the surface it is skimmed off, and when all has risen the residue of the fish bodies is taken out and pressed to get all the still adherent portion. A ton of fish makes from 24 to 30 gallons. This is then put in wooden boxes and any convenient receptacle, and forms a lucrative article of trade among the natives, and is known in Sitka and other white settlements as *small-fish grease*.

Within a few years, and since the Indians have seen the "rockers" of the miners, they have introduced wooden boxes, with sheet-iron bottoms. These answer very well, and save time, labor, and trouble. About the same time a white man attempted the plan of extracting the grease by heating the fish in a basin floating in boiling water and then subjecting it to pressure, but the attempt proved a failure. Another plan attempted was to cold-press the fish, and for the purpose a powerful screw-press was erected, but that also proved a failure. My own impression is that the grease could be successfully extracted by steam, as is now done at the oil works at Skidgate, Queen Charlotte's Islands, in extracting oil from dog-fish livers. Still, there may be some chemical reason why the grease yields to incipient decomposition, which may suggest some preparation which can produce a similar result.

The ordinary price for the grease at Nass is twenty-five cents per gallon, but in seasons of scarcity the price advances from one dollar to one dollar and twenty-five cents per gallon, although the latter figure is seldom attained.

The Hudson's Bay Company salt a great quantity of these fish for export. They are simply put into casks or butts when first caught, and lightly salted. After remaining two or three days a brine is formed. They are washed in this brine, resalted, and packed in tight barrels, casks, or kits. For smoking, they are allowed to remain in brine a day or two, then strung on slender sticks, which are passed through the eyes, and hung in the smoke. When freshly smoked they have a bright golden appearance, much like red herrings, and are most delicious eating, but they are so excessively fat that they will not keep unless they are smoked quite dry. This is a tedious process, and turns the skin a dull dusty color.

There is a second run of Eulachon in Nass River towards the end of June, but the quality is inferior, and but little grease is made from them.

The Eulachon come suddenly in countless myriads into Nass River, and after spawning depart as suddenly. They evidently pass the remainder of the year in the deep water south of the Aleutian Islands, and make their appearance almost simultaneously in Cook's Inlet and Cross Sound, Alaska, where they are very abundant, and in Nass River. They make their appearance in Fraser's River a few weeks later, but are not as fat or as plentiful as they are farther north.

As a remedial agent, Eulachon oil is considered by some of the best authorities who have tested it as equal to cod-liver oil. Others who have tested its effects only among Indians are in doubt of its efficacy. But it should be borne in mind that the Indians of the coast, who live exclusively on a fish diet, and on the algæ and other products of the ocean, rich in iodine, bromine, and phosphates, are not so easily affected by cod-liver or Eulachon oil as white people who reside in the interior, and partake of the usual regimen of civilized life. Hence, some persons who have administered Eulachon oil to coast Indians have been surprised at the want of success, and have hastily condemned it as worthless. A diet of new milk, fresh from the cow, would undoubtedly prove as efficacious for the coast tribes as cod-liver or Eulachon oil is for white people.

The following is a copy of a report made by Theophilus Redwood, esq., F. R. S., professor of chemistry and pharmacy to the Pharmaceutical Society of London, to Messrs. Langley & Co., Victoria, British Columbia, who kindly furnished it to me for this paper. Professor Redwood writes:

"Eulachon oil, although differing in its source from cod-liver oil, is said to resemble it in its properties, and to have been substituted for it as a remedial agent. In examining the oil, therefore, it was considered important to determine in what points it resembles and where it differs from, cod-liver oil. In taste and smell I cannot indicate any marked difference. Its tendency to congeal is much greater than that of cod-liver oil. At 50° Fahr. the Eulachon oil has the consistency of soft butter, and it does not become fluid until heated above 70° Fahr. The

portion separated by filtration at 60° remains bright at all temperatures above that point, and has a very slight yellowish tint, resembling that of the best pale cod-liver oil. When a few drops of sulphuric acid are added to a small quantity of the oil, placed in a porcelain capsule, it assumes a deep brown tint, without in the first instance affording the violet color which is produced under similar circumstances by cod-liver oil. If, however, the mixture thus formed be allowed to remain exposed to the air for several hours the violet color becomes developed. If an ounce or two of the Eulachon oil be boiled with about twice its volume of distilled water, and the water after being carefully separated and filtered be evaporated to dryness, a small quantity of a brown extractive matter will be left, which closely resembles the extract obtained under similar circumstances from cod-liver oil.

"The Eulachon oil readily saponifies with caustic alkali, and the soap, after being decomposed with acetate of lead, yields oleate of lead to ether, but the oleic acid resulting from the decomposition of this is not brown like that obtained from cod-liver oil.

"Eulachon oil, therefore, although in some respects resembling cod-liver oil, differs from it in some of its chemical and physical characters. The resemblance to cod-liver oil is, however, greater than that of any other oil I am acquainted with that is not extracted from a fish liver.

"THEOPH. REDWOOD."

It would have been interesting if Professor Redwood had given the exact analysis of Eulachon oil, as that of the cod liver has been fully given in various medical works. The student of medicine could have thus been able to have compared the two together, and have found what constitutes their medicinal value.

Professor Redwood says that the oleic acid resulting from the decomposition is not brown like that of the cod-liver oil. The brown color is owing to the presence of a peculiar substance obtained by an analysis of cod-liver oil by De Jough, and named by him *gaduin*, but it has not been ascertained that gaduin is in any way connected with the virtues of the oil.

It has been thought that the action of the liver carbonizes the oil in a manner and thus renders it more susceptible of being taken up and assimilated by the systems of persons to whom it is administered. It is not improbable that the biliary principles associated with the oil are concerned in its peculiar influences. Winckler has inferred from his researches that cod-liver oil is an organic whole, differing from all other fixed oils. Eulachon oil, although a body oil, instead of a product of the liver, seems to possess properties essentially different from all other fish-oils, and future analysis may show that the curative principle of cod-liver oil does not lay in any of the causes mentioned, but in some hitherto undeveloped principle, which is identical with that of the Eulachon. I find no mention of the Eulachon in the voyages of Portlock,

Dixon, Means, Marchard, or Vancouver, except that Means mentions them casually as *sardines*, and says the Indians are as fond of them and make quite as much account of them as they do of salmon. They are found in countless myriads in the waters of Alaska Territory, but hitherto no other use has been made of them in that Territory except as an article of food for the Indians.

If some of the canneries of Alaska would try the experiment and put them up in oil similar to sardines, I predict that a lucrative trade would result. No regular statistics of the Eulachon fishery have ever been kept either in British Columbia or Alaska, and the foregoing meager account of a very important food-fish is all that I have been able to procure.

DESCRIPTION OF TWO NEW SPECIES OF FISHES, ASCELICHTHYS RHODORUS AND SCYTALINA CERDALE, FROM NEAH BAY, WASHINGTON TERRITORY.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Ascelichthys, genus nova.

Family of *Cottidæ*. Body rather robust, covered with naked skin. Head comparatively broad and depressed, covered with naked skin. Preopercle with a simple, strongly hooked spine. Villiform teeth on jaws, vomer, and palatines. No slit behind fourth gill. Gill membranes broadly united, free from the isthmus. *No ventral fins.* Spinous dorsal of low flexible spines. Other fins normally developed. This genus has the general appearance of *Oligocottus*, but is distinguished at once from all the known genera of the family by the absence of the ventral fins; hence the generic name from ασκελής, without leg, and ἰχθύς, fish.

Ascelichthys rhodorus, sp. nov.

Body rather plump, broad, and low anteriorly, nearly cylindrical mesially, becoming compressed behind. Head comparatively broad and low, ovate, regularly narrowed forward, and rounded anteriorly. Eyes rather large, placed high, separated by a slightly concave interorbital space, narrower than the eye. Mouth rather large, nearly horizontal, the maxillary extending to opposite the posterior border of the eye. Lower jaw slightly shorter than upper. Lips rather full, the upper jaw protractile. Teeth small, in villiform bands on jaws, vomer, and palatines. The palatine bands long and narrow. Pseudobranchæ large. Gill-rakers almost obsolete. No slit behind the fourth gill. Branchiostegals six. Gill-membranes broadly united, free from the isthmus. A low, fringed dermal flap above the posterior part of each eye. No other cirri anywhere, and no trace anywhere, on body or head, of dermal prickles or scales. No nasal spines. Nostrils both with short tubes, the anterior the longer.

Suborbital stay very slender, barely reaching the preopercle. Preopercle with a rather short simple spine, strongly hooked upwards and in-

wards, concealed in the skin. A concealed downward-directed spine below this. A downward-directed spine on front of opercle below.

Skin comparatively thin and loose. Lateral line complete and continuous.

Dorsal fins connected by a membrane about half the height of the first dorsal. Dorsal spines low and weak, nearly uniform in height, the middle spines very slightly higher than the others, the highest less than the diameter of the eye, the two anterior close together. The spines all very slender. The enveloping membrane very thick.

Soft dorsal nearly twice as high as the spinous part. Anal about as high as second dorsal, its rays more robust. Pectoral fins rather broad and short, strongly procurrent below, the lower rays thickened. Longest rays reaching past vent to beginning of second dorsal. No trace of ventral fins, either externally or under the skin.

Fin rays: Dorsal IX or X–18 or 19; A. 13; P. 16.

Anal papilla very small. Six pyloric cæca. Intestines short, about as long as body, with one flexure. Stomach filled with Chiton, Patella, small Crustacea, snails, and worms.

Coloration olivaceous, usually rather dark, and shaded with greenish, but sometimes with whitish saddle-like blotches, one on each side of the head, one on preopercle, one at front of dorsal, one most conspicuous opposite the junction of the two dorsals, and two smaller ones under second dorsal. On most of the specimens these markings are but faintly indicated. Belly somewhat dusky. Lips, in most specimens, edged with vermilion, especially the lower.

Spinous dorsal fin dusky, black in the middle and in front above, *with a conspicuous edging of bright crimson*. This marking is rarely faint or obsolete. Soft dorsal, anal, and caudal dusky, edged with paler. Pectoral dusky, edged with paler, and slightly barred at base, especially in the paler specimens.

This species is known to us from about 200 examples, from two to four inches in length, obtained by us at Waadda Island, in Neeah Bay, near Cape Flattery, at the entrance to the Straits of Juan de Fuca. It is found in the greatest abundance at this locality under rocks between tide-marks. It is less active in its movements than the species of *Oligocottus*, and unlike them it is often found out of the water, left in damp places under the rocks by the receding tide.

The following species have been obtained by us in this locality, which is the richest in rock pool fish of any which we have anywhere seen:

Xiphister mucosus,
Xiphister rupestris,
Xiphister chirus,
Ascelichthys rhodorus,
Gobiesox reticulatus,
Anoplarchus atropurpureus,
Murænoides lætus,
Apodichthys flavidus,
Apodichthys fucorum;
Oligocottus globiceps,
Oligocottus maculosus,
Scytalina cerdale.

Table of proportional measurements.

Species: *Ascelichthys rhodorus.*

Locality	Neeah Bay.	
	Inches and 100ths.	100ths of length to base of caudal.
Extreme length	3.90	.....
Length to base of middle caudal rays	3.40	.....
Body:		
Greatest height	.....	21
Least height of tail	.....	8
Head:		
Greatest length	.....	30
Greatest width	.....	27
Width of interorbital area	.....	5
Length of snout	.....	5
Diameter of orbit	.....	6
Dorsal (*spinous*):		
Distance from snout	.....	30
Length of base	.....	26
Greatest height	.....	4½
Dorsal (*soft*):		
Length of base	.....	34
Height at longest ray	.....	10
Anal:		
Distance from snout	.....	56
Height at longest ray	.....	9
Caudal:		
Length of middle rays	.....	16
Pectoral:		
Length	.....	24
Ventral:		
Length	.....	0
Branchiostegals	.....	6
Dorsal	.....	IX, 18
Anal	.....	13
Pectoral	.....	16
Ventral	.....	0
Number of cæcal appendages	.....	6

Scytalina, gen. nov.

Family *Congrogadidæ*, allied to *Congrogadus* Günther.

Body anguilliform, cylindrical anteriorly, compressed behind, covered with very small, imbedded cycloid scales. No lateral line. Head broad, with tumid cheeks, broader than body, resembling a serpent's head. Lower jaw slightly projecting. Each jaw with two strong canines in front, besides which is about one series of small, close-set conical teeth in the lower jaw and a broad patch in the upper. A single series of small teeth on vomer and palatines. Branchiostegals six. Gill-openings very wide, the membranes broadly connected below and free from the isthmus. Pseudobranchiæ small, present. A slit behind fourth gill. Tongue largely free anteriorly. Intestines short, without pyloric cæca. Pectoral fins very small. No ventral fins. Dorsal fin very low, without spines, *beginning near the middle of the body.* Anal similar, and beginning nearly opposite it. Tail rounded behind. Caudal fin well developed, joined to dorsal and anal. Vent near the middle of the body. No anal papilla.

Etymology: diminutive of *Scytale*, a genus of serpents, in allusion to the form of the head and neck and the fang-like canines.

The relations of this genus seem to be with *Congrogadus* Günther, from

which it differs in the presence of canines and in the short dorsal fin. This is the first species of the family thus far known from north of the equator.

Scytalina cerdale, sp. nov.

Body elongate, cylindrical anteriorly, compressed behind, covered with very small imbedded scales. No lateral line. A slight vertebral streak and three very obscure dusky lateral streaks simulating lateral lines.

Head broader than long, with tumid cheeks and constricted neck, much resembling the head and neck of a small snake. Form of snout subconic, the head abruptly narrowed at the eyes, below which is a slight vertical groove. Snout depressed, rounded at tip.

Interorbital space rather broad, posteriorly concave, a median wrinkle extending along the vertex to the nuchal depression. All these depressions are rather apparent than real, being due to the tumidity of the cheeks, which encroach on the other parts.

Eyes quite small, directed almost upward, nearly even with the top of the head. Lips full, the upper separated by a crease from the skin of the forehead, the lower with free margin. Skin of forehead with two or three dermal flaps on each side. In one of these the anterior nostrils and some mucous pores open. Posterior nostril near the eye, with a very small flap. Edge of lower lip sparsely fringed, below which the skin has several coarse pores with dermal flaps.

Gape of mouth rather wide, extending a little beyond the eyes. Lower jaw slightly projecting, its front with two strong, conic, divergent canines. Between these, and behind, along the sides of the jaw, is a series of smaller close-set conical teeth. Upper jaw with two smaller canines, closer together than those in the lower jaw. Edge of upper jaw with close-set conical teeth, apparently in a single row behind, widening into a broad band in front. A single series of small teeth on vomer and palatines.

Branchiostegals seven. Gill-openings very wide, the membranes broadly connected and free from the isthmus. Pseudobranchiæ small. Gill-rakers almost obsolete. Gills four, a slit behind the fourth. Opercle very short, the tumid cheeks encroaching upon it.

Pectoral fins very small, a little below the axis of the body, their length a little more than the diameter of the eye. No ventral fins. Dorsal fin very low, of soft rays only, which are short and weak, imbedded in the skin. Its insertion a little in front of first ray of anal and slightly in advance of the middle of the body. Tail apparently isocercal, rounded behind, with a well-developed caudal fin, which is rounded behind, and composed of rays longer and much slenderer than those in the dorsal and anal. No constriction between dorsal and anal and caudal, the rays of the former fins being joined to the latter at their full height. Anal precisely like dorsal and nearly coterminous with it. Vent immediately in front of anal. No anal papilla.

Intestinal canal a simple short tube, without cæcal appendages. Air bladder obsolete, or reduced to a filmy membrane. Nothing found in the stomach.

Flesh color, with much mottling of purplish above, in fine, close pattern, so that the light areas appear in the form of pale spots. Lower parts finely speckled like the back, except the belly, which is nearly plain. Fins similarly colored.

Anal nearly plain. Caudal reddish edged.

Fin rays not readily counted. Dorsal about 41. Anal 36.

Two specimens of this species were obtained by us at Waadda Island; a third was seen, but it escaped us. It inhabits piles of shingle and small bowlders near the mark of lowest tides, and when disturbed makes its way downward with great celerity through small crevices into the water. The specimens taken are each about 5½ inches in length.

Table of proportional measurements.

Species: *Scytalina cerdale.*

Collector's number of specimen	No. 226.
Locality	Neeah Bay.
	Inches and 100ths.
Extreme length	5.80
Length to base of middle caudal rays	5.50
Body:	
Greatest height	7
Head:	
Greatest length	13
Distance from snout to nape	9
Greatest depth	7½
Greatest width	6
Width of interorbital area	2½
Length of snout	3½
Length of cheek	7
Length of mandible	5
Diameter of orbit	1½
Dorsal:	
Distance from snout	45
Length of base	55
Greatest height	2
Anal:	
Distance from snout	46
Length of base	54
Vent:	
Distance from snout	42
Caudal:	
Length of middle rays	5⅓
Pectoral:	
Length	1¾
Ventral:	
Length	0
Branchiostegals	7
Dorsal	*ca* 41
Anal	36
Number of cæcal appendages	0

ON CAMARAPHYSEMA, A NEW TYPE OF SPONGE.

By JOHN A. RYDER.

A singular organism, which I will name *Camaraphysema obscura*, was first observed by me on living oysters from Chesapeake Bay, attached to hydroids growing on those mollusks. The single specimen which I obtained measured less than half an inch in length, and consisted of a larger and smaller individual (person), united basally to a common attachment, constituting a corm or colony. The color was yellowish, or dirty white; the form of the branches was cylindrical, club-shaped, covered by a tough skin (ectoderm?), which was perforated at intervals, giving rise to tubular, funnel-shaped, oscular openings of exceedingly variable form, according to their condition of expansion. The margin of the funnels was entire and exceedingly thin and tough; this portion was capable of being thrown into longitudinal folds and withdrawn or inverted inwards into the basal portion. These funnels communicated at their bases with chambers, lined, apparently, with a single layer of cells (endoderm?). No mesodermal structures were observed, unless the single egg which I noticed in the first cleavage stage, from its apparent position, is to be regarded as a product of this layer.

The chambers were lined throughout the entire organism with a similar layer of nucleated, columnar cells, as was shown by a series of cross-sections, but no evidence of a collar or flagellum could certainly be detected as forming the inner extremities of the cells. The embryos observed were nearly all in the blastula or morula stage of development, and appeared to lie superimposed upon the living cellular pavement of the chambers, except the one observed in the stage of first cleavage, which seemed to lie in contact with the membranous wall of its chamber. The whole organism was composed of very irregular chambers, separated from each other by an apparently almost structureless membrane, probably of an ectodermal nature. The only evidence of structure here was the presence of faint, delicate striations when the edges of the walls were transversely cut across and viewed with high powers. No spicules were to be found in any situations; no fibers, as in the genus *Spongia;* but the whole supporting structure consisted, as stated before, of the structureless ectodermal membrane, which was perforated and produced at intervals into the funnel-shaped oscular organs.

The chambers in the center or axis of the cylindrical body of the organism could not certainly be made out to communicate with those next to the membranous, funnel-bearing body-wall; but these axial chambers appeared to differ in no way from the outer ones in structure. They were lined like the external chambers with cells, and, like them, contained ova in different stages of development, together with brown material, apparently dirt or remains of ingested food, which would appear to show that there was some sort of communication with the oscular funnels. Only once did I find what I believed to be an intercameral

demi-canal, paved in the same way with cells as the chambers themselves.

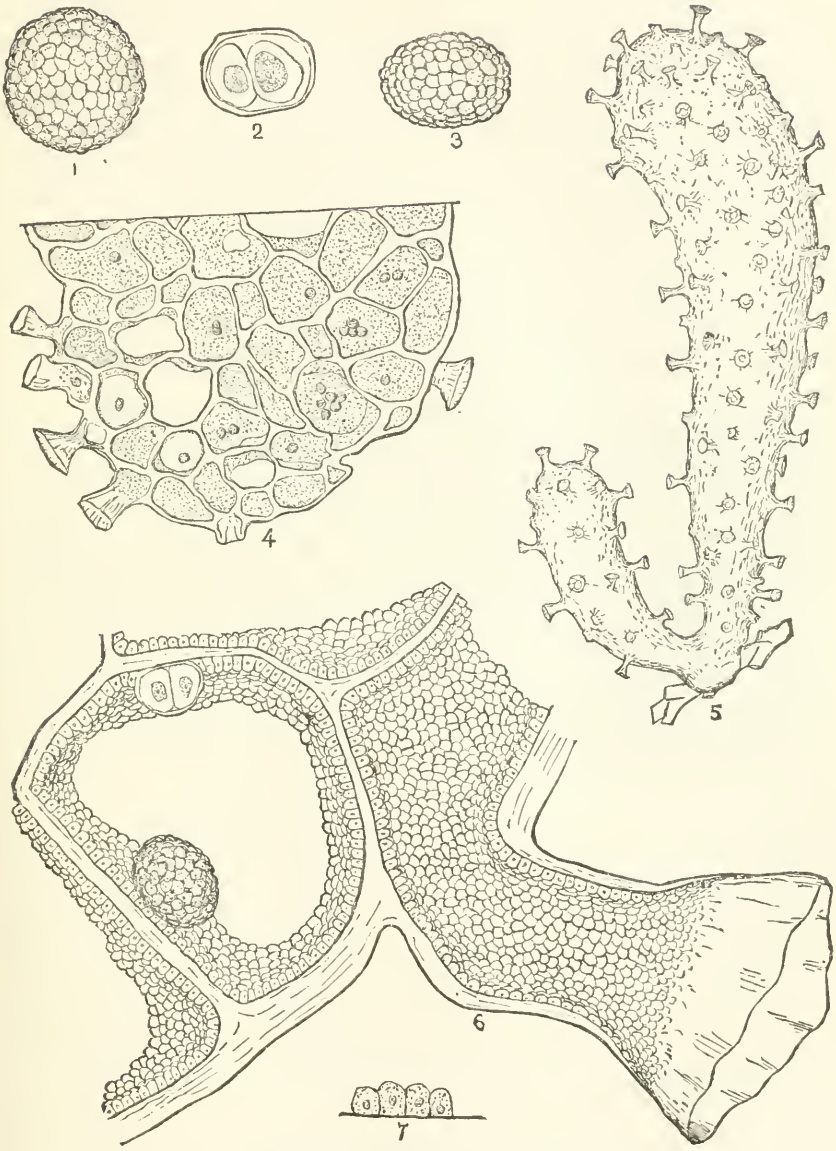
Not seeing the sponge in an absolutely fresh condition, I could not observe the action of the funnels in life; but once while the whole sponge was still in a comparatively fresh condition, and under observation in a zoophyte trough, I saw one of the inverted funnels suddenly everted and expanded to apparently its fullest extent. I was also unable to detect the slightest evidence of any other kinds of openings besides the funnels into the organism, and these were of about the same size throughout. This fact, together with others which I have stated, removes all doubt as to the sponge nature of the organism.

There is no form known to me in literature which corresponds to this in structure. *Halisarca* does not have a tough membranous ectoderm, while the *Physemaria* have an ecto-skeleton, composed of the shells of *Foraminifera*. But as the existence of the *Physemaria* has been apparently doubted by some zoologists, the position of *Camaraphysema* becomes an interesting question. At any rate it may be safely placed close to the fleshy sponges, and may possibly constitute a distinct family.

The account now offered, while it is not as complete as might be desired, rests upon sufficient evidence to make it desirable that the fullest possible description of the organism should be put upon record for the benefit of those who may have the opportunity of extending or confirming my interpretation of its anatomical and embryological features. While I could hardly convince myself at first that I did not have before me some one of those curious compound Ascidians of the suborder *Synascidiæ*, the absence, however, of a common cloacal cavity and any indications of a branchial apparatus or a digestive canal satisfied me that I was not dealing with a tunicate, but that I should have to look among the very lowest of the sponges for its nearest affines.

I have stated that no collar or flagellum could be detected as forming the inner extremities of the cells lining the cavities. This fact does not, however, render it improbable that such structures exist in the living animal, as it must be borne in mind that both Bowerbank and Carter have called attention to the circumstance that the flagellate cells of sponges withdraw their collars and flagella after death. The extreme irritability of sponges is notorious, and to one who sees it for the first time would be considered remarkable, and it is not unlikely that *Camaraphysema* partakes of this characteristic, known to be well-nigh common to all the members of the group.

The exact locality from whence this species was derived could not be ascertained; all that the writer could learn was that the lot of oysters from whence he had obtained his specimen had certainly been brought from the waters of the Chesapeake. It is to be hoped that more specimens will be brought to light, as the writer in investigating his unique specimen was obliged to sacrifice it in order to make his study as complete as possible by slicing it up into sections.



CAMARAPHYSEMA OBSCURA, Ryder.

EXPLANATION OF THE FIGURE ON PRECEDING PAGE.

FIG. 1.—Embryo in the mulberry stage of development, enlarged 250 times.

FIG. 2.—Embryo in the condition of the first cleavage, showing the nuclei and nucleoli of its cells distinctly and an egg membrane, 250 diameters.

FIG. 3.—Embryo in mulberry stage of more frequent ovoid form, 250 diameters.

Fig 4.—Part of a cross-section of the larger branch of the animal, showing the chambered character of the organism, the membranous septa, the oscular funnels in various conditions of extension, and the eggs and embryos in place; 25 diameters.

FIG. 5.—The whole animal of *Camaraphysema obscura*, enlarged 7 times.

FIG. 6.—A small portion of a cross-section similar to Fig. 4, showing the single layer of cells which pave the walls of the chambers, with the embryos in position in one of the latter. The striæ on the cut edges of the walls of the chambers and the peculiar conformation of the oscular funnels are indicated. Enlarged 200 times.

FIG. 7.—Four of the pavement cells lining the chambers, magnified 900 times, showing their nuclei distinctly.

DESCRIPTION OF TWO NEW SPECIES OF SCOPELOID FISHES, SUDIS RINGENS AND MYCTOPHUM CRENULARE, FROM SANTA BARBARA CHANNEL, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sudis ringens, sp. nov.

The type of this species is in very poor condition, having been taken from the stomach of a *Merlucius*, itself found in the stomach of an Albicore (*Orcynus alalonga* = *Orcynus pacificus* Cooper). The process of digestion has destroyed the adipose fin, the ventral fins, and the skin of one side, and the back part of the head is considerably mutilated. Fortunately, the anterior part of the head, with the jaws and teeth, is not at all injured, and the dorsal and anal fins are well preserved. There is, therefore, no doubt concerning the classification of the fish, and as it is the only one of its type yet found in the Pacific, and evidently different from *S. hyalina*, a description of it seems desirable, even though our material is not complete.

Body very slender and elongate, compressed, the depth forming about one-sixteenth of the length. Head rather slender, anteriorly pointed and moderately depressed, so much injured behind the eyes that its exact form posteriorly cannot be ascertained. Mouth large, horizontal, the gape extending more than half the length of the head. Margin of the upper jaw formed entirely by the very slender, nearly straight premaxillaries, which are closely appressed to the long and slender maxillaries. Maxillaries extending to below the eye, nearly as far as the mandibular joint. Tip of upper jaw emarginate. Tip of lower jaw rather broad, turned up, and fitting in the notch of the upper jaw. Premaxillaries armed with a series of small, sharp, subequal, close-set teeth, which are hooked backward. A long slender canine in front on each side.

Lower jaw with about ten sharp, slender teeth on each side, these teeth very unequal, some of them short, three or four very long and canine-like. Near the front is one fang-like tooth on each side, then a considerable interspace, behind which the others are arranged partly in two rows. Most of these teeth, especially the inner and larger ones, and the anterior canines, are freely depressible. A long series of teeth on the palatines, one or two of the anterior teeth on each side and one or two others long, slender, and fang-like. Tongue free anteriorly, roughish, but apparently without teeth.

Opercular bones very thin and membranaceous. Branchiostegals about seven. Gill-membranes not connected. Gill-rakers short, sharp, spine-like.

Scales nearly all lost. The few preserved are very large, cycloid, their diameter nearly a fourth of the depth of the body.

Dorsal fin inserted somewhat behind the middle of the body, at a distance of nearly 4 times its base in front of the anal, its height a little greater than the length of its base. It is composed of 11 (I, 10) rays. Adipose dorsal not preserved.

Anal fin anteriorly nearly as high as the dorsal, its posterior rays low. The number of rays apparently I, 25, possibly I, 24 or I, 26. Ventral fins totally obliterated. Pectoral fins placed low, rather short, about as long as the maxillary. Caudal fin short, narrow, apparently forked.

The coloration is apparently light olive, the sides silvery, with dark punctulations. Fins plain. Peritoneum silvery, underlaid by black pigment.

Table of measurements.

Total length	(ca) 6.60 inches	
Length to base of caudal	6.25 inches	= 100
Body:		
Greatest depth		6
Least depth		2
Length of caudal peduncle		6
Head:		
Length	(ca)	16½
Length of maxillary		9
Length of mandible		11½
Length of snout		8
Dorsal:		
Distance from snout		57
Length of base		5½
Greatest height	(ca)	7
Anal:		
Distance from snout		80
Length of base	(ca)	14
Greatest height	(ca)	5
Pectoral length		8
Dorsal rays		I, 16
Anal rays		I, 25

This species differs from *Sudis hyalina* as described by Dr. Günther (Cat. Fishes Brit. Mus., v, 420) chiefly in the dentition, canine teeth being present on the premaxillaries and palatines, as well as on the mandible. The head is also shorter and the mouth apparently larger in proportion.

Myctophum crenulare, sp. nov.

Form much compressed, deepest in front of the base of the pectorals, bluntly convex anteriorily, tapering behind. Ventral region much more arched than dorsal. Caudal peduncle long and very slender. Head short and high, abruptly rounded in profile, the snout very blunt. Jaws equal, the snout not projecting beyond the mouth. Maxillary very slender, scarcely widened to its tip, and not dilated, its extremity reaching beyond the eye to the margin of the preopercle.

Premaxillaries anteriorly on a level of the pupil. Teeth very small, present on all the dentigerous bones. Rami of the mandible nearly parallel, coming together in a sharp keel below.

Orbital margin above and in front with a thin membranaceous rim, that in front distinct and formed by the upturned edge of the preorbital. Nasal bones membranaceous, their edges upturned, forming a horizontal

groove. A groove between the frontal bones. Orbital margins separated by a groove from the preopercle. Margin of preopercle very oblique. All the membrane bones extremely thin, membranaceous. Eye large, $3\frac{1}{3}$ in head. Gill-rakers long and slender. Head $3\frac{3}{4}$ in length to base of caudal; depth $4\frac{1}{2}$.

Head and body completely covered with thin membranaceous scales, those on the middle of the sides not elevated and not noticeably larger than the others. Free edges of all the scales crenulate, some of them, especially on the back, with the crenations acute, but without spines, the scales not being really ctenoid or spinous. About 45 scales in a longitudinal series.

A phosphorescent spot on each mandible near the symphysis, 33 pairs of spots along the belly, 6 in front of ventrals, 6 between ventrals and origin of anal, and 21 between front of anal and base of caudal.

Caudal peduncle above and below with two or three backward-directed spines, which are apparently the exserted tips of vertebral processes.

Fin rays (not quite certain, the tips being frayed out): Dorsal about 12, anal about 16, the fins rather low.

Origin of dorsal nearer the snout than the base of caudal, much behind the base of the ventrals. Ventrals short, not reaching half way to vent. Pectorals reaching base of ventrals.

Color very dark steel-blue above, silvery on sides and below, with dark metallic luster. The usual phosphorescent spots present, as above described. No evident cream-colored blotch on the back of tail.

Myctophum crenulare is known to us at present from a single specimen, about $1\frac{1}{2}$ inches long, taken from the stomach of an Albicore (*Orcynus alalonga*) in Santa Barbara Channel, July 11, 1880. It had evidently just been swallowed, and is in fairly good condition.

It belongs to that division of the genus "*Scopelus*" called by Dr. Günther "*Myctophum*" (Cat Fishes Brit. Mus., v, 405). As the latter name has priority over *Scopelus*, it must be retained as a generic name for some or all of these fishes.

Table of measurements.

Extreme length	2.20 inches
Length to base of caudal	1.80 inches = 100
Body:	
Greatest depth	23
Least depth of tail	4
Length of caudal peduncle	22
Head:	
Greatest length	27
Width of interorbital	6
Length of maxillary	19
Length of snout	3
Diameter of eye	8
Dorsal, distance from snout	51
Anal, distance from snout	54
Pectoral, length	$9\frac{1}{2}$

Ventral:		
Length		12
Distance from snout		39
Dorsal rays	(ca)	12
Anal rays	(ca)	16
Number of scales in longitudinal series		45
Number of phosphorescent spots		33

SANTA BARBARA, CAL., *July* 15, 1880.

DESCRIPTION OF TWO NEW SPECIES OF FLOUNDERS (PAROPHRYS ISCHYRUS AND HIPPOGLOSSOIDES ELASSODON,) FROM PUGET'S SOUND.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Parophrys ischyrus, sp. nov.

Body rhombic-oblong, less deep than in *Platichthys stellatus* or *Lepidopsetta bilineata*, and with the head more pointed and protruding, but less so than in *Parophrys vetulus*. Body tapering from the middle to the head and tail, the four bounding lines but little curved and quite regular. Caudal peduncle strong, compressed, and rather long. Head comparatively long, a slight angle over the eye, and the snout protruding and not obtuse. Lips full, simple. Mouth moderate, oblique, the lower jaw slightly projecting and somewhat more developed on the blind side,

Teeth about $\frac{5+25}{10+22}$ in number.

Teeth in one series, rather close set, some on both sides of the jaw, but more numerous on the blind side, somewhat irregular in length, some of them movable. In form the teeth are somewhat compressed and incisor-like and bluntish, but not as notably so as in some related species. No teeth on vomer and palatines.

Maxillary reaching past the front of the orbit, nearly to the pupil. Anterior nostril with a flap. Posterior nostril almost simple. Tongue free. Eyes rather large, the upper directed upward, the lower slightly in advance of the other. An area covered with smooth skin in and behind orbit of upper eye.

Interorbital space rather broad, somewhat elevated mesially, continuous, with a slightly marked ridge above the opercle and forking forwards, the lower branch ending in a blunt prominence.

Snout behind nostrils, interocular ridge, and posterior part of head covered with scales like those on the body, but smaller and rougher. Preorbital very narrow, naked. Skin of head continuous over the edge of the preopercle. Gill openings above not continued forward. Gill-rakers short, slender, and weak, about 12 below the angle of the arch. Branchiostegals seven. Lower pharyngeal bones separate, each with two rows of coarse, blunt teeth.

Scales moderate in size, thick and firm, adherent, not closely imbricated, anteriorly separated. Those on the tail oblong and a little im-

bedded, those on the head and anterior regions rather regularly arranged, but not close together.

Scales strongly ctenoid everywhere, each with a semicircle of six to ten upward-directed spinules on its posterior edge. Those on the head and body are similar, the former being a little smaller and rougher, especially behind the eyes, where they are somewhat stellate.

Left or blind side of the body uniformly scaled like the eyed side, the scales similar and *almost as strongly ctenoid*. Preopercle nearly smooth. Rest of head with small rough scales, similar to those on the right side, but farther apart.

Caudal, middle part of dorsal and anal, and bases of pectorals and ventrals with small rough scales in series, running up the rays on the right side. On the blind side the base of the caudal with small rough scales. Other fins naked.

Lateral line conspicuous, its scales less rough than the others; a very slight curve anteriorly, otherwise straight. A distinct short accessory lateral line on both sides, extending to about the tenth dorsal ray. A series of pores around lower eye behind. No enlarged scales along lateral line or at the bases of the fins.

Lateral line with about 88 pores; about 80 scales in a longitudinal series above the lateral line.

Dorsal fin beginning over the pupil, its first rays turned slightly toward the blind side, low in front, the rays regularly increasing to behind the middle of the body, then similarly diminishing. Anal fin similarly formed, preceded by an antrorse spine. Highest rays of dorsal and anal about equal and nearly half the length of the head.

Caudal fin large, somewhat double-truncate, the middle rays produced Pectoral a little more than half the length of the head, that on blind side shorter. Ventrals reaching to anal. Rays of dorsal and anal all simple.

Dorsal rays, 79–76; anal, 52–57; ventrals, 6. Eyes and color on the right side.

Color above light olive-brown, vagnely clouded with light and dark Fins reddish-brown; a few roundish dusky blotches on dorsal and anal, resembling in position the black vertical bars found in *Platichthys stellatus*. Pectoral and caudal tipped with dusky. Blind side white, either immaculate or else with small round rusty spots. Left side of head sometimes rusty tinged.

This species is known to us from four examples obtained with a seine in the harbor of Seattle, Washington Territory. We place it temporarily in the genus *Parophrys*, inasmuch as it has the technical characters at present assigned to that genus, *i. e.*, the small mouth with blunt uniserial teeth, and the straight lateral line with its accessory dorsal branch. The character of cycloid scales assigned to *Parophrys* needs modification, as in *Parophrys vetulus* most of the scales on the cheeks and tail are slightly ctenoid.

It is, however, evident that there is no special affinity existing between the present species and *Parophrys vetulus*, and no very close relation between either and *Lepidopsetta isolepis* Lockington, which, by its technical characters, would be also a *Parophrys*. The nearest natural ally of *Parophrys ischyrus* is perhaps *Lepidopsetta bilineata*, and the present arrangement is to be accepted only until the relations of these forms can be more fully investigated.

Hippoglossoides elassodon, sp. nov.

Body oblong-elliptical, strongly compressed, the dorsal and ventral outlines regularly and pretty strongly arched. Caudal peduncle moderate, about as long as deep and growing wider behind.

Head rather large, bluntish, its upper profile continuous with the outline of the back. Depression over the eye slight. Mouth comparatively large, very oblique, the upper jaw somewhat concave in outline, the lower correspondingly convex, the gape considerably wider on the blind side than on the right side. Lower jaw rather strongly protruding, with a considerable symphyseal knob. Maxillary rather narrow, reaching to opposite the middle of the pupil or beyond, the maxillary on the blind side much longer than the other. Premaxillary anteriorly on the level of the interocular space.

Upper jaw with a *single series* of small conical teeth, which are not very sharp. These teeth are somewhat larger in front than on the sides, and also more widely set. Everywhere they are quite small, much smaller than in *Hippoglossoides jordani*, and not larger than in *H. exilis*. Lower jaw with a single series of rather close-set teeth similar to those in the upper jaw, or slightly larger; those on the sides smaller than the anterior teeth. Number of teeth about $\frac{35+45}{25+35}$.

Eyes large, nearly even in front, the upper eye directed somewhat upward, but not reaching the dorsal line. Interorbital space a narrow sharp ridge, with about two rows of minute scales; 10 to 15 rows of scales in an oblique series on the cheeks. A series of mucous pores around lower eye behind. Preorbital narrow. Anterior nostril with a rather long flap, posterior with a slight tube

Gill-rakers long, slender, and straight, 15 to 17 below the angle of the arch, their inner margins feebly dentate. Pyloric cœca 4.

Scales small, firm, less readily deciduous even than in *H. jordani*, rough to the touch, with the spinules short and firm. Scales on head similar, but more imbedded, those on the tail larger and rougher

Scales on blind side small, mostly smooth, except on the caudal peduncle, where they are larger and rough ctenoid, like the scales on the right side. The scales along the base of the dorsal and anal and those near the lateral line more or less ctenoid. Scales along left side of head small, non-imbricate, those on the preopercle and posterior part of the cheeks becoming obsolete. The amount of roughness on the scales below is subject to considerable variation.

Lateral line very prominent, as in *H. exilis*, the tubes coarse, their number (88 to 92) less than that of the transverse series of scales.

Scales: 41 to 50; 110 to 120; 35 to 44.

Lateral line slightly rising anteriorly, but without arch. No accessory lateral line. Rays of all the fins on the eyed side (except the posterior part of dorsal and anal) and of the caudal on the left side covered high up with series of narrow ctenoid scales.

Fins well developed, of firm texture, the tips of the rays protruding.

Dorsal fin beginning immediately in front of the pupil, its anterior rays low, the others regularly increasing backwards to a point much behind the middle of the fin, then becoming rapidly shorter, the highest rays nearly half the length of the head and more than the length of the caudal peduncle.

Anal fin preceded by a spine, its highest rays opposite to or in front of those of the dorsal and equal to them, the others rapidly shortened. Caudal long, double-truncate or convex, the middle rays considerably produced, as in *H. exilis*, more than in *H. jordani*.

Pectoral fin half the length of the head, that on blind side shorter. Ventrals moderate, reaching past front of anal, their inner rays shortened.

Dorsal rays, 77 to 84; anal rays, 59 to 63; ventrals, 6.

Color light olivaceous brown, nearly uniform on the body. Fins grayish, obscurely and irregularly blotched with dusky. Blind side plain.

This species differs from *Hippoglossoides jordani* and *H. exilis*, the two species thus far known from the Pacific coast of the United States, in the presence of but a *single row* of *teeth in the upper jaw*. From *H. jordani* it further differs in the much smaller teeth, fewer fin rays, and more convex caudal. From *H. exilis* the small scales and firmer texture at once distinguish it. Its nearest relative is probably the Atlantic species, *Hippoglossoides platessoides*, which has a larger number of rays in the vertical fins.

Hippoglossoides elassodon is known to us by about 20 examples of different sizes, all obtained with hook and line from the wharves at Seattle and Tacoma, in Washington Territory.

Table of proportionate measurements.

Species	Parophrys ischyrus.		Parophrys ischyrus.		Hippoglossoides classodon.		Hippoglossoides classodon.	
Locality	Seattle.		Seattle.		Seattle.		Tacoma.	
	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.
Extreme length	17.05		14.20		9.75		12.90	
Length to end of middle caudal rays.	14.30		11.50		7.80		10.50	
Body:								
Greatest height		43⅓		45½		41		46
Least height of tail		9½		9½		9½		11
Length of caudal peduncle		10½		9½		10½		9
Head:								
Greatest length		26½		31		30		29
Width of interorbital area		1½		1¾		1		1
Length of longest gill-raker						3½		3
Length of maxillary (from tip of snout)						13		12
Length of maxillary (from tip of snout, blind side)								14
Length of mandible						16½		15
Distance from snout to orbit		4½		6		5		6¼
Diameter of orbit		5		5½		8		7
Dorsal:								
Distance from snout						8		6½
Height at longest ray		13		14⅓		14		14
Anal:								
Distance from snout						40		36¼
Height at longest ray		13½		14½		15		13½
Caudal:								
Length of middle rays		19		22½		23½		22
Length of external rays						22		19
Pectoral, length		15		16		17		14
Ventral, length		7		9		11		11
Dorsal rays	76		70			77		84
Anal rays	57		52			59		61
Ventral rays	6		6			6		6
Number of tubes in lateral line	88		88			926		90
Number of transverse rows						120		110
Number of cæcal appendages						4		

ASTORIA, OREG., *June* 16, 1880.

ON THE GENITALIA OF MALE EELS AND THEIR SEXUAL CHARACTERS.*

By S. TH. CATTIE, Arnheim, Holland.

As is well known, Darwin† has called attention to the experience of Günther that the females of fishes are in almost all cases larger than the males. This was perhaps the reason that Syrski, in 1874,‡ in investigating the reproductive organs of eels, directed his attention more especially to the smaller individuals, where he was fortunate in finding what is called by many the organs of Syrski, and also considered to be the male genital apparatus. Afterwards, in a variety which is known

* Ueber die Genitalien der männlichen Aale und ihre Sexualunterschiede, von S. Th. Cattie, Phil. nat. Cand., Docent an der Realschule zu Arnheim (Holland). Extracted from the Zoologischer Anzeiger, 7th June, 1880, pp. 275–279. Translated by J. A. Ryder.

†Ch. Darwin, Descent of Man, translated into German by Carus, part ii, p. 5 et seq.

‡ Abhandl. d. kais. Akad. d. Wissensch., Wien, April Heft, 1874.

in France under the name of *Anguille pimperneau*, Dareste* found the same organ. It appears that only in one case (*Anguilla bostoniensis*) have living spermatozoa been found in a male eel, as we learn from a communication to the Zoologischer Anzeiger, vol. ii, No. 18, p. 15, by A. S. Packard. The male in this case was about 430^{mm} long (17 inches). That the finding of such specimens is so very rare should not astonish us, since the young eels migrate to the deep sea, where the reproductive organs complete their development very rapidly (6 to 8 weeks), when spawning takes place; the old eels, the females as well as the males, dying after the reproductive act is consummated. Though on this account the spermatozoa, and in most cases their testicular mother cells, are wanting, the investigation of the histological structure of the organ of Syrski may still bring us somewhat nearer to the truth.

If one examines partially grown eels measuring 200–500^{mm} in length one will find a moderate broad band in the abdominal cavity of some of them, attached at its inner margin by a narrow duplicature of the peritoneum to the air-bladder, the other margin, however, hanging free in the cavity of the abdomen. This band extends from the liver to behind the anal opening, and is covered by thousands of fat cells. A lobular organ, consisting also of fat cells, overlies the hinder portion of the alimentary canal and ovarium. I found the eggs to average 0.75^{mm} in diameter from specimens 20–50 ^{cm} in length. Treated with acetic acid and ammoniacal carmine solution, a large nucleus and nucleolus became visible. In other examples, although the fat lobules were present, the broad band was absent. But in exactly the same position and along the dorsal aspect of the abdominal cavity a quite thin band or strip of tissue of glass-like transparency is attached, and likewise by a fold of connective tissue (peritoneum), to the air-bladder, and extends from the liver to behind the anal opening. This band or strip of tissue is crenated along its free margin, the lobes of which measure 0.75^{mm} in length and 0.5^{mm} in depth, their convex portion depending into the abdominal cavity. In this Syrskian or lobed organ one finds, along the margin where it is attached, a fine canal, the efferent seminal duct, which, upon being tinged with carmine, becomes quite distinct, and which may also be demonstrated by means of injections. The histological structure of the foregoing lobulated organ was investigated by Freud.† He found an areolar structure with connective tissue corpuscles, similar to the histological structure of the immature testes of fishes. My preparations had a similar appearance as long as the smaller examples were the subjects of investigation. In the largest specimens of eels with lobulated organs investigated by me (445^{mm} long) I found cylindriform strings, which passed from the bases to the tips of the lobes, and were filled with cells. After repeated trials with the most different reagents, I did not succeed in clearly distinguishing a nucleus in these cells. My observations

* Compt. Rendus, 1875. t. lxxxi p. 159.

† Sitzungsber. d. kais. Akad. d. Wissensch., Wien, 1877, März Heft,

were made with a Zeiss immersion, objective K, oculars 2 and 3. According to Jacoby,* Von Scibold saw similar strings of cells in an eel, in which the lobes were very strongly developed. These strings of cells presented to the eye the most undoubted similarity to the testicular mother cells of spermatozoa. I also believe that the strings of cells observed by me must be regarded as such. In no case did I observe any spermatozoa.

Previous to my investigations into the histology of the testicular lobes of the eel, I occupied myself with the question whether there were not some other external characters distinguishing the sexes besides the already mentioned difference in size and length. Jacoby remarks as follows upon this point:

"1. A distinctly broader snout in the female as compared with the slender, either elongated or short, and pointed snout of specimens with the lobulated organs.

"2. A lighter coloration of the female, usually quite green on the back and yellowish or yellow on the belly, whilst the other sex is much darker green in color, often an intense black on the back, with always a more marked metallic luster on the sides, and usually whitish on the belly.

"3. A further and important external character is an appreciable difference in the height of the dorsal fin (a point confirmed by me). All the females have a distinctly higher and wider dorsal than males of the same size.

"4. And, finally, we may note, although not a constantly appreciable character, the greater diameter of the eye of the male. Eels with strikingly small eyes seem almost always to be females. Eels which have a Syrskian organ usually have relatively large eyes, though large-eyed females are equally common."

Jacoby then gives some measurements, the averages of a great number of eels measured by him, from which the actual value of his characters becomes apparent. I believe, nevertheless, that he attaches too much importance to some of his characters, and some others, not less important, he has not noticed at all.

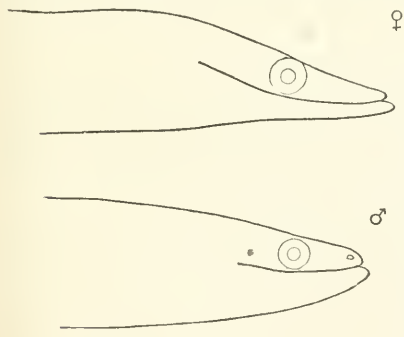
Out of a great number of eels measured by me I select the following, in which the measurements given in the parallel rows are taken from pairs the lengths of which are, as nearly as possible, the same:

* Dr. L. Jacoby, Der Fischfang in der Lagune von Commachio.

	Length of the body.	Width of the snout between the nasal tubes.	Width of the snout between the centers of the eyes.	Length of the mouth from the middle of the eye to the tip of the snout.	Diameter of the eyes.	Length of the head to the gill-opening, measured along the lower jaw.	Height of the dorsal fin.
	mm.	mm.	mm.	mm.	mm.	mm.	mm.
I ♂	270	— 4	8	8	4	35	6
I ♀	305	4.5	8.5	9	3.5	35	— 7
II ♂	325	— 4	8	9	4.5	37	7
II ♀	324	— 5	9	10	5	39	8
III ♂	327.5	— 4	9	9	4	40	6.5
III ♀	327.5	5	10	—10	5	40	7.5
IV ♂	345	— 4	8	10	5	41	6
IV ♀	344	4.5	9	+10	4	43	7
V ♂	355	4	+ 9	9	5	41	— 7
V ♀	352	5	10	10	+ 5	42	7.5
VI ♂	359	— 4.5	+ 9	— 9.5	5	+ 41	— 7
VI ♀	358	5	10	10	5	42	+ 8
VII ♂	378	4.5	9.5	10	5	43	7
VII ♀	375	6	11	12	5	45	+ 8
VIII ♂	389	4.5	9.5	10	5	44	7
VIII ♀	380	— 5.5	10	11.5	4.5	47.5	+ 8

— 4 indicates somewhat less than 4; + 4 somewhat more than 4.

From this table the conclusion is reached that all the females have the dorsal fin higher than those specimens of the same length presumed to be males, and that with age this difference becomes still more marked.



The larged-eyed character of eels with the lobulated organs has appeared to me to be too uncertain a feature, so much so that, according to the foregoing table of measurements, the same feature might be assumed as characteristic of the females. On the other hand, I attach great importance to the broader snout of the female in contrast to the slender and pointed snout of the male. But the snout of the female is not only broader, but also more depressed, and has the eyes more prominent, a feature to which I would call special attention, and one which I do not find in the male. In contrast, the snout of the male eel is more convex, as will be seen by comparing the accompanying outline sketches.

If one will only notice the width or slenderness of the dorsal, and more especially the broad, depressed snout of the female, with the prominent eyes, as compared with the slender, convex snout of the male, it will require little trouble to pick out the specimens from these data conjectured to be males.

On an average amongst twenty eels, measuring 300–500mm in length, furnished me by different fishermen, I found 5 eels with lobulated organs or 25 per cent. If, however, I paid attention to the two most impor-

tant characters, namely, the relative proportions of the dorsal and snout, by their help picking out those specimens which appeared to be males, I actually found 80 to 90 per cent. of the individuals so selected to be males with the Syrskian organ.

I found it impossible to discover distinctive sexual differences of coloration; all the males and females investigated by me were of a white color ventrally, green above, with a metalic luster on the sides.

DESCRIPTION OF A NEW SPAROID FISH (SPARUS BRACHYSOMUS), FROM LOWER CALIFORNIA.

By W. N. LOCKINGTON.

Sparus brachysomus n. sp.

D. $\frac{12}{12}$; A. $\frac{3}{11}$; P. 15; V. $\frac{1}{5}$; C. 3–9–8–3; L. lat. cir. 50.

Body compressed, high; snout and forehead rising in nearly a straight line, at an angle of about fifty degrees with the axis of the body, to the occiput. From this point the dorsal outline arches upwards to the third dorsal spine, then downwards in a continuous arch to the end of the dorsal fin. Abdominal outline much less curved than the dorsal, the anal portion more curved than the anterior portion, lower jaw curved, outline between lower jaw and ventrals nearly straight.

Greatest depth $2\frac{2}{3}$; length of head about $3\frac{1}{11}$; dorsal base about $2\frac{3}{10}$; pectoral about $3\frac{2}{3}$ times in the greatest length; snout (along axis of body) $\frac{8}{7}$; orbit $4\frac{1}{2}$; interocular width $3\frac{33}{46}$ in the length of the head; least depth of caudal peduncle $5\frac{1}{4}$ times in the greatest depth.

Posterior extremity of maxillary falling somewhat short of the anterior margin of the orbit, its upper margin concealed beneath the preorbital throughout; no prominent knob at upper extremity. Lower jaw shorter than the upper.

Nostrils simple; the posterior a large elongated slit close in front of the orbit and on a level with the lower half of the eye; the anterior a small circular foramen situated at a lower level than the posterior and about one-fourth of the diameter of the eye in advance of it.

Interocular space considerably convex transversely, but only slightly so longitudinally.

Posterior margin of preoperculum straight and vertical, lower line convex, the angle of junction strongly rounded. Operculum ending in a flat point; suboperculum membranous at tip.

Numerous conical teeth in front of the jaws, the anterior row considerably larger than those behind. Three rows of molars in the upper jaw, two in the lower. In the specimens examined there are 9 large incisors in the mandible, forming a bold arc, the interior of which contains about five irregular rows of crowded cardiform teeth, reaching back to the anterior small molars. Upper jaw similar, with 7–10 large incisor teeth.

Number of molars in each row of lower jaw variable, but usually 9 on each side, those of the inner row increasing in size to the last, or to the penultimate, which sometimes exceeds the last in size. Teeth of outer row also increasing in size posteriorly, but to a less extent and less regularly, so that the hinder four molars of the inner row are much larger than their neighbors in the outer row. The two inner rows meet at an acute angle, the anterior pair in contact.

Inner row of molars of intermaxillaries consisting of 21 teeth, of which 6–7 form a row on each side, and increase in size to the hindermost or the one in front of it, while the remainder form a curved line of small tubercular teeth of even size along the inner side of the front of the jaw, behind the band of incisors. Outer row of molars 8 in number, similar to those of the lower jaw. Middle row formed of more numerous (about 14) and, on the whole, smaller teeth than either of the outer rows, increasing in size posteriorly, so that, though the anterior five or six are very small, the posterior ones are about equal in size to the smaller teeth of the outer row. The hindmost four or five teeth of the inner row in all cases exceed greatly in size any teeth in the other rows.

Gill-rakers consisting of clusters of pin-like, slender teeth set upon tubercles; those of the last two pairs of branchial arches largest. The principal clusters of teeth are triangular, with several rows of teeth, the largest behind, the other rows diminishing in length and in size of teeth as they succeed each other anteriorly.

Pharyngeal bones, upper and lower, covered with a dense cluster of teeth similar to those in front of the jaws. The inner row of the lower pharyngeals larger than those in front, which are about four in number, and the anterior teeth rather larger than the posterior.

Dorsal commencing immediately over the pectoral base; first spine about one-fourth the length; second spine eleven-twentieths of length of third; fourth broken in specimen examined; fifth slightly shorter; and the remaining spines decreasing regularly to the twelfth, which is less than half as long as the third.

Rays of soft dorsal twice bifurcate.

Second anal spine longer than the third and about twice as long as the first, which is inserted a little behind the pectoral base; rays twice bifurcate.

Caudal deeply and triangulately emarginate on its hinder border, the free portion of the central rays about one-third the length of that of the outer rays. Outer pair of principal rays undivided, most of the others four times bifurcate.

Fifth ray of pectorals longest, fourth but little shorter, lower rays tapering rapidly, producing a rather narrow elongate fin; rays twice bifurcate.

First soft ray of ventrals longest; rays three times bifurcate.

Scales large, broader than long, slightly striated and scalloped on their engaged margin, posterior margin rounded, anterior somewhat angular, the center advancing. Scales of body subequal, operculum and

preoperculum with rather smaller scales, those of interoperculum smaller still. Margins of orbit scaleless, the scales of occiput, which are rather small, advancing to a point very slightly in advance of the anterior orbital margin. Cheeks, jaws, and fins scaleless.

Lateral line approaching gradually nearer to the dorsal outline toward the posterior portion of the body, and running a little above the center of the caudal peduncle; pores simple.

Color, in alcohol, dark brown on snout and cheeks, fading to silvery on sides and rest of body; behind the pectorals there are traces of golden reflections.

On the orbital margin, just above the posterior nostril, there is a tubercular projection of the bone.

Several specimens of this species were sent from Magdalena Bay, Lower California, by Mr. W. J. Fisher. They were unfortunately in rather bad condition, so that the tips of the rays of the soft dorsal and anal are broken off both in the example described and in others which were carbolized and dried.

One of the examples is in the National Museum, Washington, D. C.

This species should probably be placed in the genus *Calamus* Poey, which includes also the *Pagellus calamus* of Cuv. & Val., but as I have not Poey's work at hand I leave it in the Linnæan genus *Sparus*.

Dimensions.

	Inches.
Total length from tip of snout to tip of caudal lobe	14.00
Total length from tip of snout to end of middle caudal rays	12.37
Greatest depth across pectoral base	5.25
Depth of caudal peduncle	1.00
Length of head to tip of opercular spine	3.42
Tip of snout to upper pectoral axil	3.90
Tip of snout to origin of anal	7.70
Tip of snout to origin of dorsal, along dorsal outline	5.55
Tip of snout to anterior axil of ventrals, along abdominal outline	4.35
From orbit to tip of upper jaw, in straight line	2.25
Upper margin of orbit to level of center of interocular space	.37
Longitudinal diameter of eye	.76
Width of interocular space	.92
Length of snout	1.69
Tip of snout to end of maxillary	1.52
Length of pectorals, center ray	3.88
Length of ventrals	2.40
Length of base of dorsal	6.07
Length of base of spinous dorsal	3.88
Length of first spine of dorsal	.53
Length of second spine of dorsal	1.10
Length of third spine of dorsal	2.03
Length of fifth spine of dorsal	1.97
Length of anal base	2.15
Length of first anal spine	.45
Length of second anal spine	.94
Length of third anal spine	.73
Greatest thickness at operculum	1.75
Greatest distance from abdominal outline to lateral line	4.05

DESCRIPTION OF SEVEN NEW SPECIES OF SEBASTOID FISHES, FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The Sebastoid fishes of the coast of California have been referred by Professor Gill to four genera: *Sebastodes* (type *paucispinis*), *Sebastosomus* (type *melanops*), *Sebastomus* (type *rosaceus*), and *Sebastichthys* (type *nigrocinctus*), the first separated by the small size of the scales, the others mainly differentiated by the degree of development in the spines of the head. The genus *Sebastodes* we consider valid, referring to it only *paucispinis*, although the affinities between *paucispinis* and the group termed *Sebastosomus* are not remote, as is shown by the smooth head, protruding lower jaw, small scales, and longer anal fin in the latter group.

The discovery by us of numerous additional species not known to Professor Gill renders it evident to us that the groups *Sebastosomus* and *Sebastomus* cannot be maintained as genera distinct from *Sebastichthys*, and that, in order to recognize them as subgenera even, a different distribution of the species must be adopted.

The Californian species known to Professor Gill are distributed by him as follows:

Genus SEBASTODES.
paucispinis.
Genus SEBASTOSOMUS.
melanops.
simulans.
flavidus.
ovalis.
pinniger.
Genus SEBASTOMUS.
elongatus.
rosaceus.
ruber.
auriculatus.
nebulosus.
Genus SEBASTICHTHYS.
nigrocinctus.

The following arrangement expresses our present views as to the relations of the species known to us, so far as it can be shown in a linear series.

Genus SEBASTODES.
paucispinis.
Genus SEBASTICHTHYS.
Series (or subgenus) *Sebastosomus*.
melanops.

simulans.
flavidus.

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ovalis.

Series (or subgenus) *Sebastichthys.*

atrovirens.
pinniger.

---

elongatus.

---

rubrivinctus.

---

auriculatus.

---

vexillaris.

---

chlorostictus.
rosaceus.
constellatus.

---

ruber.

---

rastrelliger.
nebulosus.
fasciolaris.
serriceps.
nigrocinctus.

Of the foregoing species we have examined a large series of all except *ovalis*, *rubrivinctus*, and *nigrocinctus*. *All* the species except *nigrocinctus*, *ovalis*, and *rubrivinctus* are of frequent occurrence in the San Francisco markets.

The characters drawn from the presence or absence of the different pairs of spinous ridges on the top of the head are among the most reliable in this group, although not hitherto accurately given by the describers of the species. Some individual irregularities may be observed, but these are usually readily detected.

For these spines we have adopted the following names: *Nasal:* those near the nostrils; present in all our species of *Sebastichthys*. *Preocular:* for those above the front of the eye; present in all except *flavidus* and *simulans*. In *melanops* the ridge is present, but it usually does not end in a spine. *Supraocular:* above the eye; present in all but *simulans*, *melanops*, and *flavidus*. *Postocular:* close behind these; present in most of the red species, usually wanting in others. *Tympanic:* behind the postocular, and generally present. *Occipital:* long ridges on the posterior part of the head on each side of the occipital crest. These ridges end in spines in all except *melanops*, *simulans*, and *flavidus*. *Coronal:*

a pair of distinct spinous ridges in front of the occipital ridge; present in one species only—*auriculatus*. *Nuchal:* close behind the occipital; in one species (*serriceps*) large and distinct, in the others either wanting or often coalescent with the preceding.

Two suprascapular spines are present in all the species except *auriculatus*, which has three on each side.

The following table gives the names of the spinigerous ridges on the top of the head *usually* present in each species, beginning with those in which the ridges are least elevated:

	Pairs.
Paucispinis, preocular, occipital	2
Flavidus, nasal	1
Melanops, nasal and preocular	1 or 2
Simulans, nasal	1
Ovalis, nasal, preocular, supraocular, postocular, tympanic, and occipital	6
Pinniger, nasal, preocular, supraocular, postocular, tympanic, occipital	6
Atrovirens, nasal, preocular, supraocular, occipital, and sometimes tympanic	4 or 5
Elongatus, nasal, preocular, supraocular, tympanic, occipital	5
Rastrelliger, nasal, preocular, supraocular, tympanic, occipital	5
Auriculatus, nasal, preocular, supraocular, tympanic, coronal, occipital, and often nuchal	7
Vexillaris, nasal, preocular, supraocular, occipital, and sometimes tympanic	4 or 5
Chlorostictus, nasal, preocular, supraocular, postocular, tympanic, occipital	6
Rubrivinctus, nasal, preocular, supraocular, tympanic, occipital	5
Rosaceus, nasal, preocular, supraocular, postocular, tympanic, occipital	6
Constellatus, nasal, preocular, supraocular, postocular, tympanic, occipital	6
Nebulosus, nasal, preocular, supraocular, tympanic, occipital	5
Ruber, nasal, preocular, supraocular, postocular, tympanic, occipital	6
Fasciolaris, nasal, preocular, supraocular, tympanic, occipital	5
Serriceps, nasal, preocular, supraocular, tympanic, occipital, nuchal	6
Nigrocinctus, nasal, preocular, supraocular, postocular, occipital	5

The character of the gill-rakers has been hitherto unnoticed. In this regard the species may be grouped as follows:

1. Long and slender: *flavidus*, *simulans*, *ovalis*, *pinniger*, *melanops*, *atrovirens*.

2. Long and rather strong: *vexillaris*, *elongatus*, *chlorostictus*, *rosaceus*.

3. Stout and rather short, usually not clavate, but constricted toward the tips: *rubrivinctus*, *auriculatus*, *constellatus*, *ruber*.

4. Stout, short, compressed, and clavate: *nebulosus*, *fasciolaris*, *serriceps*, *nigrocinctus*.

5. Very short, broader than high: *rastrelliger*.

Sebastichthys atrovirens sp. nov.

Allied to *S. pinniger*. Body oblong, not very stout, not tapering rapidly backward. Head moderate, rather pointed, its upper outline with a slightly curved slope from the snout to the nuchal region.

Mouth moderate, not very oblique, the lower jaw little projecting, the rather slender maxillary extending to the posterior border of the pupil; the premaxillary below the horizon of the pupil. Maxillary largely scaly. Eye large, about three and a half times in length of head.

Ridges on top of head rather low, not ending in very prominent spines. The following pairs are present: *Nasal*, *preocular*, *supraocular*, and *occipital*, four in all. Occasionally the tympanic spine is also developed, although very small. The nasal spines are quite prominent. The preocular and superocular moderately so, but short. The occipital spines are comparatively short and low.

Preorbital bone with the neck very narrow, scarcely one-fifth the diameter of the eye, provided anteriorly with two stout spines, which project backward.

Preopercular spines short, but rather sharp, the second longer and slenderer than the others, all of them pointed. Subopercle and interopercle with spines. Opercular and suprascapular spines sharp.

Interorbital space rather broad and slightly convex, widened backward, a little depressed on each side next the supraocular spine, its width less than that of the eye and more than the length of the occipital spine.

Gill-rakers long and slender, but stouter, rougher, and shorter than in *S. pinniger*, 9 above the angle and about 22 below; the longest two-fifths the diameter of the eye, about half the interorbital space.

Scales on the head rather large, about 15 in a cross-series on the cheeks above the suborbital stay. Preorbital scaly.

Scales on body large and somewhat more regularly arranged than usual. Accessory scales present, but not numerous; 52 transverse series of scales.

Dorsal spines moderate, the fifth and sixth spines highest, the others regularly shortened each way, the twelfth about as long as the first, the membrane joining the thirteenth less than half way up; the highest spine rather less than half the length of the head and lower than the soft rays, which are rather high. Caudal slightly rounded.

Anal fin short and high, its spines slender, the second shorter than the third, and not much stronger. Pectorals long and narrow, reaching past the vent and nearly to the beginning of the anal, their length seven-eighths that of the head, *their base quite narrow*, less than the diameter of the eye. Ventrals long, reaching just past the vent.

D. XII, I, 14; A. III, 7.

Color similar to that of *S. rastrelliger*, but paler, usually olive-green, marbled with darker; belly pale yellowish green; fins olivaceous. Sometimes this species is quite dark, but it never shows red tints either on body or fins.

This species is closely related to *S. pinniger*, from which it differs in the absence of the postocular and tympanic spines and in the coloration, *S. pinniger* being always chiefly orange-red. Externally it resembles *S. rastrelliger* most, but it may be known at once from the latter species by the long gill rakers and narrow pectorals.

S. atrovirens is very abundant from Point Concepcion as far as San Diego. About Catilina Island it is the most abundant species of the

genus. It is frequently seen in the San Francisco markets. It reaches a length of about 15 inches, and is usually known as Garrupa or Grouper.

Sebastichthys rubrivinctus sp. nov.

Body robust, rather deep and compressed, tapering behind to a slender caudal peduncle.

Head long, acute in profile, there being a nearly straight slope from a bony prominence in front of the spinous dorsal to the tip of the lower jaw. Mouth rather large, oblique, the lower jaw strongly projecting. Maxillary broad, scaleless, extending to opposite the middle of the eye; anterior edge of premaxillary on the level of the lower border of the eye.

Ridges on top of head quite low, five pairs of them ending in spines, which are bluntish and depressed. *Nasal*, *preocular*, *supraocular*, *tympanic*, and *occipital* spines present. In one example the nasal spines are covered by the skin. Ocular ridges not much elevated.

Interorbital space flattish, narrow, not so broad as the eye, not widened behind, covered with rather sparse, almost cycloid, scales. Two long frontal ridges extend the length of the interorbital space. These are covered with bare skin. Behind and between these are two shorter ridges occupying the place of the coronal ridges found in *S. auriculatus*. These two are covered by naked skin, and do not end in spines. Tympanic spines well developed. Occipital ridges long, curved, diverging behind.

Suborbital stay very prominent, its tip nearly reaching the preopercle.

Preopercle with five very strong spines, the three uppermost very long and sharp, the second the longest. Subopercle and interopercle entire. Opercle above with two sharp, long spines. Suprascapular with two strong spines. Preorbital very wide, its neck two-fifths the diameter of the eye, with one sharp spine and a large prominence, which usually ends in a spine also.

Eye extremely large, its diameter $3\frac{3}{4}$ in length of head.

Gill-rakers rather short, rather robust, much compressed, toothed on the inner margin, the longest about one-fourth the length of the eye. Gill-rakers 8 + 20 in number, about 4 + 16 of them being free.

Scales on head all small and thin, mostly cycloid, the minute accessory scales extremely numerous. Scales of body smoother than usual, the accessory scales numerous on the posterior part and on the nuchal region, where the scales generally are smaller and more crowded than on the flanks.

Dorsal spines robust, rather high, the fifth the highest, not quite half the length of the head; those behind rapidly shortened to the twelfth; the twelfth spine lower than the first and much less than half the height of the fifth, its membrane joining the thirteenth spine below its middle. Soft rays about equal in height to the spines. Caudal fin very slightly emarginate. Anal rather low, its second spine much longer and stronger than the third, both robust. Pectorals moderate, not reaching vent;

the base moderate, nearly equal to the diameter of the eye. Ventrals not reaching tips of pectorals.

D. XIII, 14; A. III, 7. Scales in about 48 transverse series.

Color very pale rose-red, almost white, with cross-bars of a deep, intense crimson-red, these bands broadest on the back. One of the bands runs across the eye, snout, suborbital, and maxillary, with indistinct boundaries; the next across the nuchal region and front of dorsal and opercle; the next across the middle of the spinous dorsal, including the ventrals and the posterior half of the pectorals; another across the soft dorsal and anal; another across the base of the caudal, the fin itself being deep rose color. The other fins share the color of that part of the body against which they lie.

This species is known from two examples, each about one foot long, taken on a reef in Santa Barbara Channel, by J. Weinmiller, February 14, 1880.

Afterwards about eight others, larger than the original types, were taken in deep water near Monterey. It is known to the fishermen as the "Spanish Flag," and is the most brilliantly colored large fish on the Pacific coast.

Its relations to the other red species are not intimate.

Sebastichthys vexillaris sp. nov.

Body stout and compressed; the back elevated; the form rather deeper and more elliptical than in the other red species. Head moderate; the profile moderately acute. Mouth rather large, moderately oblique, the broad maxillary usually extending to a point somewhat behind the orbit. Premaxillary anteriorly on the level of the lower edge of the pupil. Jaws subequal, the lower somewhat projecting, but without symphyseal knob; the upper jaw not emarginate.

Ridges on top of head long and low, rather broader and lower than in the other red species; their spines rather depressed. The following pairs of spines are present, four or five in all: *Nasal*, *preocular*, *supraocular*, *occipital*, and sometimes *tympanic*. The nasal spines are prominent; the preocular spines are quite conspicuous and extend well backward; the supraocular ridge is depressed and broad, its spine triangular; the occipital spines are rather long and diverge backward. In some specimens a tympanic spine is present, which is wanting in the others. The interorbital space is broad and flattish, broader than in related species, about equal to the diameter of the orbit. It is occupied by two raised ridges, which are covered by the scales. In large specimens these ridges are quite obscure.

Preopercular spines moderate; some of them usually divided into two, three, or four at tip, the middle one the largest. The degree of division of these spines is quite variable, but at least the middle spine is usually divided.

Posterior border of the interopercle with a strong spine, above which

are one to three conspicuous spines on the subopercle. Opercle with two diverging spines, above which are two suprascapular spines.

Eye moderate, high up, 4 to 4½ in head. Preorbital with the neck very broad, with two bluntish downward-directed spines in front, its narrowest portion two-fifths the diameter of the eye. Suborbital stay short and rather weak. Maxillary and preorbital with fine scales.

Gill-rakers rather long and strong, compressed, toothed on the inner margin, shorter than in *atrovirens*, the longest slightly clavate, about half the length of the eye; the number about $\frac{8}{19}$, nearly all of them free.

Scales moderate, with few accessory smaller ones, in 55 transverse series.

Dorsal spines very strong and high, about as in *chlorostictus*, higher than in any other species; the first about half as long as the eye; the fourth the highest, more than half the length of the head, and much higher than the soft rays. The twelfth spine is a little higher than the first, and its membrane joins the thirteenth about half-way up. Membrane of spinous dorsal rather more deeply incised than in other species. Soft dorsal rather high, but lower than the spines.

Anal spines much smaller than in *rosaceus*, etc.; the second not longer than the third, and not much stronger; about two-thirds as high as the soft rays. Soft rays of anal high. Caudal truncate. Pectoral shorter than head, not reaching the vent; its base rather broad.

Ventrals moderate, not reaching vent.

D. XIII, 16; A. III, 6.

Color rather bright and pale, yellowish red, becoming lighter below, the reddish and yellowish forming large and irregular areas, sometimes one shade predominating, sometimes the other. A pink cross-blotch on the back at the base of the second and third dorsal spines. Upper parts of the head mostly pink, with broad olive shades running backward, one on the lower lip, one on the maxillary, one from preorbital region downward, one from the eye backward and downward across the cheeks, and another across the opercular spines. Fins all pinkish red; the membranes olive. Top of head usually with alternating cross-shades of pinkish and yellowish. In some specimens the yellowish shades are replaced by light olive. Others are quite red; others still are quite brownish. The spots on the back show a tendency to the rosy spots found in *constellatus* and *rosaceus*.

This species was first known to us from two specimens taken on a reef in Santa Barbara Channel. A single example was afterwards noticed in the museum of the California Academy of Sciences, and numerous others have been since obtained in the San Francisco markets, where it is very common. It reaches a larger size than its relatives, *chlorostictus* and *constellatus*, found in the same markets, and, like them, it has been confounded by previous observers with *rosaceus* and *auriculatus*. It may be known from its relatives by its high dorsal spines, low

anal spines, and the smaller number of ridges on the top of the head. Its relations are probably more near to *S. nebulosus* than to the other red species.

SEBASTICHTHYS CHLOROSTICTUS sp. nov.

Body oblong, tapering into a rather slender caudal peduncle, the back not much elevated. Head moderate, the profile rather steep, with a nearly even slope.

Mouth large, oblique, the maxillary reaching to behind the pupil, the premaxillary in front below the level of the large eye. Jaws equal in the closed mouth, the tip of the lower fitting into the emarginate upper jaw; a rather conspicuous symphyseal knob. Preorbital sinuate, usually with two or three flat spines.

Ridges on top of head rather sharp and high, ending in sharp spines. These ridges are longer than in *nebulosus* and *serriceps*, and much less elevated. These ridges are much higher than in *vexillaris;* about as in *constellatus.*

The following pairs of spines are present: *Nasal*, *preocular*, *supraocular*, *postocular*, *tympanic*, and *occipital*—6 pairs.

Interorbital space concave, with two rather prominent ridges.

Preopercular spines rather sharp, the second longest and slenderest; the lower bluntish, but well developed. Opercular spines sharp; suprascapular spines well developed. A spine on interopercle and on subopercle.

Gill-rakers long and rather strong, not clavate, the longest about two-fifths the diameter of the eye. They are longer than in any other of the red group, rather longer than in *vexillaris.* Scales on head less developed than in *S. constellatus;* the snout wholly free from scales. Mandible nearly or quite naked. Scales on body moderate, in about 55 transverse series.

Dorsal spines very high, nearly as high as in *vexillaris;* the fourth highest, one-third higher than the soft rays, which are also considerably elevated.

Dorsal fin rather deeply emarginate; caudal fin emarginate; anal fin not very high, its second spine much higher and stronger than the third, about as high as the soft rays. Pectorals with moderate base reaching beyond tips of ventrals, about to vent.

D. XIII, 14; A. III, 6.

Color rather light olivaceous above, and pinkish overlaid with golden on the sides. Head light red and golden. Three roundish light spots placed as in *constellatus* and *rosaceus*, but much less distinct. There are no small light spots on the body. The upper parts of the body, from just below the lateral line, are closely covered with small round spots of a clear olive-green. These spots are most distinct on the back and the top of the head. On the sides of the body, just above and below the lateral line, these spots form two continuous series, following the course

of the lateral line. Eyes above with green spots. Fins nearly plain red; the dorsal spotted with olive.

This species is known to us from numerous specimens obtained in the San Francisco market, taken in deep water at Monterey. It is not rare, but it has been hitherto confounded with *rosaceus*, from which it may be known at once by the green spots and the great height of the dorsal.

Sebastichthys constellatus sp. nov.

Body rather robust, heavy forwards, tapering into a rather slender caudal peduncle. Head rather pointed in profile, the slope nearly straight from the tip of the snout to the base of the dorsal.

Mouth large, oblique, the lower jaw slightly projecting beyond the emarginated tip of the upper jaw. A conspicuous knob just beyond the symphysis of the lower jaw.

Maxillary very broad, extending to beyond the line of the pupil, its middle part with many small scales; premaxillary in front just below the level of the eye.

Ridges on top of the head well developed, rather high and narrow, ending in moderate spines. The following pairs are present: *Nasal*, *preocular*, *supraocular*, *postocular*, *tympanic*, and *occipital*. The interorbital area has two prominent ridges covered by the scales, and not ending in spines. Behind these is a deep concavity. The nasal spines are bluntish, the preocular sharp, the supraocular ridge rather short, the postocular and tympanic similar to each other. The occipital ridge is long, curved, ending in a sharp spine. Two suprascapular spines. Preopercle with its first and third spines triangular, bluntish, the second long and sharp, the fourth and fifth reduced to bluntish prominences. Opercle with two strong spines above. Slight spines on the subopercle and interopercle.

Preorbital wide, its neck about one-third the diameter of the orbit, its edge lobed, without spines.

Eye large, 4⅓ in head.

Muzzle and preorbital scaled to the tip of the snout more completely than in other species, mandible scaly.

Gill-rakers short, very thick, compressed, clavate, with a tuft of spine-like teeth at tip, the longest of them about one-fifth the diameter of the eye, their number 3 + 24 free ones, besides rudiments. Scales strongly ctenoid, the accessory scales largely developed; 53 transverse series.

Dorsal spines rather strong, rather low, the fourth the longest, a little more than one-third the length of the head. Twelfth spine rather short, shorter than the first, its membrane joining the thirteenth spine about half-way up.

Soft dorsal rather low, about equal to the spines.

Anal with the second spine robust, curved, considerably longer than the third, higher than the soft rays. Caudal very slightly emarginate.

Pectorals reaching beyond tips of ventrals, about to vent, their length two-thirds that of the head.

D. XIII, 13; A. III, 6.

Head densely covered with small scales; a series across the cheeks along the upper edge of the suborbital stay usually numbering 30 to 40, the increased number being due to the greater development of the accessory scales.

Color rather light, bright orange-red, the back olive shaded, the belly yellowish. Cheeks with red and yellowish shades. Head and body everywhere closely covered with small roundish pale spots. The spots above are light rose color; below are nearly white and larger. Four or five roundish rose-colored spots on the back, besides some mottlings of a similar shade. The first spot, often obscure, under the fourth dorsal spine; the next near the lateral line under the eighth dorsal spine; the next close to the junction of the two parts of the dorsal; the fourth under the end of the soft dorsal; a fifth sometimes near the base of eighth dorsal spine. Opercular flap with a rosy spot. Fins light reddish, shaded with olive, or nearly uniform. Dorsal speckled at base with light and dark.

This beautiful species was first noticed by us in Santa Barbara Channel, where a single example was obtained. It is abundant in the markets of San Francisco, where it has been confounded with *rosaceus* on account of the similarity of the pink spots. The numerous stellate light spots, however, distinguish it at sight. It is very closely related to *rosaceus*, however.

The discovery of three species in the waters of California having the light spots supposed to distinguish *S. rosaceus*, invalidates the identification of that species with the similarly spotted *S. oculatus* of Chili.

Sebastichthys rastrelliger sp. nov.

Body rather oblong, deepest at the shoulders, slowly tapering backward to a rather deep caudal peduncle; head short, rather blunt and deep, the upper profile straight; mouth moderate, little oblique, the maxillary reaching to the posterior margin of the eye, the premaxilliary rather below the level of the eye; jaws equal, the lower convex, not produced at tip, and without symphyseal knob.

Preorbital bone moderate, the width of its neck about two-fifths the diameter of the eye, its free margin sinuate, without spines.

Eye moderate, anterior, its diameter about 4½ in head.

Ridges on head strong, but broad and depressed, ending in small spines. The following pairs present: *Nasal*, *preocular*, *supraocular*, *tympanic*, and *occipital*, five in all. The occipital ridges are very long, equaling the diameter of the orbit; preopercular spines short and stout, the two upper subequal; opercular spines usually very broad and flat, their posterior edge sometimes serrated or bifid; suprascapular spines strong; spines on interopercle and subopercle small, sometimes obsolete; inter-

orbital space moderate, less than the diameter of the eye, flattish, with two low ridges; spines of head little divergent backwards.

Gill-rakers *very short*, wide, compressed, the longest as wide as high, the shortest much wider and not free, all strongly toothed on anterior margin and side; the number about $\frac{7}{14}$, only 6 to 9 of them being movable.

Scales on body large, the accessory scales almost wanting; about 45 transverse series, and about 50 in the course of the lateral line.

Dorsal spines low, the fifth highest, about two-fifths the length of the head; the last spines not much shortened; the fin comparatively little emarginate; soft rays considerably higher than the spines. Caudal fin slightly rounded. Anal fin short and high, its spines low, the second as high as the third and much stouter. Pectorals rather short, reaching vent, *their base extremely broad*, its width greater than the length of the eye and about one-third the length of the head; the lower rays much thickened. Ventrals moderate, not quite reaching the tips of the pectorals.

D. XIII, 13; A. III, 6.

Color blackish green, with paler mottlings, the sides spotted with darker; belly pale greenish, often many scales on the side, each with a darker spot; paired fins dark, often tinged with reddish; other fins chiefly olivaceous, mottled with darker; anal fin often spotted with black. The brightness of the olive and greenish shades is quite variable, but the species is always without bands or distinct markings and without distinct red.

This species is extremely abundant from Point Concepcion to Santa Catalina Island, and large numbers come into the San Francisco market. It may be known at once from all the others by the small gill-rakers ("rastra") and by the breadth of its pectoral fins. It grows to the length of about 15 inches.

S. rastrelliger is intermediate, in regard to the development of the spines, between the groups termed *Sebastomus* and *Sebastosomus* by Professor Gill. Its relations with *S. nebulosus* are most intimate, and it forms the base of a series ascending in degree of roughness of head, terminating in the extreme of *S. nigrocinctus*.

Sebastichthys fasciolaris Lockington, nom. sp. nov.

(*Sebastes fasciatus* Girard, not of Storer.)

The form described and figured by Girard as *Sebastes fasciatus* is, in our opinion, specifically distinct from *Sebastes nebulosus* of Ayres, with which it has usually been identified.

The name *fasciatus* is preoccupied in this group. We have therefore adopted the above name, proposed by Mr. Lockington in MSS.

Sebastichthys fasciolaris is very closely related to *S. nebulosus*. It is rather stouter, and the slope of the profile is steeper. The ridges on

the top of the head are much higher and stronger, especially the occipital ridge, which forms a wall-like elevation, much as in *S. serriceps*. The sides of this ridge are vertical, or even directed upward.

The color of this species is very constant and quite distinct from that of *nebulosus*. It is nearly black, everywhere speckled with whitish. There are coarse yellowish blotches on the sides of the head and body, and a broad, yellowish, lateral band. This band begins on the membrane of the third and fourth dorsal spines, and extends downward to the lateral line, which it follows to the tail. The edges of this band are very uneven, and it is of varying width, but it is always distinct and continuous. The body is mottled with light and dark, and the fins are all blackish, with pale spots.

In the bluntish spines of the sides of the head, the horizontal mouth, with shortish subequal jaws, the short, thickish gill-rakers, the high dorsal spines, and moderate, subequal anal spines, this species agrees with *S. nebulosus*. Both species are common in the San Francisco market, in about equal abundance.

Measurements in hundredths of length to base of caudal.

	Serriceps.	Rastrelliger.	Atrovirens.	Rubrivinctus.	Vexillaris.	Chlorostictus.	Constellatus.
Body:							
Greatest height	38	36	35.5	40	36	34.5	41
Least height of tail	11	12	12	10	12.5	9.5	9
Head:							
Greatest length	35	41	37.5	38	37.2	40	42
Snout	10	9	9.2	11	8.5	10	11.3
Orbit	8.5	8.5	11	9.5	8		11.5
Interorbital space	5	6	8	5.7	7	6.8	6
Least width of preorbital	3	2.5	1.5	3	2		2.5
Maxillary	18	20	17	16	17.5	18.5	20.6
Longest gill-raker	2.5	1.5	3.5	2.3	3	3.8	4
Occipital ridge	6	8	6	9.3	6.5	7.5	8
Supraocular ridge	5	6	6	6	5	5.2	6
Dorsal:							
Snout to dorsal	32.5	35	35	38	33	36.2	40
Longest spine	13	13	16	16	21	21.5	15
Longest ray	15.5	16	19	15	15.2	16.7	14
Anal:							
Base	13.5	15	15	12.5	15	13	
Second spine	14	12	14.5	15	14.6	16.6	16
Third spine	14	9	15	13.5	12.2	14.5	13
Longest ray	22	19	20	20	20	18	15
Caudal, length	20.5	20	21	15.3	17.5	18	18.5
Pectoral, length	27	27	32	24	27		24
Width of base	11	11	8.8	9.5	11	9.5	10
Ventral, length	26.5	22	24.5	19.5	22	21	18
Dorsal	XIII, 13	XIII, 13	XIII, 14	XIII, 14	XIII, 13	XIII, 13	XIII, 14
Anal	III, 5	III, 6	III, 7	III, 7	III, 6	III, 6	III, 6
Transverse rows of scales	55	47	47	50	56	42	48
Length to base of caudal, in inches	8.7	9.25	7.25	9.7	11.3	9.3	6.23
Extreme length, in inches	10.4	11.3	8.75	11.3	14.25	11.2	8.55

SAN FRANCISCO, CAL., *February* 28, 1880.

NOTE.—The publication of this paper has been accidentally delayed for some time. Meanwhile the writers have discovered a number of additional species of *Sebastichthys* descriptions of which precede those of the present species, although of course no allusion is made to them in this earlier paper.

DESCRIPTION OF A NEW EMBIOTOCOID (ABEONA AURORA), FROM MONTEREY, CALIFORNIA, WITH NOTES ON A RELATED SPECIES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Body very elongate, with dorsal and ventral outlines evenly curved; caudal peduncle very long, thick at base; snout blunt and rounded, top of head everywhere transversely convex and the occipital region but little depressed.

Mouth small and oblique, the lower jaw somewhat shorter than the upper and included. The maxillary reaches but two-thirds the distance to front of orbit; premaxillaries anteriorly about on a level with lower rim of orbit.

Teeth long and strong, somewhat compressed and incisor-like, arranged in a close series; each tooth with three short-rounded lobes near the end, the middle lobe the longest; their form precisely as in *Abeona minima*. These incisor teeth are crowded, with the lobes overlapping, and often with one slipped entirely behind the others.

Scales of cheeks in three distinct series below, in one posteriorly. Behind this outer row and well separated from it are, in the upper jaw, from two to several distinct canines, there being usually a pair near the middle of the jaw. Gill-rakers rather feeble, of moderate length. Lower lip thin, with a frenum.

Dorsal fin with the spines from the fifth or sixth to the eleventh, longer than the others, about equal to each other and to the longest soft ray. Pectorals not reaching as far as do the ventrals, which scarcely reach the vent. Caudal forked for nearly half its length. Ventral groove almost obsolete; the distance from ventrals to vent about equals the length of the anal fin.

Lateral line with 40 to 45 scales (4–43–13).

Color bluish black above, becoming lighter on lower half of sides silvery below. Opercles and lower half of sides punctate with black dots and shaded with light orange or rose red, the latter here more intense on the centers of the scales. A broad grayish area extending backward from the axil of the pectorals, without orange tints and darkened by black punctulations on the edges of the scales; this area ends opposite the origin of the anal fin; above it the orange shade forms a rather distinct band from the lips to the base of the caudal. Axil of pectorals black, especially above. Fins plain, speckled with blackish. Anal somewhat yellow.

Fin rays: D. VIII, 17; A. III, 26.

The intestines were filled with a species of Ulva, indicating a vegetable diet.

This species is known to us from fifteen examples taken in the bay of Monterey, and purchased by us in the San Francisco market.

It agrees with *Abeona minima* in the peculiar dentition characteristic of that genus, as well as in the large scales and shortened fins. Its form is, however, quite different, resembling more the genera *Brachyistius* and *Cymatogaster*. It is a considerably larger fish than *Abeona minima;* its dorsal spines are weaker and the number of fin rays is greater. (D. IX, 14; A. III, 16—in *Abeona minima.*)

From *Cymatogaster aggregatus* it is widely separated by the different dentition; with *Brachyistius frenatus* Gill it has closer affinities, but the two species belong to different genera.

This latter species has been but once observed, and no description has been yet published, merely a brief note enumerating some of its peculiarities. We therefore subjoin a fuller account, drawn from a fine specimen obtained by us at Santa Barbara.

Brachyistius frenatus Gill.*

(Proc. Acad. Nat. Sci. Phila., 1862, 275.)

Body elongate, compressed, the body proper regularly elliptical, with long caudal peduncle. Head long, very slender and pointed, much depressed above the eyes, the snout projecting. Mouth very small, terminal oblique, the small maxillary falling much short of the orbit. Lips rather thin, the lower with a frenum. Teeth long and slender, somewhat lanceolate, few in number, arranged in a single series.

Preorbital broad. Cheeks with about two rows of scales; opercles with three. Eye large, anterior, about 3 in head.

Gill-rakers numerous, long and slender.

Scales large, 42 in the course of the lateral line. Dorsal spines high and rather strong, the first low, the others rapidly increasing to the sixth and seventh, the eighth shorter, the soft rays a little higher than the highest spines.

Caudal peduncle nearly as long as the head, not very slender. Caudal fin rather deeply forked.

Anal spines feeble, the fin elevated in front. Ventrals reaching soft rays of anal. Pectorals reaching first anal spine. Ventral groove very short.

D. VIII, 15; A. III, 22.

Color dark olive-brown above, with lighter stripes along the rows of scales. Below everywhere a brilliant light coppery red; each scale with a light blue spot and dark punctulations. Head colored like the body. Fins all light reddish, plain, the dorsal somewhat dusky. A streak of sky-blue spots below and in front of the eye.

Measurements of Abeona aurora.

Extreme length	6.93 inches	
Length to base of caudal	5.57 inches =	100

*We have since obtained this species in very great numbers at various places along the coast from Los Angeles to Vancouver's Island. *Ditrema brevipinne* Günther is undoubtedly the same species.

Body:	
Greatest depth	36
Least depth of tail	14
Length of caudal peduncle	21
Head:	
Greatest length	25.5
Width of interorbital area	9
Length of snout	7
Length of maxillary	6
Diameter of eye	7
Dorsal:	
Distance from snout	37.5
Length of base	43.5
Height of longest spine	12
Height of highest soft ray	12
Anal:	
Length of base	16.5
Height of longest ray	9
Caudal:	
Length of middle rays	13.2
Length of outer rays	25
Pectoral, length	24
Ventral, length	19
Dorsal rays	VIII, 17
Anal rays	III, 20
Scales	4-43-13
Transverse series below lateral line	35

San Francisco, Cal., *February* 28, 1880.

DESCRIPTION OF A NEW FLOUNDER (PLATYSOMATICHTHYS STOMIAS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Body extremely elongate for the family, thin, and strongly compressed. Head rather long and slender; the snout somewhat pointed. Mouth extremely large and oblique, the lower jaw included; the maxillary very long and slender, reaching much beyond the eye, its length about half that of the head. Premaxillary in front above the level of the lower eye.

Teeth in the upper jaw anteriorly long, slender, and wide-set. Some of the teeth very freely depressible, the larger ones scarcely movable. Posteriorly the teeth are much smaller, close-set, and fixed in two rows; the inner row continuous with the larger anterior series, the outer row extending outside of some of the enlarged teeth.

Teeth in the lower jaw very sharp and slender, long, and wide-set, alternating with shorter ones, which are very freely depressible. Outside of the larger teeth is a series of small, fixed, close-set teeth. The larger teeth in each jaw are distinctly arrow-shaped. Pharyngeal teeth apparently in one row.

Eyes large, dextral, their anterior margins about even with each other; the upper eye larger and directed obliquely upward. A conspicuous ocular ridge about the upper eye, becoming continuous with the lateral line. Interorbital space narrow, not half the width of the eye, scaly, as is the space in front of it. Cheeks wide, the posterior edge of the preopercle free. Opercle rather short and weak. Premaxillary protractile, capable of little protrusion.

Gill-rakers long and strong, about 4 + 13 in number, the longest more than half the diameter of the eye.

Scales very small and thin, irregularly arranged, their margins weakly ciliated, in about 135 transverse series; about 100 tubes in the course of the lateral line. The lateral line is nearly straight, gently ascending in front. No accessory lines. Scales on blind side similar.

Dorsal fin beginning just behind the middle of the eye, its rays low, especially anteriorly, its greatest height considerably behind the middle. Caudal fin somewhat forked. Anal fin higher than the dorsal, its highest rays about midway. No spine before anal. Caudal peduncle long and slender, about as long as the maxillary. Pectoral fins short, the one on the right or eyed side longest, its length nearly equal to that of the maxillary. Ventral fins very short, reaching just past the vent.

Fin rays: D. 101; A. 85.

Color plain brown, with darker punctulations. Left side white, the many dark points giving it a soiled appearance. Fins dusky.

This species is known to us from one example over a foot long, bought in the San Francisco market, and taken just outside the Golden Gate. It doubtless reaches a much larger size, and the adult is probably less slender than this example.

It differs from its congener, the Greenland Halibut, *Platysomatichthys hippoglossoides*, of the North Atlantic, in the slenderer body, larger mouth, longer gill-rakers, and narrow interorbital space, but the two appear to agree in all respects of generic value.

We regret the necessity of using the clumsy and inappropriate generic name *Platysomatichthys* for these fishes instead of the name *Reinhardtius* proposed by Professor Gill. The former name, although later in date, has priority of definition.*

Table of measurements of Platysomatichthys stomias.

Extreme length	12.9 inches	
Length to base of caudal	10.9 inches	= 100
Greatest depth of body		.30
Least depth		.07
Length of caudal peduncle		.12
Length of head		.28
Number of gill-rakers		4, 11
Length of longest gill-raker		.032
Length of snout		.068
Length of maxilliary		.152

*In a paper written later, but by accident printed earlier (Proc. U. S. Nat. Mus., 1880, 51), we have recognized this species as the type of a distinct genus, *Atheresthes*.

Length of mandible	.168
Greatest width of maxillary	.03
Diameter of orbit	.07
Distance from snout to dorsal	.116
Length of base of dorsal	.79
Greatest height of dorsal	.094
Distance from snout to anal	.346
Length of base of anal	.615
Height of longest ray	.105
Length of middle caudal rays	.142
Length of outer caudal rays	.185
Distance from snout to pectoral	.295
Length of pectoral (right side)	.128
Distance from snout to ventral	.127
Length of ventral	.057
Dorsal rays	101
Anal rays	85
Number of tubes in lateral line	98

SAN FRANCISCO, CAL., *March* 1, 1880.

DESCRIPTION OF A NEW EMBIOTOCOID FISH (CYMATOGASTER ROSACEUS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Body rather elongate, deepest at the shoulders; the profile thence to the occiput convex, the occipital and interorbital region considerably depressed; body tapering backwards from the shoulders into a short and slender caudal peduncle.

Head small, thick, the snout blunt. Mouth rather large, little oblique, the lower jaw included; maxillary slightly passing the vertical from the front of the orbit; premaxillary anteriorly on a level with the inferior margin of the pupil. Eye very large, its diameter about one-third the length of the head; interorbital region very broad. Lower lip with a narrow frenum, above which its margin is narrowly free.

Teeth large, in a single row, much as in *Cymatogaster frenatus*, but blunter, slightly compressed and truncate at tip, somewhat incisor-like, the edge, however, entire. Teeth few and distant, about $\frac{12}{8}$; none on the sides of the lower jaw. They are larger, blunter, and more wide-set than in *Cymatogaster aggregatus*.

Scales on the cheeks in three series below.

Gill-rakers small and weak, much as in *Cymatogaster aggregatus*, curved and apparently smooth.

Scales large, but rather smaller than in any of the related species, 50 in the course of the lateral line.

Spinous dorsal high; the first spine two-fifths the length of the highest; the sixth to tenth of nearly equal height, and higher than the soft rays. Anal fin with the base oblique and convex, the spines rather strong, more or less curved, as in *Abeona*.

Caudal fin narrow, forked for more than half its length, the lobes rather pointed. Pectoral fins small, not reaching to the tips of the ventrals, which attain the anal.

Fin rays: D. X, 18; A. III, 20.

Color in alcohol silvery, strongly flushed with rose-red, darker above. Top of head orange. A very distinct oblong chocolate-colored spot above the lateral line at the origin of the soft dorsal fin. Another much smaller one just below the end of the soft dorsal. Fins immaculate, slightly tinged with reddish. In life the color was silvery, with the rosy flush less distinct.

This species is known from a single specimen found by Mr. W. N. Lockington in the San Francisco market. A few others have since been obtained from sweep nets in deep water.

In its relations it is intermediate between the species which we have taken to be *Brachyistius frenatus* Gill and the common *Cymatogaster aggregatus*. The frenum of the lower lip is too little developed in the large-scaled Embiotocoids (*Abeona*, *Cymatogaster*, "*Brachyistius*") to be used for generic distinction. *Abeona* is well set off by the tricuspid teeth, but the dentition of *Cymatogaster* and *Brachyistius* is essentially the same, the slightly more incisor-like form of the teeth in *Brachyistius* being scarcely definable as a generic character.

The numbers of fin rays do not afford very good generic characters, as will be seen by the following enumeration:

	Dorsal.	Anal.
Cymatogaster aggregatus	IX, 20–21	III, 22–24
Brachyistius rosaceus	X, 18	III, 20
Brachyistius frenatus	VIII, 15	III, 22
Abeona aurora	VIII, 17	III, 20
Abeona minima	IX, 14	III, 16

We therefore provisionally refer the present species, with *Brachyistius frenatus*, to the genus *Cymatogaster*.

Table of measurements.

Extreme length	5.92 inches	
Length to base of caudal	4.70 inches =	100
Body:		
Greatest depth		40
Least depth of tail		11½
Length of caudal peduncle		15
Head:		
Greatest length		30
Width of interorbital area		8
Length of snout		6½
Length of maxillary		8½
Diameter of eye		10½
Dorsal:		
Length of base		50
Height of highest spine		15
Height of longest ray		15

Anal:	
Length of base	21
Height of longest ray	9
Distance from ventrals	25
Caudal:	
Length of middle rays	13
Length of outer rays	26
Pectoral, length	27½
Ventral, length	23
Dorsal rays	X, 18
Anal rays	III, 20
Scales	6–50–16

SAN FRANCISCO, CAL., *March* 2, 1880.

DESCRIPTION OF A NEW SPECIES OF DEEP-WATER FISH (ICICHTHYS LOCKINGTONI), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Icichthys gen. nov.

Allied to *Icosteus* Lockington, but the body lower and more elongate, not compressed at the bases of the vertical fins. Head moderate: eyes lateral; mouth terminal, little oblique, with small, sharp teeth in one series, in the jaws only. Gill-openings very wide, continuous. Gill-rakers long. Pseudobranchiæ present. Branchiostegals 7. *Body entirely scaly.* Lateral line continuous, *unarmed.* Bases of fins without spinules.

Dorsal and anal fins long and low, composed of soft rays only. Pectoral fins moderate. Ventral fins small, thoracic, I, 5. Pyloric cæca about 6, large. Bones all very flexible, cartilaginous.

The scaly body fully distinguishes this species from *Icosteus*, with which singular genus its affinities are intimate, although the known species do not resemble each other closely.

(Etymology: ἰκίζω, to yield or submit; ἰχθύς, fish—in allusion to the flexible skeleton.)

Icichthys lockingtoni sp. nov.

Body oblong, moderately elongate, somewhat compressed, the caudal peduncle rather slender.

Head moderate, compressed, with vertical cheeks, rather broad and slightly convex above, the snout abruptly descending, hence bluntish in profile. Profile nearly straight from upper part of snout to the nape.

Mouth moderate, little oblique, the slender maxillary scarcely widened at the tip, extending to rather below the front of the pupil, the anterior edge of the premaxillary on the level of the lower rim of the eye. Lips thin. Upper lip not protractile. Premaxillary tapering backward, not forming the whole margin of the upper jaw. Maxillary behind slipping entirely under the membranous edge of the preorbital. Preorbital rather

wide, with one or two series of rather large, thin cycloid scales. These scales perhaps covered the cheeks also in life. At present no other scales are present on the head in the typical example. Lower jaw prominent, projecting in front, but included at the sides. Teeth in jaws only, minute, sharp, closely and evenly set, much as in *Icosteus ænigmaticus*, but rather larger and less numerous.

Eyes large, lateral, longer than snout, their diameter contained about 4 times in the length of the head. Cheeks rather wide. Preopercle with a prominent crest, behind which are some radiating mucous cavities; the bone with a broad, prolonged, flexible membranaceous edge, covered with radiating striæ, each of which ends in a slightly exserted flexible point. Opercle and subopercle rather large, extremely thin, and each crossed by numerous conspicuous radiating striæ.

Gill-openings wide, not separated by an isthmus, the membranes not connected. Pseudobranchiæ present. Branchiostegals 7. Gill-rakers long, slender, sharp, their length nearly three-fourths the diameter of the eye. They are rather close-set and moderately stiff. Gills 4, a slight slit behind the posterior gill.

No bony stay connecting suborbital and preopercle.

Scales very small, apparently cycloid, soft and smooth to the touch, covering the body evenly, but becoming smaller below. Lateral line nearly straight, apparently continuous, but not conspicuous on the middle part of the body. It does not run up on the caudal fin. There are on it no traces of the spinules, so conspicuous in *Icosteus ænigmaticus*.

Scales (too small to be accurately counted) in about 120 transverse series.

Dorsal fin long and low, beginning opposite a point nearly midway between the vent and the base of the ventrals; the number of rays 39 to 40. All the rays are soft and articulated, and apparently all except the first are branched. The first rays are very low, the fin gradually rising posteriorly, the highest about one-third the length of the head. The base of the fin is somewhat scaly.

Anal fin entirely similar, but shorter, beginning slightly in front of the middle of the body (without caudal), and ending just in front of the last rays of the dorsal; its rays about 28.

Caudal broad, fan-shaped, on a slender pedunele; the accessory rays numerous and recurrent. The fin is broken, so that its outline cannot be ascertained.

Pectorals as in *Icosteus*, with the carpal bones slightly exserted, as if pedunculate, the base a little below the axis of the body, the outline rounded. The fin is short and small, its length less than that of the head.

Ventrals short and small, thoracic, placed a little behind pectorals, with one obsolete spine and five soft rays, one of which is slightly filamentous. The fin is about one-third the length of the head.

Fin rays not beset with spinules.

Vent normal, immediately in front of the anal, without papilla.

Air-bladder apparently wanting. Pyloric cœca about 6, rather long.

Bones all soft and flexible, as in *Icosteus ænigmaticus*. The skin, however, not thick and tough, as in the latter species, but thin and scaled.

Coloration in spirits plain brown, lighter below; the skin somewhat punctulate.

Measurements of typical example.

Total length	7.5 inches
Length to base of caudal	6.8 inches = 100
Greatest depth	25
Least depth	9
Length of head	20
Diameter of eye	5⅓
Interorbital width	5⅓
Distance from snout to dorsal	37
Length of base of dorsal	51
Height of dorsal	7
Distance from snout to anal	50
Base of anal	32
Length of pectoral	11
Length of ventral	8
Number of fin rays:	
Dorsal	39
Anal	28
Scales in lateral line	(ca) 120

The single example of this species at present known was obtained in the market of San Francisco by Mr. W. G. W. Harford, with two of the original types of *Icosteus ænigmaticus*. It has been presented by the California Academy of Sciences, for whom it was originally obtained, to the United States National Museum. Its specific distinctness from *Icosteus ænigmaticus* was first noticed by Mr. Lockington, and we have seen fit to name the species for him, in recognition of his important work in Californian ichthyology.

The two species are called "deep-water fish" by the dealers.

As before noticed, the relations of this genus are evidently with the associated genus *Icosteus*, but the two genera bear little resemblance to any form known to us. They will probably constitute a distinct family or subfamily, in the Trachinoid group.

This family (*Icosteidæ*) may be defined as follows:

Body oblong, compressed. Head moderate, unarmed; the suborbital without bony stay. Mouth terminal, little oblique; the premaxillary not protractile; the maxillary slender. Teeth minute, sharp, erect, in one series on the jaws only. No barbels. Gills 4, a slit behind the fourth. Gill-openings wide; the membranes free from the isthmus. Gill-rakers slender. Branchiostegals 7.

Dorsal and anal fins long, without spines. Caudal fin, with many recurrent accessory rays, on a slender peduncle. Pectoral fins rounded, with the carpal bones slightly exserted. Ventral fins thoracic, 1, 5, or 1, 4. Vent normal, without anal papilla. Pseudobranchiæ present.

Skeleton imperfectly ossified, the bones flexible, so that the whole body is limp and destitute of firmness.

The two genera may be thus compared:

* Head and body naked, covered with rather thick tough skin; lateral line and fin rays beset with spinules. Dorsal and anal rather high, the body at their bases closely compressed. Dorsal rays, 50 to 55; anal rays, 35 to 40; ventrals rather long, I, 4 ..... ICOSTEUS.

** Head partly and the body wholly covered with small scales. Lateral line and fins rays smooth. Dorsal and anal fins low, their bases little compressed. Dorsal rays, 35 to 40; anal rays, 25 to 30; ventrals short, I, 5..... ICICHTHYS.

SAN FRANCISCO, CAL., *March* 12, 1880.

CATALOGUE OF TROCHILIDÆ IN THE COLLECTION OF THE UNITED STATES NATIONAL MUSEUM.

By ROBERT RIDGWAY.

The following catalogue enumerates all the species of Humming Birds which are contained in the collection of the National Museum, with the localities represented, the latter being in many cases additional to those given in standard text-books relating to this family of birds. The chief aim of the list is to show what species are wanted to complete the collection, and exchanges to this end are respectfully solicited. Many of the species of the list are represented by an incomplete series of specimens, often by a single skin only, and of these additional specimens are desirable, especially if from a locality not mentioned in the list. Such species are indicated by an asterisk prefixed to the name.

The names[1] and numbers correspond with those of Elliot's "List of Described Species of Humming Birds," published by the Smithsonian Institution.[2]

* 1. **Eutoxeres aquila** (Bourc.) Reich.
Veragua.

4. **Rhamphodon nævius** (Dumont) Reich.
Brazil.

6. **Glaucis hirsuta** (Gmel.) Boie.
Costa Rica; Trinidad; Grenada, W. I.; E. Peru (Pebas); Panama; "Brazil".

10. **Glaucis cervinicauda** (Gould) Salv. & Elliot.
E. Ecuador (Rio Napo); Brazil?

11. **Glaucis ruckeri** (Bourc.) Gould.
Panama; Costa Rica.[3]

[1] A few names are here changed in consequence of recent emendations.

[2] List of Described Species of Humming Birds. By Daniel Girand Elliot. Reprinted from a Synopsis of the Trochilidæ in the Smithsonian Contributions to Knowledge. Washington: Smithsonian Institution, 1879. (Smithsonian Miscellaneous Collections, No. 334.)

[3] Including the type of *G. anca* Lawr.

*13. Phæoptila sordida Gould.
S. Mexico (Oaxaca).

*16. Phæthornis yaruqui (Bourc.) Gould.
Ecuador.

18. Phæthornis emiliæ (Bourc.) Bonap.
Costa Rica; Colombia.

*19. Phæthornis augusti (Bourc.) Bonap.
Venezuela.

*20. Phæthornis pretrii Less.
Brazil.

*21. Phæthornis superciliosus (Linn.) Swains.
Bahia.

22. Phæthornis longirostris (Less.) Caban. & Heiu.
Mexico; Guatemala; Colombia (Turbo);[1] Panama; E. Peru (Pebas);[2] Chiriqui.

*23. Phæthornis hispidus (Gould) Gray.
E. Ecuador (Rio Napo).

*24. Phæthornis syrmatophorus Gould.
Quito.

*25. Phæthornis anthophilus (Bourc.) Gray & Mitch.
"Bogota".

*26. Phæthornis eurynome (Less.) Gray.
Brazil.

*27. Phæthornis squalidus (Temm.) Bonap.
Southern Brazil; Rio Negro.

*28. Phæthornis longuemareus (Less.) Gray.
Trinidad; "Brazil".

29. Phæthornis adolphi Gould.
Guatemala; Costa Rica; Panama; New Grenada (Turbo).

*30. Phæthornis griseigularis Gould.
Colombia.

*31. Phæthornis striigularis Gould.
Colombia.

36. Eupetomena macroura (Gmel.) Bonap.
Brazil (Bahia).

*37. Eupetomena hirundo Gould.
Bolivia.

38. Sphenoproctus pampa (Less.) Gould.
Guatemala.

*39. Sphenoproctus curvipennis (Licht.) Gould.
E. Mexico (Mirador).

[1] Types of *P. cassini* Lawr.

[2] A specimen (No. 55374) from Pebas, labeled in Mr. Lawrence's handwriting "*P. moorei* Lawr." is not distinguishable from northern specimens of *P. longirostris*. It does not, however, agree with Mr. Lawrence's description of *P. moorei*, so that Mr. Elliot may be right in referring the latter to *P. superciliosus*.

* 40. **Campylopterus largipennis** (Bodd.) Cab. & Hein.
Cayenne.

* 42. **Campylopterus rufus** Less.
Guatemala (Dueñas; Guatemala City).

* 41. **Campylopterus obscurus** Gould.
E. Peru (Pebas).

44. **Campylopterus lazulus** (Bonnatt.) Bonap.
Colombia; W. Peru.

45. **Campylopterus hemileucurus** (Licht.) Cab. & Hein.
E. Mexico (Jalapa); Honduras; Veragua; Guatemala; Costa Rica.

* 46. **Campylopterus ensipennis** (Swains.) Less.
Tobago.

* 47. **Campylopterus villavicencio** (Bourc.) Gould.
Rio Napo.

* 50. **Campylopterus roberti** (Salvin) Gould.
Guatemala (Choctum, Vera Paz).

*52. **Aphantochroa cirrochloris** (Vieill.) Gould.
Brazil.

54. **Cæligena clemenciæ** Less.
E. Mexico (Mirador).

* 55. **Cæligena henrici** (Less.) Cab. & Hein.
Guatemala.

56. **Cæligena viridipallens** Bourc. & Muls.
Guatemala (Coban, Vera Paz; Guatemala City); "Mexico".

* 57. **Cæligena hemileuca** (Salvin) Elliot.
Costa Rica.

58. **Lamprolæma rhami** (Less.) Reich.
E. Mexico (Orizaba and Mirador); Guatemala (Guatemala City).

59. **Oreopyra calolæma** Salvin.
Costa Rica.

* 60. **Oreopyra leucaspis** Gould.
Chiriqui.

62. **Oreotrochilus pichincha** (Bourc. & Muls.) Bp.
Pichincha.

* 63. **Oreotrochilus chimborazo** (Delattr.) Gould.
Chimborazo.

* 64. **Oreotrochilus estellæ** (D'Orb. & Lafr.) Gould.
Bolivia (La Paz).

* 65. **Oreotrochilus leucopleurus** Gould.
Chili (Valle del Yero).

68. **Lampornis violicauda** (Bodd.) Elliot.
"Florida";[1] Brazil (Bahia); Guiana; Venezuela; Panama; Colombia (Bogota and Cartagena); E. Peru (Pebas); Trinidad; Demerara.

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[1] Types of Audubon's works

69. **Lampornis mango** (Linn.) Gosse.
Jamaica.

70. **Lampornis prevosti** (Less.) Gould.
Mexico (Tehuantepec).

71. **Lampornis viridis** (Aud. & Vieill.) Gould.
Porto Rico.

* 73. **Lampornis gramineus** (Gmel.) Gould.
Guiana.

75. **Lampornis dominicus** (Linn.) Elliot.
St. Thomas; Haiti; Porto Rico.

76. **Eulampis holosericeus** (Linn.) Gould.
St. Thomas; Martinique; Dominica; Antigua; Guadeloupe; St. Vincent; Grenada; Barbuda; Tobago; St. Bartholomew, and Barbadoes.

77. **Eulampis jugularis** (Linn.) Gould.
Martinique; Dominica; Guadeloupe, and St. Vincent.

78. **Lafresnaya flavicaudata** (Fraser) Bonap.
Colombia (Bogota and Popayan).

* 79. **Lafresnaya gayi** (Bourc. & Muls.) Bp.
Ecuador (Quito).

80. **Chalybura buffoni** (Less.) Reich.
Venezuela (Laguayra); Colombia; Panama.

* 82. **Chalybura isauræ** (Gould) Salv.
Veragua; Costa Rica.

83. **Chalybura melanorrhoa** Salvin.
Costa Rica.

* 84. **Chalybura cæruleiventris** (Reich.) Cab. & Heiu.
Colombia (Bogota).

85. **Florisuga mellivora** (Linn.) Bonap.
Guatemala; Bogota; E. Peru; Tobago; Guiana (Demerara); Ecuador (Quito); Tres Marias, W. Mexico! [?]

86. **Florisuga fusca** (Vieill.) Reich.
Brazil (Bahia).

87. **Petasophora anais** (Less.) Gould.
Colombia; Ecuador (Quito and Puna I.); Bolivia (La Paz).

88. **Petasophora thalassina** (Swains.) Gould.
Mexico (Jalapa and Tres Marias); Guatemala (V. de Fuego, 5,000 ft., and Guatamala City).

89. **Petasophora cyanotis** (Bourc.) Gould.
Costa Rica; Veragua; Colombia.

* 92. **Petasophora serrirostris** (Vieill.) Bonap.
Brazil.

93. **Petasophora delphinæ** (Less.) Bonap.
Trinidad; Colombia; Guatemala (Coban, Vera Paz).

* 94. **Panoplites jardini** (Bourc.) Gould.
Ecuador (Quito).

95. **Panoplites flavescens** (Lodd.) Gould.
Colombia (Bogota).

96. **Panoplites matthewsi** (Bourc.) Gould.
E. Ecuador (Rio Napo); E. Peru (Pebas).

97. **Phæolæma rubinoides** (Bourc.) Reich.
Colombia.

99. **Clytolæma rubinea** (Gmel.) Gould.
Brazil.

*100. **Clytolæma aurescens** Gould.
E. Peru (Pebas).

*103. **Iolæma frontalis** (Lawr.) Gould.
E. Peru (Pebas).

*[1] 106. **Eugenes fulgens** (Swains.) Gould.
Arizona; E. Mexico; Guatemala.

107. **Eugenes spectabilis** (Lawr.) Muls.
Costa Rica.

*109. **Eugenia imperatrix** Gould.
Ecuador (Quito).

111. **Heliodoxa jacula** Gould.
Costa Rica; Veragua; Colombia.

*112. **Heliodoxa jamesoni** (Bourc.) Gould.
Ecuador (Quito); Bogota.

113. **Heliodoxa leadbeateri** (Bourc.) Gould.
Colombia; "Rio".

*114. **Pterophanes temmincki** (Boiss.) Gould.
Bogota; Quito.

*115. **Patagona gigas** (Vieill.) Gray.
Quito; Chili; Peru (near Urubamba).

116. **Docimastes ensiferus** (Boiss.) Gould.
Ecuador (Quito); Bogota.

120. **Helianthea typica** (Less.) Gould.
Colombia.

121. **Helianthea bonapartii** (Boiss.) Gould.
Colombia.

*123. **Helianthea lutitiæ** (Delattr. & Bourc.) Gould.
Colombia (Popayan); Quito.

*130. **Bourcieria fulgidigula** Gould.
Ecuador (Quito).

131. **Bourcieria torquata** (Boiss.) Gould.
Colombia (Bogota).

*133. **Bourcieria wilsoni** (Delattr. & Bourc.) Bp.
Ecuador (Quito).

*136. **Bourcieria prunelli** (Bourc. & Muls.) Bp.
Colombia (Bogota).

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[1] Females particularly desired.

* 137. **Bourcieria cæligena** (Less.) Elliot.
Bogota (?).

* 138. **Bourcieria columbiana** Elliot.
Colombia (Bogota).

* 140. **Hemistephania johannæ** (Bourc.) Reich.
Colombia (Bogota).

* 141. **Hemistephania ludoviciæ** (Bourc. & Muls.) Reich.
Colombia (Bogota).

* 142. **Hemistephania rectirostris** (Gould) Elliot.
Ecuador.

* 144. **Hemistephania veraguensis** (Salv.) Elliot.
Costa Rica.

145. **Floricola longirostris** (Vieill.) Elliot.
Mexico (Chiapas); Guatemala (Dueñas); Costa Rica; Panama; Trinidad.

147. **Floricola constanti** (Delattr.) Elliot.
Costa Rica; Guatemala; San Salvador; Chiapas; Mazatlan.

* 148. **Floricola leocadiæ** (Bourc.) Elliot.
Mexico (Tehuantepec, Acapulco, and Mazatlan).

* 149. **Lepidolarynx mesoleucus** (Temm.) Reich.
Brazil.

150. **Heliomaster furcifer** (Shaw) Elliot.
Brazil; Buenos Ayres (Conchitas).

152. **Heliotrypha exortis** (Fras.) Elliot.
Colombia (Bogota).

155. **Heliangelus clarissæ** (De Long.) Bp.
Colombia (Bogota).

* 156. **Heliangelus strophianus** (Gould) Bp.
Ecuador (Quito).

* 161. **Urosticte benjamini** (Bourc.) Gould.
Ecuador (Quito and Nanegal).

162. **Eustephanus galeritus** (Mol.) Reich.
Chili (Santiago).

* 165. **Topaza pella** (Linn.) Gray.
Cayenne; Demerara.

167. **Aithurus polytmus** (Linn.) Cab. & Hein.
Jamaica.

169. **Thalurania glaucopis** (Gmel.) Gould.
Brazil (Rio and Bahia); "Tres Marias Islands"[1] [???].

170. **Thalurania columbica** (Bourc. & Muls.) Gould.
Costa Rica; Veragua; Panama; Colombia.

* 171. **Thalurania furcata** (Gmel.) Gould.
Guiana (Demerara); Trinidad.

* 173. **Thalurania nigrofasciata** (Gould) Bp.
Ecuador (Quito); E. Peru (head Huallaga R.); Upper Amazons?

[1] Type of *T. luciæ* Lawr.

* 177. **Thalurania eriphile** (Less.) Bp.
Brazil (Rio Grande do Sul); Ecuador (Quito).

* 179. **Thalurania bicolor** (Gmel.) Elliot.
Dominica.

180. **Mellisuga minima** (Linn.) Bp.
Jamaica; St. Domingo; Haiti (Pt. au Prince).

* 182. **Microchera parvirostris** Lawr.
Costa Rica (Angostura).

183. **Trochilus colubris** Linn.
Eastern North America (numerous localities); Mexico; Guatemala; Costa Rica; Veragua.

184. **Trochilus alexandri** Bourc. & Muls.
California; Nevada; Utah; New Mexico; Arizona.

* 185. **Calypte costæ** (Bourc.) Gould.
Guatemala; W. Mexico (Mazatlan); S. California (Ft. Tejon); Cape St. Lucas; Arizona.

186. **Calypte annæ** (Less.) Gould.
California; Arizona.

* 187. **Calypte helenæ** (Lemb.) Gould.
Cuba.

189. **Selasphorus platycercus** (Swains.) Bp.
Guatemala; Mexico (Mirador); Arizona; New Mexico; Colorado; Utah; E. Nevada; Wyoming (Ft. Bridger).

* 190. **Selasphorus ardens** Salvin.
Costa Rica.

192. **Selasphorus alleni** Henshaw.[1]
California (coast-region, Santa Cruz to Nicasio).

194. **Selasphorus rufus** (Gmel.) Aud.[2]
Columbia R., Oregon (3 specimens, types of Audubon's works!); Sitka, Alaska; Ft. Steilacoom, Washington Terr.; Dakota; Nevada; California; Colorado; Idaho; Arizona; New Mexico; Texas (El Paso); table-lands of Mexico, south to Mirador.

193. **Selasphorus scintilla** Gould.
Costa Rica; Veragua.

* 197. **Atthis heloisæ** (Less.) Reich.
E. Mexico.

* 198. **Atthis ellioti** Ridgw.
Guatemala.

199. **Stellula calliope** Gould.
New Mexico; Arizona; California (Ft. Tejon, Ft. Crook, Honey Lake, &c.); Nevada; Montana (Ft. Ellis).

* 202. **Heliactin cornuta** (Max.) Boie.
Brazil.

* 204. **Calothorax lucifer** (Swains.) Gray.
E. Mexico (Mirador); Arizona.

[1] *S. rufus* of Elliot's list. [2] *S. henshawi* of Elliot's list.

*205. **Acestrura mulsanti** (Bourc.) Gould.
Ecuador (Quito).

*207. **Acestrura heliodori** (Bourc.) Gould.
Colombia (Bogota).

213. **Doricha enicura** (Vieill.) Reich.
Guatemala (Coban and Guatemala City).

214. **Doricha elizæ** (Less. & Delattr.) Gould.
Jalapa; Mirador; Merida; Yucatan.

*215. **Doricha bryantæ** Lawr.
Costa Rica; Veragua?

*216. **Doricha evelynæ** (Bourc.) Gould.
Bahamas (Nassau, New Providence).

217. **Doricha lyrura** Gould.
Bahamas (Inagua).

*218. **Myrtis fanny** (Less.) Reich.
Ecuador (Quito).

220. **Tilmatura duponti** (Less.) Cab. & Hein.
Guatemala.

223. **Calliphlox amethystina** (Gmel.) Reich.
Trinidad; Brazil.

*225. **Lophornis stictolophus** Salv. & Elliot.
Colombia (Bogota).

*226. **Lophornis delattrii** (Less.) Gould.
Panama; Veragua?

*228. **Lophornis ornatus** (Bodd.) Gould.
"Brazil"; Trinidad.

*230. **Lophornis magnificus** (Vieill.) Gould.
Brazil.

231. **Lophornis helenæ** (Delattr.) Reich.
"Mexico"; Guatemala.

*233. **Lophornis verreauxi** (Bourc.) Reich.
E. Peru (Pebas).

*234. **Lophornis chalybea** (Vieill.) Bp.
Brazil.

*235. **Popelaria**[1] **tricholopha** Reich.
Colombia.

*236. **Popelaria langsdorffi** (Bourc. & Vieill.) Ridgw.
Brazil; E. Peru (Pebas).

*237. **Popelaria conversi** (Bourc. & Muls.) Ridgw.
Costa Rica.

240. **Steganura underwoodi** (Less.) Reich.
Colombia (Bogota).

*241. **Steganura melananthera** (Jard.) Reich.
Ecuador (Quito).

247. **Lesbia gouldi** (Lodd.) Reich.
Colombia (Bogota).

[1]Name *Souldia* preoccupied in Conchology (C. B. Adams, Cat. Gen. & Sp. recent Shells, Jan. 1847, p. 29; *cf.* Dall, P. Z. S. 1879, pp. 131, 132).

250. **Lesbia amaryllis** (Bourc.) Reich.
Colombia (Bogota); Ecuador (Quito).

253. **Cynanthus forficatus** (Linn.) Bp.
Bogota; Quito.

* 259. **Oxypogon guerini** (Boiss.) Gould.
Colombia.

* 261. **Rhamphomicron olivaceus** Lawr.
Bolivia (La Paz).

262. **Rhamphomicron heteropogon** (Boiss.) Bp.
Colombia (Bogota).

* 263. **Rhamphomicron herrani** (Delattr. & Bourc.) Gould.
Ecuador (Quito).

* 264. **Rhamphomicron stanleyi** (Bourc. & Muls.) Gould.
Bolivia (La Paz).

266. **Rhamphomicron microrhynchum** (Boiss.) Bp.
Bogota; Quito.

* 268. **Avocettula recurvirostris** Swains.
Guiana.

276. **Metallura tyrianthina** (Lodd.) Bp.
Bogota; Quito.

* 278. **Chrysuronia humboldti** (Bourc. & Muls.) Reich.
Buenaventura, Ist. Panama.[1]

* 279. **Chrysuronia ænone** (Less.) Bp.
Colombia.

* 280. **Chrysuronia josephinæ** (Bourc. & Muls.) Reich.
E. Peru (Pebas).

* 281. **Chrysuronia eliciæ** (Bourc. & Muls.) Bp.
Guatemala (Masagua, Pacific coast).

282. **Chrysuronia chrysura** (Less.) Bp.
Brazil; Argentine Republic (Conchitas).

* 287. **Schistes geoffroyi** (Bourc. & Muls.) Gould.
Bogota.

288. **Heliothrix auritus** (Gmel.) Boie.
Brazil; Colombia (Bogota).

* 289. **Heliothrix auriculatus** (Licht.) Gray.
Brazil.

290. **Heliothrix barroti** (Bourc.) Gray.
Guatemala; Costa Rica; Veragua; Panama.

291. **Chrysolampis moschitus** (Linn.) Boie.
Tobago; Trinidad; Brazil (Rio Janeiro and Bahia); Colombia (Bogota and Cartagena).

292. **Bellona cristata** (Linn.) Muls.
Grenada; St. Vincent; Barbadoes; "Venezuela".[2]

[292*a*.] **Bellona ornata** (Gould) Ridgw.
St. Vincent.

[1] Type of *Thaumatias viridicaudus* Lawr. [2] Type of *Orthorhynchus emigrans* Lawr.

293. **Bellona exilis** (Gm.) Muls.
Dominica: St. Thomas; Martinique; Antigua; Guadeloupe; Barbuda; Porto Rico: St. Bartholomew.

*294. **Cephalolepis delalandi** (Vieill.) Lodd.
Brazil (Rio Grande do Sul).

*295. **Cephalolepis loddigesi** (Gould) Bp.
Brazil.

299. **Adelomyia melanogenys** (Fras.) Gould.
Bogota; Quito.

301. **Abeillia typica** Bonap.
Guatemala.

302. **Klais guimeti** (Bourc. & Muls.) Reich.
Costa Rica; Veragua; Colombia.

303. **Aglæactis cupripennis** (Bourc. & Muls.) Bp.
Colombia; Ecuador (Quito).

*304. **Aglæactis caumatonota** (Gould) Bp.
Peru (Matara, prov. Ayacucho).[1]

*307. **Eriocnemis derbiana** (Delattr. & Bourc.) Bp.
Ecuador (Quito).

309. **Eriocnemis aureliæ** (Bourc. & Muls.) Reich.
Colombia (Bogota).

*311. **Eriocnemis lugens** Gould.
Ecuador (Quito).

*312. **Eriocnemis alinæ** (Bourc.) Reich.
Colombia.

*315. **Eriocnemis luciani** (Bourc.) Reich.
Ecuador (Quito).

316. **Eriocnemis cupreiventris** (Fras.) Reich.
Colombia (Bogota).

320. **Eriocnemis vestita** (Longuem.) Reich.
Colombia (Bogota).

*324. **Panterpe insignis** Cab. & Hein.
Costa Rica.

*325. **Uranomitra quadricolor** (Vieill.) Reich.
Orizaba; Mazatlan.

*326. **Uranomitra violiceps** (Gould) Cab. & Hein.
Mexico (Orizaba and Mazatlan).

327. **Uranomitra viridifrons** Elliot.
S. Mexico (Tehuantepec).

328. **Uranomitra cyanocephala** (Less.) Reich.
Mexico (Mirador, Tehuantepec, Chiapas, Tres Marias); Guatemala (Vera Paz).

330. **Uranomitra franciæ** (Bourc.) Reich.
Colombia (Bogota).

[1] Type of *A. oliraceocauda* Lawr.

* 332. **Leucippus chionogaster** (Tschudi) Gould.
Bolivia (La Paz).

* 333. **Leucippus chlorocercus** Gould.
E. Peru (Pebas).

334. **Leucochloris albicollis** Vieill.
Brazil.

* 335. **Agyrtria niveipectus** Cab. & Hein.
Trinidad.

* 336. **Agyrtria leucogaster** (Gmel.) Reich.
Brazil (Bahia).

* 338. **Agyrtria milleri** (Bourc.) Reich.
Colombia.

339. **Agyrtria candida** (Bourc. & Muls.) Cab. & Hein.
S. Mexico (Tehuantepec); Guatemala.

341. **Agyrtria brevirostris** (Less.) Reich.
Brazil (Rio Grande do Sul).

347. **Agyrtria tephrocephala** (Vieill.) Elliot.
Brazil; Surinam.

* 349. **Agyrtria fluviatilis** (Gould) Heine.
E. Ecuador (Rio Napo).

* 356. **Elvira cupreiceps** (Lawr.) Muls.
Costa Rica.

* 357. **Elvira chionura** (Gould) Muls.
Costa Rica (Dota).

* 358. **Callipharus nigriventris** (Lawr.) Elliot.
Costa Rica.

* 360. **Eupherusa eximia** (Delattr.) Gould.
Guatemala.

* 361. **Eupherusa egregia** Sel. & Salv.
Costa Rica.

362. **Polytmus thaumantias** (Linn.) Cab. & Hein.
Trinidad; Venezuela; Bogota!

363. **Polytmus viridissimus** (Vieill.) Elliot.
Guiana; Surinam?

* 368. **Amazilia dumerili** (Less.) Bp.
Ecuador (Puna I., Guayaquil).

369. **Amazilia cinnamomea** (Less.) Elliot.
Yucatan; Nicaragua; Tehuantepec; Mazatlan; San Salvador.

* 370. **Amazilia graysoni** Lawr.
W. Mexico (Tres Marias Islands).

* 371. **Amazilia yucatanenses** (Cabot) Gould.
Mexico (Jalapa); S. Texas (Ft. Brown).

372. **Amazilia fuscicaudata** (Fras.) Ridgw.
S. Mexico (Cordova and Tehuantepec); S. Texas (Ft. Brown); Guatemala; Nicaragua; Costa Rica; Colombia; Ecuador (Guayaquil).

*373. **Amazilia viridiventris** (Reich.) Elliot.
Colombia (Bogota).

375. **Amazilia beryllina** (Licht.) Gould.
Mexico (Jalapa); Guatemala.

*376. **Amazilia edwardi** (Del. & Bourc.) Bp.
Panama.

*377. **Amazilia niveiventris** (Gould) Elliot.
Costa Rica.

*378. **Amazilia mariæ** (Bourc.) Elliot.
Guatemela.

*379. **Amazilia cyanura** Gould.
Guatemala (Pacific side); Realejo.

382. **Amazilia erythronota** (Less.) Elliot.
Tobago; Trinidad.

384. **Amazilia sophiæ** (Bourc. & Muls.) Bp.
Costa Rica; Nicaragua.

387. **Amazilia cyanifrons** (Bourc.) Elliot.
Colombia (Bogota).

*[1]389. **Basilinna leucotis** (Vieill.) Boie.
Mexico (Jalapa, Mirador, and Mazatlan); Guatemala (Chilasco, Vera Paz).

*390. **Basilinna xantusi** (Lawr.) Elliot.
Cape St. Lucas.

391. **Eucephala grayi** (Del. & Bourc.) Reich.
Ecuador (Quito).

397. **Eucephala cærulea** (Vieill.) Gould.
Trinidad; Guiana; Demerara; Bahia.

*401. **Juliamyia typica** Bonap.
Panama; Bogota; Turbo.

*402. **Juliamyia feliciana** (Less.) Gould.
Ecuador (Guayaquil); Bogota!

403. **Damophila amabilis** (Gould) Reich.
Costa Rica; Panama; Bogota; Turbo.

*404. **Iache latirostris** (Swains.) Elliot.
W. Mexico (Colima, Mazatlan, and Tres Marias); Arizona.

*406. **Iache doubledayi** (Bourc.) Elliot.
Tehuantepec (Chihuitan).

408. **Hylocharis sapphiria** (Gm.) Gray.
Brazil (Bahia and Rio Grande do Sul); Demerara.

409. **Hylocharis cyanea** (Vieill.) Gray.
Brazil (Bahia and Rio Grande do Sul); Surinam.

410. **Cyanophaia cæruleigularis** (Gould) Elliot.
Panama; Cartagena; "Centr. Am."

411. **Cyanophaia goudoti** (Bourc.) Elliot.
Colombia (Bogota).

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[1] Females wanted.

*412. **Cyanophaia luminosa** (Lawr.) Elliot.
Colombia (Cartagena).

*414. **Sporadinus elegans** (Vieill.) Bp.
St. Domingo.

415. **Sporadinus ricordi** (Gerv.) Bp.
Cuba.

*416. **Sporadinus maugæi** (Vieill.) Bp.
Porto Rico.

418. **Chlorostilbon caniveti** (Less.) Bp.
Mexico (Mirador, Jalapa, and Tehuantepec); Yucatan (Merida); Guatemala; Costa Rica.

419. **Chlorostilbon pucherani** (Bourc. & Mnls.) Ell.
Southeastern Brazil (Rio Grande do Sul); W. Mexico (Tres Marias) [???].[1]

420. **Chlorostilbon splendidus** (Vieill.) Elliot.
Buenos Ayres (Conchitas); Paraguay (Rio Parana).

421. **Chlorostilbon haberlini** (Reich.) Cab & Hein.
Colombia (Bogota).

422. **Chlorostilbon angustipennis** (Fras.) Gould.
Costa Rica (Cartago); Panama; Quito; E. Peru (Pebas).

423. **Chlorostilbon atala** (Less.) Gould.
Trinidad.

*[2]425. **Panychlora poortmani** Bourc.
Colombia (Bogota).

*427. **Panychlora stenura** Cab & Hein.
"New Granada."

DESCRIPTION OF A NEW EMBIOTOCOID FISH (DITREMA ATRIPES), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Allied to *Ditrema* (*Phanerodon*) *furcatum*. Body unusually elongate, slenderer than in *Ditrema furcatum*, tapering into a long and slender caudal peduncle. Back little elevated. Profile slightly depressed above the eyes, the snout rather projecting.

Head small, triangular in profile, the snout rather acute. Mouth small, oblique, the maxillary not reaching the front of the eye. Premaxillary anteriorly rather above the level of the lower edge of the pupil. Lower jaw slightly included in the closed mouth. Teeth smaller and fewer in number than in *D. furcatum*, conical, in one series, $\frac{8}{6}$ or less in number (about $\frac{15}{12}$ in *D. furcatum*).

Eye moderate, about as long as snout, 3½ in length of head. Inter-

[1] Type of *C. insularis* Lawr.

[2] Females wanted.

orbital space strongly convex transversely. Cheeks with three rows of scales.

Gill-rakers rather small, but longer and stronger than in *D. furcatum*, the longest about one-third the diameter of the orbit.

Scales moderate, averaging rather smaller than in *D. furcatum*, about 5–70–13.

Spinous dorsal comparatively low, the first spine short, the others rapidly increasing to the fifth, after which the others are nearly of equal length, but gradually increasing to the last. The first soft ray is a little higher than the highest spine. The other soft rays are gradually shortened.

The caudal fin is deeply forked, the lobes being about equal. In *D. furcatum* the upper lobe is evidently the longer. Anal fin low, its spines moderately developed. Pectorals not reaching to the tips of the ventrals, which scarcely fall short of the first anal spine.

Fin rays: D. X, 23; A. III. 29.

Coloration light dusky olive above, silvery below, with pearly reflections. Scales above the axis of the body each with a golden-red spot at base, the outer margin of the scales tinged with light blue. These spots fade in alcohol, but are conspicuous in life, forming reddish streaks along the rows of scales.

Membrane of dorsal, anal, and ventral fins light olive-green. Traces of a dark shade on upper part of first rays of soft dorsal. No black at base of dorsal. A distinct black blotch on upper third of first eight rays of the anal. *Ventrals broadly tipped with reddish black*, as in *Hyperproropon argenteus*. Pectorals and caudal entirely *plain*, the black edging to the latter fin, characteristic of *D. furcatum*, being entirely wanting. Premaxillaries and end of snout distinctly dusky. Iris silvery, reddish above.

In *Ditrema furcatum* the color is nearly plain, pale, olivaceous, and silvery, the scales with bright reflections, but without distinct red markings. The sides are more silvery than in *D. atripes*, and there are more black punctulations. The naked portion of the base of the soft dorsal is black. There is no dark shade on the ventrals, and the caudal is distinctly margined with black behind. The dark anal spot is similar in the two species, but it is sometimes wanting in *D. furcatum*.

The species *Ditrema argyrosoma* (*Phanerodon argyrosomus* Gill, *Embiotoca argyrosoma* Girard), if distinct from *Ditrema furcatum*, is unknown to us. It differs, according to Girard, in having the anal III, 21, but the types had been mutilated and this count may, perhaps, be erroneous.

Measurements of Ditrema furcatum and Ditrema atripes in 100ths of length to base of caudal fin.

	Ditrema furcatum.	Ditrema atripes.
	Inches.	*Inches.*
Extreme length	10.3	9.15
Length to base of caudal	8.18	7.35
Body:		
Height	.39	.38
Least height of tail	.12	.113
Length of caudal peduncle from end of anal fin	.167	.23
Head:		
Length	.263	.285
Width of interorbital area	0	.082
Length of snout	.07	.078
Length of gill-rakers	.01	.018
Length of maxillary	.075	.075
Length of mandible	.075	.092
Diameter of orbit	.075	.072
Dorsal:		
Length of base	.512	.48
Length of fifth spine	.085	.085
Length of highest spine	.09	.010
Length of highest ray	.12	.113
Anal:		
Length of base	.30	.275
Longest ray	.06	.058
Caudal:		
Middle rays	.09	.095
Upper lobe	.256	.23
Lower lobe	.24	.24
Pectorals, length	.25	.26
Ventrals, length	.155	.176
Dorsal	X, 25	X, 24
Anal	III, 33	III, 29
Tubes in lateral line	70	71
Rows of scales above lateral line	5	5
Rows of scales below lateral line	13	13

The present species was described from two specimens, similar in size, obtained in the San Francisco market, and probably caught in Monterey Bay. Later, about 200 others were obtained at Monterey and Santa Cruz, but the species has not yet been noticed elsewhere on the coast.

We refer this species for the present to the genus *Ditrema*, of which *Phanerodon* Girard is considered by us a synonym.

We have not seen the Japanese type of the genus, *Ditrema temmincki*, but in external characters at least it agrees with *Phanerodon*.

San Francisco, Cal., *March* 14, 1880.

DESCRIPTION OF A NEW SCORPÆNOID FISH (SEBASTICHTHYS MALIGER), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Allied to *Sebastichthys nebulosus* and more remotely to *Sebastichthys vexillaris*. Body oblong, moderately robust, the profile with a regular but not very steep slope. Mouth moderate, nearly horizontal, the jaws equal when closed, the upper jaw somewhat emarginate. Maxillary reaching to near the posterior border of the eye; premaxillary in front below the level of the eye. Preorbital moderate, its neck about one-third the width of the large eye, with an angular lobe.

Spinous ridges on the top of the head rather prominent, much as in *nebulosus*, but lower, a little less depressed than in *rexillaris*. The following pairs are present: Nasal, preocular, supraocular, tympanic, and occipital, five in all. The nasal spines are very strong. The preocular and supraocular are broad and sharp. The tympanic spines are smaller than in related species. The occipital ridges are short and comparatively weak, the point rather depressed.

Preopercular spines very short, but all distinct, the upper one broad, the second longest and most acute. Opercular spines large, the upper very long and strong. Bluntish spines on subopercle and interopercle. Two suprascapular spines. Interorbital space rather deeply and somewhat evenly concave, with a rather deep pit anteriorly.

Gill-rakers about 10+20, stout, moderately long, rather longer than in *nebulosus*, somewhat clavate, the longest about equal to the diameter of the pupil.

Scales moderate, rough, in about 55 transverse rows. Accessory scales developed.

Dorsal spines very high and strong, the fourth spine highest, usually more than half the length of the head, the last spines low, so that the fin is deeply emarginated.

The *membrane of the spinous* dorsal is *very deeply incised*, more than half the anterior edge of each of the middle spines being above the membrane; even four-fifths of the length of the highest spine is sometimes free anteriorly. This is subject to some variations, but in all cases the bare portion of the spines is much higher than in other species. Soft dorsal high, but lower than spinous dorsal. Caudal truncate.

Anal fin rather low, the spines short. Second anal spine a little higher than the third, not two-thirds the height of the soft rays.

D. XIII, 12; A. III, 7.

Pectoral fins extremely broad and rounded, as in *S. rastrelliger*, the tips reaching beyond the tips of the ventrals, but not to the vent. The base of the fin is greater than the diameter of the eye and about twice the length of the occipital ridge. In both sexes the lower rays are thickened and fleshy.

Prevailing color a warm brownish yellow, sometimes quite yellow on the sides and below, the back sometimes considerably olive, sometimes reddish tinged. Sides of head, front of back, and thoracic region usually most distinctly yellow. The coloration mottled and clouded, but without distinct markings except the small spots with which the anterior region is closely covered. They are smallest and most distinct on the thoracic and scapular region. Here they are of a clear orange-brown color. On the top of the head they become more orange, and on the anterior part of the back they become larger and of a bright clear orange. Posteriorly they blend with the ground color. Top of head with dusky cross-shades. Sclerotic coat of eye spotted above with orange.

Fins all with the membranes slaty black; the pectorals and dorsal

paler at base and spotted with reddish. Membrane of the third dorsal spine scarcely paler than that of the second. There are no other traces of the light areas found in *nebulosus* and *fasciolaris*. There are usually traces of brownish shades radiating from the eye and alternating with yellowish areas.

This species is not rare in the San Francisco markets. The specimens from which the above description was taken, four in number, were obtained in the neighborhood of the Farallones. It is frequently taken in deep water in Monterey Bay and in the Straits of Fuca; it is very abundant, reaching a large size. It is one of the larger species, agreeing in size and appearance with *S. vexillaris*. Its relations are, however, more nearly with *S. nebulosus*, and it forms a transition from the brown to the red series.

Table of measurements.

Length to base of caudal	= 100
Body:	
Greatest height	37.5
Least height of tail	11.8
Head:	
Greatest length	38.5
Length of occipital ridges	6.3
Length of supraocular ridges	4.3
Length of preocular ridges	2.2
Interorbital width	7.9
Length of snout	9.2
Length of gill-rakers	3.5
Length of maxillary	19.5
Diameter of orbit	10.5
Dorsal:	
Longest spine	23
Longest ray	17.5
Least height of membrane between third and fourth spines	4.5
Anal:	
Second spine	12.3
Third spine	12
Longest ray	18
Caudal, length	17
Pectoral:	
Length	25
Width of base	11
Ventral, length	22
Dorsal	XIII, 12
Anal	III, 6
Lateral line (rows of scales)	47
Extreme length, in inches	15.45
Length to base of caudal, in inches	13.1

SAN FRANCISCO, CAL., *March* 15, 1880.

NOTE ON A NEW FLAT-FISH (LEPIDOPSETTA ISOLEPIS) FOUND IN THE MARKETS OF SAN FRANCISCO.

By W. N. LOCKINGTON.

In the review of the Pleuronectidæ of San Francisco (Proc. U. S. Nat. Mus. 1879, 69–108), a species belonging to the genus *Lepidopsetta* (Gill) is described as identical with the *Platichthys umbrosus* of Girard (Pac. Rail. Rep., x, 149, 1857). At the epoch when this description was written, as well as on previous occasions when a comparison was instituted between this species and the description of Girard above referred to, several discrepancies were noted, yet it was not supposed possible that that author had redescribed one of Dr. Ayres's species when the description of the latter was accessible to him.

Such, however, as first pointed out by Dr. Gill, turns out to be the case, and *Platichthys umbrosus* (Grd.) must sink into a synonym of *Lepidopsetta bilineata* (Ayres), while the form described by me as *L. umbrosa* needs renaming.

The synonymy of the two species will be as follows:

Lepidopsetta bilineata.

Platessa bilineata Ayres, Proc. Cal. Acad. Nat. Sci., i, 40.
Platichthys umbrosus Grd., Pac. Rail. Rep., x, 1855–'57, 149.
Lepidopsetta bilineata Gill, Proc. Phil. Acad. Nat. Sci.
Lepidopsetta umbrosa Gill, Proc. Phil. Acad. Nat. Sci.
Lepidopsetta bilineata Lockn., Proc. U. S. Nat. Mus. 1879, 103.

Lepidopsetta isolepis sp. nov.

Lepidopsetta umbrosa Lockn., Proc. U. S. Nat. Mus. 1879, 106.

This species is not closely related to *L. bilineata*. Its ctenoid scales, almost uniform over the head and body, its nearly straight lateral line, its smaller eyes, with a broader, flattish interorbital space, as well as the differences in the form and the number of fin rays, completely distinguish *L. isolepis* from *L. bilineata*.

Typical examples are in the United States National Museum.

NOTE ON A FORGOTTEN PAPER OF DR. AYRES AND ITS BEARING ON THE NOMENCLATURE OF THE CYPRINOID FISHES OF THE SAN FRANCISCO MARKETS.

By DAVID S. JORDAN.

During the infancy of the California Academy of Sciences the reports of its proceedings were published in the Daily Placer Times and Transcript, a newspaper then issued in San Francisco.

In the files of this paper for 1854 occur descriptions of new species of fishes from the San Francisco markets, by Dr. W. P. Gibbons and Dr. W. O. Ayres. The descriptions of Dr. Gibbons were soon after republ-

lished in the Proceedings of the Academy of Natural Sciences of Philadelphia (1854), and identifications of them have been carefully made by Alexander Agassiz (Proc. Boston Soc. Nat. Hist., 1861, 122). By this means the names given by Dr. Gibbons have taken their proper places in synonymy.

The descriptions published by Dr. Ayres have, on the contrary, not been noticed, so far as I know, by any subsequent author, not even by Dr. Ayres himself, who soon after redescribed the same species as new, apparently not considering the first publication as a sufficient one, as one species at least received a new name on the second description.

The following are the species in question:

1. *Leuciscus gibbosus* Ayres.

Stouter and thicker than any previously described species of the genus. Mouth small. About 60 scales in the lateral line. Brown above; silvery below. Weight about a pound. (Daily Placer Times and Transcript, issue of May 30, 1854.)

This description is not very explicit, but we are to remember that the species was described from the fish market of San Francisco, and that the five species then common in the markets were the subjects of the five descriptions. The following species of Cyprinoid fishes are taken in the Lower Sacramento River, and are now, as then, abundant in the market of San Francisco: *Ptychochilus oregonensis*, *Ptychochilus vorax*, *Siboma crassicauda*, *Pogonichthys inæquilobus*, *Orthodon microlepidotus*, and *Catostomus occidentalis*.

The description of *Leuciscus gibbosus* above quoted, as well as a more elaborate one afterwards published of "*Lavinia gibbosa*," applies to *Siboma crassicauda* only among the fishes which come to the San Francisco market. The name *gibbosus* was published in May, 1854; the name *crassicauda* in August, 1854. We have therefore no alternative but to drop the latter very characteristic name, and call the species *Siboma gibbosa*, or, perhaps better, *Telestes gibbosa*, for the robust caudal peduncle hardly furnishes a sufficient reason for a genus *Siboma*. In Ayres's time, as now, this species was known in the market as the "Chub."

2. *Leuciscus microlepidotus* Ayres (l. c., May 30).

This species, afterwards more fully described as *Gila microlepidota*, is the well-known *Orthodon microlepidotus*.

3. *Leuciscus macrolepidotus* Ayres (l. c., May 30).

Form much like that of *Leuciscus pulchellus*, though a little more slender. Anal fin longer. Caudal much arcuated. Scales 60. Size of the preceding.

This is evidently the species described in August of the same year by Baird and Girard as *Pogonichthys inæquilobus*, under which name it was afterwards mentioned by Dr. Ayres.

It must therefore take the less appropriate name of *Pogonichthys macrolepidotus*. This is now the "Split-tail" of the markets.

4. *Leuciscus gracilus* (sic) Ayres (l. c., May 30).

Body slender; head much elongate. Color silvery, becoming darker on the back. Scales about 80; much larger than any other known *Leuciscus*, weighing, it is said, 30 pounds or more, but generally varying, as we find it in the markets, from 5 to 20 pounds. This is the species here known as Salmon Trout, &c. * * *

This species was described soon after by Dr. Ayres in the Proceedings of the California Academy of Sciences, 1854, p. 19, as *Gila grandis*. It is apparently identical with the prior *Ptychochilus oregonensis* of Richardson. This species is now no longer called "Salmon Trout," its market name being "Pike."

The small-scaled *Ptychochilus* (*? vorax* of Girard) was not then noticed by Dr. Ayres.

5. *Catostomus occidentalis* Ayres (l. c.).

Soon after reconsidered by Dr. Ayres, in the Proceedings of the California Academy, under the same name, and also still later by Professor Agassiz (Am. Journal Sci. Arts, 1855), still as *Catostomus occidentalis*.

San Francisco, Cal., *March* 20, 1880.

NOTE ON "SEMA" AND "DACENTRUS."

By DAVID S. JORDAN.

In the Bulletin of Hayden's United States Geological and Geographical Survey, vol. iv, No. 2, 1878, I published "Notes on a collection of fishes from the Rio Grande at Brownsville, Tex." In this paper are characterized two new species, "*Sema signifer*" (p. 399), and "*Dacentrus lucens*" (p. 667).

These species must be suppressed. The former is a fœtal Embiotocoid, apparently *Cymatogaster aggregatus*, the other is the young of *Hysterocarpus traskii*.

The latter discovery was made before the paper was printed, but by inadvertence it was sent to the press during my absence in the field.

Of course neither of these species really came from the Rio Grande at Brownsville, Tex., and their presence in a jar otherwise containing only Texas fresh-water fishes is the only excuse for the gross blunders as to their relationships.

San Francisco, Cal., *March* 20, 1880.

DESCRIPTION OF A NEW SCORPÆNOID FISH (SEBASTICHTHYS PRORIGER), FROM MONTEREY BAY, CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Allied to *S. ovalis* and *S. elongatus*, having the mouth, spines, and fins of the former and the color and general appearance of the latter.

Body elongate, a little deeper than in *S. elongatus* and somewhat more compressed, tapering slowly backward into a slender caudal peduncle, which is rather shorter and stouter than in *S. elongatus*.

Head rather short and small, the profile somewhat steeper than in *S. elongatus*. Mouth small, much as in *S. ovalis*, the short, narrow maxillary extending to below the middle of the eye, the premaxillary on the

level of the lower margin of the pupil. Lower jaw strongly projecting, with a conspicuous symphyseal knob. Eye very large, longer than snout. Preorbital with its neck extremely narrow, armed with a slight spine.

Spinous ridges on top of head very low and weak, about as in *S. oralis*, rather lower and narrower than in *S. atrovirens* and *S. pinniger*. The following pairs of spines are present: Nasal, preocular, supraocular, tympanic, and occipital, five pairs in all, as in *S. elongatus*. The ridges are most of them partly covered by scales. Preocular spine little prominent. Supraocular ridge very little developed, its length two-fifths that of the eye (in *S. elongatus* two-thirds). Tympanic spine minute. Occipital ridge not conspicuous, the spine depressed.

Preopercular spines sharp, rather shorter than in *S. elongatus*, but similar, the second longest, the points of all directed backward rather than radiating. Opercular spines moderate; bluntish points on subopercle and interopercle. Two bluntish suprascapular spines.

Interorbital space broad, nearly as broad as the eye, somewhat regularly convex, the middle being elevated. In *S. elongatus*, as in most of the red species, the interorbital space is transversely concave.

Gill-rakers very long, slender, and numerous, about 10 + 30, the longest longer than the supraocular ridge, and about half the diameter of the eye.

Scales rather small, as in *S. oralis*, in about 65 transverse series, the accessory scales rather few.

Dorsal fin very low, as in *S. oralis*, not deeply emarginate, the shortest (twelfth) spine two-thirds the height of the fifth, which is little more than one-third the length of the head. Soft dorsal low, nearly twice as high as long, the highest ray about equal to the longest spine. Caudal fin moderately forked. Anal fin very low, its length about equal to the height of its longest ray. Second spine much longer and stronger than the third, scarcely shorter than the longest ray.

Pectorals shortish and rather narrow, the base rather wider than the eye, the tips reaching beyond the tips of the ventrals to the vent.

D. XIII, 13; A. III, 7.

Coloration very similar to that of *S. elongatus*, red, with olive markings. There is, however, more blackish and less greenish.

Ground color bright light red. Body mottled above with dusky olive-green, the ground color forming distinct blotches under the third dorsal spine and under the first and last rays of the soft dorsal. *Lateral line running in the middle of a very distinct continuous red stripe*, precisely as in *S. elongatus*. Head above with purplish cross-shades. Opercle with a dusky blotch: two olive shades radiating from the eye. Lips and tip of lower jaw blackish (red in *elongatus*). Eyes red. Caudal fin bright red, speckled with dark olive. Spinous dorsal bright red, the posterior part of each membrane blackish; soft dorsal olive and red; lower fins bright light red, with shades of olive-yellow.

This species is known to us from about eight examples obtained in the San Francisco market. They came from Monterey Bay, in a box containing *Sebastichthys rosaceus*, *constellatus*, *elongatus*, and *chlorostictus*, species all similar in size and redness of color. Later about sixty examples were obtained, all from deep water about Monterey and the Farallones.

The relations of *Sebastichthys proriger* seem to be most intimate with *S. ovalis* (Ayres), from which it differs in the more elongate form, the red color, and the absence of the postocular spine. It resembles superficially *S. elongatus* most, and its position is evidently between *ovalis* and *elongatus*. Its relations with *S. pinniger* are also not remote. To the green *S. ovalis*, *S. proriger* bears the same relation that the red *S. pinniger* does to the green *S. atrovirens*.

In the following table comparative measurements of *S. pinniger*, *ovalis*, and *elongatus* are given for purposes of comparison with *proriger*:

Table of comparative measurements.

	Ovalis.	Prorigor.	Elongatus.	Pinniger.
Total length, in inches	9	9.45	12.6.	8.33
Length to base of caudal (=100)	7.6	8	10.7.	7.17
Body:				
Greatest depth	.32	.30	.285	.38
Least depth of tail	.09	.09	.09	.129
Head:				
Greatest length	.38	.34	.38	.368
Snout	.085	.087	.087	.10
Orbit	.08	.095	.105	.10
Interorbital space	.08	.08	.057	.07
Preorbital, least width	.01	.013	.028	.016
Maxillary	.123	.14	.17	.17
Mandible		.18		
Longest gill-raker	.05	.045	.043	.055
Occipital ridge	.055	.06	.07	.07
Supraocular ridge	.032	.04	.07	.04
Dorsal:				
Distance from snout	.327		.353	
Longest spine	.11	.12	.135	.16
Longest soft ray	.12	.128	.127	.168
Length of base		.59		
Anal:				
Length of base	.14	.13	.12	.16
Second spine	.11	.14	.155	.13
Third spine	.09	.118	.106	.145
Longest soft ray	.12	.15	.135	.195
Caudal:				
Middle rays	.12	.13	.128	.18
Outer rays	.17	.175	.175	
Pectoral:				
Length	.275	.28	.28	.30
Width of base	.09	.09	.09	.098
Ventral, length	.20	.19	.19	.295
Scales, number of transverse rows	63	65	45	43

MONTEREY, CAL., *March* 25, 1880.

DESCRIPTION OF A NEW AGONOID (AGONUS VULSUS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Body elongate, tapering rapidly to the long tail, everywhere broader than high. It is highest and broadest at the shoulders, but is lower and narrower than the head.

Head acutely triangular as viewed from above, the profile irregularly sigmoid; lower surface of head and body plane from the head to the tail. Mouth U-shaped, entirely inferior, the maxillary reaching to opposite the front of the pupil, the premaxillary in front to the base of the posterior pair of rostral spines. The distance from the anterior margin of the premaxillaries forward to the tip of the rostral spines equals more than half the length of the snout, more than half the diameter of the eye, less than one-fifth the length of the head. Lips thickish. Upper jaw protractile. Teeth small, in a villiform band, none evident on the vomer or palatines. Maxillary mandible and branchiostegal region with some small scattered cirri; under side of snout with few barbels or none. Eyes large, nearly as long as snout, $3\frac{2}{3}$ in length of head, the orbital bones forming a raised ridge around them. Interorbital space transversely concave, nearly straight longitudinally, with a lengthwise groove and two slight ridges. Profile depressed at the front of the eyes, thence nearly straight to the tip of the rostral spines.

Spines on head highly developed. On each side a stout straight rostral spine projecting horizontally forwards; at its base a stout spine curved backwards, upwards, and outwards; behind this a smaller one projecting upwards. Orbital ridge above serrated, and with two prominent recurved spines, one in front, the other behind; behind these a ridge on each side confluent with the dorsal ridges and each with four spines; between these the top of the head is roughish and somewhat concave, with traces of a median keel. At the occiput is a conspicuous pit between the above-mentioned ridges, broader than long and longer than deep. Just below these ridges, on each side, is another and more prominent ridge, also ending in four spines, the last very strong; this is continuous with the upper lateral keel of the body; below this, on the opercle, is a strong keel ending behind in a spine; still lower is an irregular ridge, armed with two or three irregular series of spines and tubercles, extending from the preorbital along the subortal and preopercle, ending in a stout preopercular spine; behind the pectorals this ridge again appears as the long lateral keel of the body.

Along the lower margin of the preopercle are three or four more bluntish spines. There are on the head between seventy and eighty more or less developed spinous processes.

Isthmus rather wide.

Body with four ridges on each side, formed by the series of scales. Each scale ending in a strong recurved spine, its roots forming striæ on

the scales. Between the two lateral keels are traces of another keel; traces also exist between the two dorsal keels in front.

The spines are developed on all the keels except in front and behind on the two abdominal ones. The two dorsal keels, at about the eighth scale in front of the caudal fin, coalesce, after which the median furrow is obliterated and the spines continue double.

Just below the point of junction the abdominal keels also unite. The two lateral ridges remain distinct throughout. At the base of the tail, on each side, is a median spine between the lateral ridges.

The abdominal ridges are farthest apart behind the base of the ventrals, in front of which and behind which they converge, but anteriorly they do not meet. Breast with six or eight polygonal plates. Belly transversely convex, with traces of a furrow, into which the ventrals are depressible. Vent just behind the middle of the length of ventrals. Lateral line about forty.

Dorsal beginning behind the seventh dorsal scale, and extending over eight scales, four scales intervening between it and the soft dorsal, which covers seven scales. The anal begins under the end of the first dorsal, and extends over eleven scales. Dorsal spines very delicate and flexible. Pectorals reaching the eleventh scale in the upper lateral series. Ventrals beginning opposite the fifth scale and extending to the tenth.

Color nearly obliterated—dark brown, with blackish cross-bars, involving the fins. One bar across caudal, one across posterior part of soft dorsal and anal, one across posterior part of spinous dorsal and front of anal, and one across front of spinous dorsal. Pectorals black, with whitish edging. Caudal and ventrals blackish. Belly white.

Dimensions, in hundredths, of length to base of caudal fin.

Total length	4.1 inches
To base of caudal	3.6 inches = 100
Height of body	12
Height of tail	4
Width of body	14
Length of head	25
Width of head	19
Depth of head	12
Diameter of orbit	7
Length of snout	9
Length of rostral spine	2.3
Cleft of mouth	6.5
Width of mouth	6.5
Width of occipital pit	6
Space between dorsals	8
From front of mandible to tip of rostral spine	6
Isthmus	6
Length of spinous dorsal	12.5
Length of soft dorsal	12.5
Length of anal	18
Length of pectoral	18
Length of ventral	8
Length of caudal	13.5

This species is known to us from about ten specimens picked out of piles of prawns in the San Francisco market. They are taken in the sweep-nets of the "Paranzelle" off Point Reyes.

It belongs to the group or genus termed *Podothecus* by Professor Gill (typified by *Agonus acipenserinus*), which is distinguished from *Agonus cataphractus* by the longer spinous dorsal and by the greater number of plates on the breast. *Agonus vulsus* differs from *Agonus acipenserinus* in the much rougher head, the narrow suborbital, and in the slight development of the barbels, as well as in many minor respects.

Agonus acipenserinus is rather stouter, the head broader and smoother above, the turbinal bones more widely separated. The nasal spines are similar in the two species, as well as the position of the mouth. The preocular spine is obsolete, the interorbital space is broader and not corrugated, with two longitudinal ridges. Posterior part of head comparatively smooth, without pit at the occiput. Ridges and spines on posterior part of head continuous with those on the body, as in *A. vulsus*, but higher than those on the body, instead of smaller, as in the latter. latter. Opercular ridge small, the bones feebly striate.

Suborbital region quite broad and smooth, with a strong ridge beneath, on which are three strong retrorse spines, below which is a groove. Preopercle with two radiating ridges, each ending in a spine. About 28 spinous projections on the head in all, the number on the suborbital region much less than in *vulsus*. Eye much smaller than in *A. vulsus*, much shorter than snout, nearly 4 in head. Ocular ring not serrated, developed only above the eye. Body similarly armed, but the spines rather blunter and the back and belly less concave. There are no series of spines along the bases of pectorals and caudal. The abdominal series join behind close to the end of the ventrals, as the dorsal series close behind the second dorsal. The dorsal fins are separated by about two scales. The ventral fins are short, the fin scarcely half the length of the snout, the vent close behind its base; no visible groove ("Podothecus") at their base. Pectorals reaching about to front of anal. Breast with about nine large plates. Isthmus present.

D. IX, 7; A. 8. Lat. l. 37.

Barbels greatly developed, as long as the diameter of the eye, arranged in three tufts, one at each angle of the mouth and one under the snout. None on the branchiostegal region. The type of the present description of *Agonus acipenserinus* is in the museum of the California Academy of Sciences, and came from Vancouver's Island. It does not agree well with the account of *Podothecus peristethus* of Gill, although Professor Gill considers the two identical.*

San Francisco, Cal., *March* 1, 1880.

*See also Steindachner (Ichthyol. Beiträge, ix, p. 18), where the same opinion is expressed. In this article ("Ueber zwei neue Agonus-Arten aus California") *Brachyopsis verrucosus* Lockington is described as *Agonus* (*Brachyopsis*) *Barkani*, and *Brachyopsis xyosternus* Jor. & Gilb. as *Agonus* (*Brachyopsis*) *Annæ*. The date of publication of *B. verrucosus* is May 24, of *B. xyosternus*, July 2, while *A. Barkani* and *A. Annæ* were "Vorgelegt in der Sitzung am 15 Juli 1880." It is certain, therefore, that the American names are entitled to the right of priority.—D. S. J.

LIST OF SPECIES AND VARIETIES OF MINERALS IN THE NATIONAL MUSEUM OF THE UNITED STATES IN 1879.

By FRED. M. ENDLICH.

Albite.
Allanite.
Allophanite.
Altaite.
Alum.
Amalgam.
Amber.
Amblygonite.
Amphibolite.
  Actinolite.
  Asbestus var.
  Hornblende.
  Tremolite.
Analcite.
Anatase.
Andalusite.
  Chiastolite.
Anglesite.
Anhydrite.
Anorthite.
Anthrophyllite.
Antimony.
Apatite.
Apophyllite.
Aragonite.
Argentite.
Arguerite.
Arsenicum.
Asphalt.
Atacamite.
Aurichalcite.
Azurite.
Barite.
Baritocalcite.
Berthierite.
Beryl.
Biotite.
Bismuth.
Bitumen.
Boracite.
Borax.
Bromyrite.
Brookite.
Brucite.
Cacoxenite.
Calamine.
Calaverite.
Calcite.
Cancrinite.
Caolinite.
Carnallite.
Carpholite.
Cassiterite.
Celestite.
Cerargyrite.
Cerite.
Cerussite.
Cervantite.
Chabasite.
Chalcanthite.
Chalcocite.
Chalcodite.
Chalcopyrite.
Chlorastrolite.
Chlorite.
Chloritoidite.
Chondrodite.
Chromite.
Chrysoberyl.
Chrysolite.
Cinnabarite.
Clinochlorite.
Clintonite.
Cobaltite.
Columbite.
Copiapite.
Copper.
Copperasite.
Coquimbite.
Corundophyllite.
Corundum.
Cryolite.
Cryptomorphite.
Cuprite.
Cyanite.
Danburite.
Datholite.
Deweylite.
Diallogite.
Diamond.
Diasporite.
Dolomite.
Domeykite.
Dufrenite.
Embolite.
Emerald.
Emplectite
Enstatite.
Epidote.
Epsomite.
Erubescite.
Erythrite.
Euchroite.
Euphyllite.
Euxenite.
Fergusonite.
Fibrolite.
Fluorite.
Forsterite.
Fowlerite.
Franklinite.
Gadolinite.
Galenite.
Garnet.
  Almandite.
  Grossularite
  Melanite.
  Ouvarovite.
  Pyropite.
  Spessartite.
Gehlenite.
Genthite.
Geyserite.
Gibbsite.
Glauberite.
Glockerite.
Goethite.
Gold.
Graphite.
Greenockite.
Gypsum.
  Selenite var.
Halite.
Harmotomite.
Hauerite.
Hausmannite.
Hauynite.
Haydenite.
Helvinite.
Hematite.
  Columnar.
  Compact.
  Micaceous.
  Ochreous.
  Specular.
  Tabular.
Hessite.

Heulandite.
Hortonolite.
Howlite.
Hydromagnesite.
Hydrotalcite.
Hypersthenite.
Idocrase.
Ilmenite.
Iodyrite.
Iolite.
Iridosmine.
Iron (meteoric).
Jamesonite.
Jeffersite.
Kermesite.
Labradorite.
Lanarkite.
Lapis lazuli.
Laumontite.
Lazulite.
Leonhardite.
Lepidolite.
Leucite.
Liebethenite.
Limonite var.
Linnæite.
Liroconite.
Magnesite.
Magnetite.
Magnolite.
Malachite.
Manganite.
Marcasite.
Margarite.
Meerschaum.
Meionite.
Melaconite.
Melanosiderite.
Mesolite.
Metacinnabarite.
Millerite.
Mimetite.
Mineral coal var.
Molybdenite.
Molybdite.
Muscovite.
  Garnet inclusions.
  Hematite inclusions.
  Magnetite inclusions.
  Tourmaline inclusions.
Natrolite.
Nephelite.
Nitre.
Oligoclase.
  Aventurine oligoclase.
Olivenite.
Opal.
  Fire opal.
  Milky opal.
  Precious opal.
  Semi-opal.
  Wax opal.
  Wood opal.
Orpiment.
Orthoclase.
  Adularia.
  Amazonstone.
  Chesterlite.
  Moonstone.
  Ossidian.
  Pumice.
  Sunstone.
Ozocerite.
Pectolite.
Peridot.
Petzite.
Pharmacosiderite.
Phlogopite.
Pickeringite.
Picrophyllite.
Pitchblende.
Pitticite.
Polybasite.
Polyhalite.
Polymygnite.
Prehnite.
Psilomelanite.
Pyrargyrite.
Pyrite.
Pyrolusite.
Pyromorphite.
Pyrosclerite.
Pyroxenite.
  Angite.
  Coccolite.
  Hedenbergite.
  Jeffersonite.
  Malacolite.
  Sahlite.
  Uralite.
Pyrrhotite.
Quartz.
  Agate.
  Amethyst.
  Aventurine.
  Basanite.
  Chalcedony.
  Carnelian.
  Chrysoprase.
  Crystal.
  Flint.
  Heliotrope.
Quartz—Continued.
  Hornstone.
  Jasper.
  Noraculite.
  Onyx.
  Prase.
  Rosy.
  Sandstone flexible.
  Sardonyx.
  Siliceous sinter.
  Silicified wood.
  Smoky.
Quicksilver.
Realgarite.
Retinite.
Rhodonite.
Ripidolite.
Rutile.
Samarskite.
Sassolite.
Scapolite.
Scheeletinite.
Scheelite.
Schirmerite.
Schreibersite.
Scorodite.
Serpentine var.
  Chrysotilite.
  Ophite.
  Precious.
Siderite.
Sillimanite.
Smectite.
Smithsonite.
Sphalerite.
Spinel.
Spodumen.
Stannite.
Staurolite.
Stephanite.
Stercorite.
Stibnite.
Stilbite.
Strontianite.
Struvite.
Sulphur.
Sussexite.
Sylvanite.
Sylvite.
Tachydrite.
Talc.
Tellurite.
Tellurium.
Tennantite.
Teschemacherite.
Tetrahedrite.

Thomsonite.
Titanite.
Topaz.
Pycnite.
Tourmaline.
Troilite.
Trona.
Turquois.
Ulexite.
Vermiculite.
Vivianite.
Wad.
Asbolite.
Wavellite.
Warwickite.
Wheelerite.
Whitneyite.
Willemite.
Witherite.
Wolframite.
Wollastonite.
Wolfenite.
Xenotimite.
Zaratite.
Zincite.
Zircon.
Zoisite.
Zorgite.

DESCRIPTION OF A NEW SPECIES OF HEMIRHAMPHUS (HEMIRHAMPHUS ROSÆ), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Hemirhamphus rosæ, sp. nov.

Allied to *Hemirhamphus unifasciatus* and other typical species of the genus.

Body rather elongate, moderately compressed; the greatest depth being one-ninth of the length from the snout to the base of the caudal. Length of the whole head, including the lower jaw, contained $2\frac{2}{3}$ times in the length from tip of lower jaw to base of caudal. Length of the lower jaw beyond the tip of the upper jaw $4\frac{1}{2}$ times in the same length. The length of the head from the tip of the upper jaw is contained $3\frac{4}{5}$ times in the trunk (without head or caudal).

The triangular part of the premaxillaries is convex, slightly carinated above, and about as broad as long. The eye is rather large, somewhat less than the interorbital space, and about half of the postorbital part of the head. Mandible elongate, the narrowed tip slightly bent downward; the bone bordered on each side for its entire length by a conspicuous membrane, the membranaceous part being about as wide as the bony portion itself. Upper surface of mandible convex, grooved. Teeth in both jaws small, even, all of them apparently unicuspid. Top of head nearly plane, very slightly convex. Preorbital rather long; its diameter two-thirds that of the eye.

Scales rather small, very deciduous, about 63 in a longitudinal series.

Fin rays: D. I, 13; A. I, 14.

Dorsal and anal fins not at all scaly; the dorsal a very little longer than the anal and inserted slightly in front of it; the anterior rays of dorsal and anal moderately elevated. Caudal fin moderately forked; the lower lobe the longer; the middle rays nearly twice the diameter of the eye. Pectoral fin a little longer than the postorbital part of the head. Insertion of ventral fin slightly nearer the tip of the caudal fin above than the eye, and midway between the gill-opening and the base of the caudal. Ventrals a little shorter than the postorbital part of the head, not reaching vent.

Color translucent green, with the usual silvery band somewhat broader than a scale. Belly white. A dark vertebral band made of three streaks of dark points. Edges of scales with dark punctulations. Fins plain. Lower jaw dark blood-color; the ground-color red, rendered dark by punctulations. Bordering membrane deep red.

Table of proportional measurements.

Extreme length from chin to tip of tail	5.75 inches.
Length from tip of upper jaw to base of tail	4.00 inches — 100
Body:	
Greatest depth	11½
Greatest width	8
Least depth of tail	4½
Length of caudal peduncle	6
Head:	
Length from tip of lower jaw	50
Length from tip of upper jaw	20
Width of interorbital area	6
Length of mandible from eye	36
Length of snout	6
Diameter of orbit	5
Dorsal:	
Distance from snout	76
Length of base	16
Greatest height	7
Anal:	
Distance from snout	78
Length of base	14
Caudal:	
Length of upper rays	13
Length of middle rays	11
Length of lower rays	14
Pectoral length	11½
Ventral:	
Distance from snout	63
Length	7½
Dorsal rays	I, 13
Anal rays	I, 14

This species is abundant in the bay of San Diego and in the harbor of San Pedro. At San Diego we obtained in the winter, a very large number of immature individuals. At Wilmington we secured one specimen nearly adult, and saw numerous others swimming about near the surface in the muddy waters of the harbor.

We have named this species for Miss Rosa Smith, of San Diego, who has given much attention to ichthyology, and to whom the National Museum is indebted for many specimens of San Diego fishes.

San Diego, Cal., *August* 10, 1880.

DESCRIPTIONS OF SEVEN NEW SPECIES OF FISHES FROM DEEP SOUNDINGS ON THE SOUTHERN NEW ENGLAND COAST, WITH DIAGNOSES OF TWO UNDESCRIBED GENERA OF FLOUNDERS AND A GENUS RELATED TO MERLUCIUS.

By G. BROWN GOODE.

On the 4th of September, 1880, the Fish Commission steamer "Fish Hawk" made a two days' trip from the summer station at Newport, R. I., to the edge of the Gulf Stream. Several hauls of the trawl-net were made at the following stations: Nos. 865, 866, 867; lat. 40° 5′; long. 70° 23′ W.; depth, 65 fathoms. No. 868; lat. 40° 1′ 42″ N.; long. 70° 22′ 30″ W.; depth, 162 fathoms. No. 869; lat. 40° 2′ 18″ N.; long. 70° 23′ 6″ W.; depth, 192 fathoms. No. 870; lat. 40° 2′ 36″ N.; long. 70° 22′ 58″ W.; depth, 155 fathoms. No. 871; lat. 40° 2′ 54″ N.; long. 70° 23′ 40″ W.; depth, 115 fathoms. No. 872; lat. 40° 5′ 39″ N.; long. 70° 23′ 52″ W.; depth, 86 fathoms.

The results of this day's work are unparalleled in the history of the Commission. Over 120 species of invertebrates and fishes were added to the fauna of Southern New England. The list of fishes never before seen south of Cape Cod is as follows. The other fishes taken in the same hauls are also mentioned, inclosed in brackets:

1. *Glyptocephalus cynoglossus*, (Linn.) Gill; young; 869, 870.
2. *Monolene sessilicauda*, n. s., n. g.; 870, 871.
3. *Citharichthys arctifrons*, n. s.; 871, 872.
4. *Citharichthys unicornis*, n. s.; 870, 871.
5. *Thyris pellucidus*, n. s., n. g.; 871, 872.
6. *Macrurus Bairdii*, Goode & Bean; adult and young; 870.
7. *Macrurus carminatus*, n. s.; 870.
8. *Hypsicometes gobioides*, n. s.; 871.
   [*Phycis chuss*, (Walb.) Gill]? (No. 25925); 866.
   [*Merlucius bilinearis*, (Mitch.) Gill]; adult and young; 870, 871, 872.
9. *Phycis Chesteri* Goode & Bean; adult and young; 868, 869, 870.
   [*Phycis regius*, (Mitch.) Gill]; 870.
10. *Lycodes Verrillii*, Goode & Bean; 870.
11. *Anarrhichas lupus*, Linn.; young; 866.
12. *Peristedium miniatum*, n. s.; 865, 872.
13. *Sebastes marinus*, (Linn.) Lütken, 870, 871.
14. *Raia*, unkn. spec. (with numerous closely studded spines); 871.
15. *Raia*, unkn. spec. (in egg, with very long tail); 869.
16. *Myxine glutinosa*, Linn.; 869, 870.

On this same ground Gloucester fishermen, in 1879, obtained numerous specimens of *Lopholatilus chamæleonticeps* never elsewhere taken.

The occurrence of *Phycis regius* and *Merlucius bilinearis* at such great depths is worthy of mention.

Nov. 23, 1880.

In the following paper are described the following genera and species, apparently never before observed:

Monolene, n. g. } *Pleuronectidæ.*
Thyris, n. g. }
Hypsicometes, n. g. *Merlueiidæ?*
Monolene sessilicauda, n. s.
Citharichthys arctifrons, n. s.
Citharichthys unicornis, n. s.
Thyris pellucidus, n. s.
Macrurus carminatus, n. s.
Hypsicometes gobioides, n. s.
Peristedium miniatum, n. s.

I am greatly indebted to Mr. Frederick Gardner, jr., who has assisted in the preparation of this paper.

Monolene,* new genus.

A genus of pleuronectoid fishes with thin elongate body and sessile caudal fin. Eyes upon left side very close together, and near to profile. Mouth moderate; the length of the maxillary less than one-third that of the head. Teeth minute in the jaws, in single series, nearly equal on both sides, though perhaps a trifle stronger on the blind side; absent on vomer and palatines. Pectoral fin upon blind side totally absent. Dorsal fin commences in advance of the eye upon the snout. Dorsal and anal rays simple. Caudal fin sessile, almost confluent with dorsal and anal. Ventrals normal. Scales rather large, ctenoid upon colored side, cycloid upon blind side. Lateral line marked; on colored side strongly and angularly curved above the anterior two-thirds of the pectoral; on the blind side straight, rising slightly as it approaches the region of the gill-opening. Gill-rakers few, feeble. Vertebræ 43.

Monolene sessilicauda, new species.

Extreme length of specimen described 0.156^{m}.†

The height of the body (38) is about three-eighths of the total length (without caudal), and is equal to twice the distance of the origin of the ventral from the snout (19); its height over the ventrals (25) is about five times the longitudinal diameter of the lower eye (5), the least height (8.5), at the base of the tail, slightly greater than the length of the lower jaw (8). The body is thin its greatest width (5) not exceeding the longitudinal diameter of the orbit.

Scales subcircular, with irregular outline, about 2 millimeters in diameter, or in diameter about one-fourth (1.25) the diameter of the eye. The posterior edge of each scale upon the colored side is pectinate with about fifteen denticulations. The scales of the blind side are oval, non-pec-

* Etymology: μόνος = single; ὠλένη = an arm.
† No. 26004.

tinate, about as large as those of the colored side. The head is everywhere closely thatched with scales, even to the edges of the lips, and small scales occur on the bases of the caudal, pectoral, and ventral fins, and upon the rays of the vertical fins nearly out to their tips. There are about 23 rows above and 25 below the lateral lines on the colored side, behind the curve of the line.

Lateral line of colored side strongly bent in its anterior part over the base and anterior two-thirds of the pectoral fin. There are about 92 scales in the lateral line, 72 of them in its straight portion. The arc of the curved portion of the lateral line (12) is slightly more than double the distance of its highest portion above the line of the straight portion of the line were it continued (5). The curve of the line is very peculiar, having two angles; that nearest the head being most obtuse. The lateral line on the blind side is nearly straight, slightly ascending above the abdominal cavity.

The length of the head (20) equals one-fifth of the standard length, and four times diameter of eye, or length of preculum (5). Distance from snout to margin of upper eye (5) much greater than distance to lower eye (3), and less than length of the maxillary (5.5), the posterior margin of which passes the perpendicular from the anterior margin of the lower eye. The width of the interorbital area is very small, less than one-sixth of the diameter of the eye. The length of the mandible (8) is two-fifths of the head.

The dorsal fin begins upon the snout in the perpendicular from the anterior margin of the lower eye. It is composed of from 99 to 104 simple rays (in five specimens), the longest of which in the posterior fourth of the fin; their length (9) nearly half that of the head. The anal fin begins between the tips of the ventral, close to the vent, and under the insertion of the pectoral. It is composed of 79 to 84 simple rays, the longest in the posterior fourth; their length (7) slightly more than one-third the length of the head.

The caudal is sessile, rounded, the middle rays in length (17) nearly double the longest dorsal rays.

The pectoral, present only on the colored side, is inserted close to the branched opening, its length (15) three-fourth that of the head.

The ventrals are upon the medium ventral line, even in length (6), slightly shorter or nearly equal to the longest rays of the anal.

Color on the left side ashy brown, with numerous more or less distinct darker brown spots. On the blind side white. Pectoral blackish, with traces of lighter transverse bands.

Radial formula: D. 99–103; A. 79–84. Lateral line (92).

Eleven specimens, ranging in length from .094 to .156 millimeter, were taken, September 4, in hauls 870 and 871.

Current number of specimen Locality	26,004. 870.		26,004*b*.		26,004c.		26,004e.	
	Millimeters.	100ths of length.	Millimeters.	100ths of length.	Millimeters.	100ths of length.	Millimeters.	100ths of length.
Extreme length	156							
Length to end of middle caudal rays.	133	100						
Body:								
Greatest height		38						
Greatest width		5						
Greatest circumference		25						
Height at ventrals		25						
Least height of tail		8.5						
Head:								
Greatest length		20						
Distance from snout to upper eye		5						
Width of interorbital area		7.5						
Distance from snout to lower eye		3						
Length of operculum		5						
Length of maxillary		5.5						
Length of mandible		8						
Diameter of orbit, longitudinal.		5						
Dorsal (spinous):								
Distance from snout		3						
Greatest height		9						
Anal:								
Distance from snout		22						
Height at longest ray		7						
Caudal:								
Length of middle rays		17						
Pectoral:								
Distance from snout		21						
Length		15						
Ventral:								
Distance from snout		19						
Length		6						
Dorsal		103		102	99		103	103
Anal		84		81	81			79
Number of scales in lateral line		*92						
Number of transverse rows above lateral line		(23)						
Number of transverse rows below lateral line		(25)						
Number of vertebræ		5						

*20 in curve.

Citharichthys, Bleeker.

A genus of pleuronectoid fishes. Mouth rather wide, the length of the maxillary almost one-third that of the head. Eyes upon left side, the upper one very near to profile. Teeth quite minute, on a single series in each jaw, rather more prominent upon the blind side. Vomerine and palatine teeth none. Pectoral fin upon blind side much shorter and with fewer rays than upon colored side. Ventrals also asymmetrical, the sinistral one upon the median ventral line, the dextral one slightly in advance and crowded up upon the blind side. Dorsal fin commences in front of the eye upon the snout. Dorsal and anal rays simple. Caudal fin subsessile, its peduncle not much developed. Scales large, flexible, cycloid, very deciduous. Lateral line strongly defined, straight or very slightly curved anteriorly. Gill-rakers short, rather stout, flexible. Vertebræ 34 (in *C. arctifrons*). Gill membranes broadly united below the throat; gill rakers lanceolate. Branchiostegals 5.

Citharichthys arctifrons, new species.

Extreme length of specimen described 137 millimeters.*

The height of the body (37) is about three-eighths of its total length (without caudal), and is equal to about four times the height of the tail (9) and about five times its thickness (7).

The scales are irregularly polygonal, cycloid; the largest about 6 millimeters in diameter; the diameter (5) nearly equal to that of the eye. The scales are flexible, loosely arranged, and very easily detached, so that it is difficult to secure a specimen in good order. Small scales on the rays of the ventral fins. There are forty scales in the lateral line (on the colored side), which is sharply defined and straight, and seven or eight above and the same number below the lateral line at the broadest part of the body.

The length of the head (24–24¼) is about one-fourth that of the body, and four times the diameter of the eye (6). The interorbital space (1) is very narrow, equal to the difference in the distances from snout to lower eye (4) and snout to upper eye (5). The length of mandible (10–10¼) is about double the latter distance; the length of the maxillary (7–7¼) slightly more than the greatest width of the body.

The dorsal fin begins upon the snout, above the anterior margin of the upper eye. Its greatest height (13–15) is about three times the distance of its anterior ray from the snout. It is composed of 82 to 83 simple rays. The anal begins under the axil of the pectoral, its greatest height (14–15) equal to or slightly exceeding half the distance of its anterior ray from the snout. It is composed of 67 simple rays.

The caudal is subsessile, triangular, of 16 rays; its length about equal to that of the head. In dorsal, anal, and caudal the rays appear to project beyond the connecting membrane half or two-thirds of their own length.

The pectorals are inserted far below the lateral line and close to the gill-opening. The pectoral on the colored side is composed of more rays (9–10) than that of the blind side (7), its length (17–19) being about double that of its mate (7–9). The ventrals are composed of 4 rays.

Color dirty light brown.

Radial formula: D. 82–3; A. 67; C. 16; P. 9–10–7; V. 5; L. lat. 40.

Numerous specimens, ranging in length from 90 to 140 millimeters, were taken, September 4, in hauls 870–871. The females were full of ripe spawn. It is not probable, therefore, that the average size of the species is much greater than that of the specimens described.

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* No. 25908, Nat. Mus.

Current number of specimen	25,908.			
Locality	871.		871.	
	Millimeters.	100ths of length.	Millimeters.	100ths of length.
Extreme length	137		122	
Length to end of middle caudal rays	111	100	102	100
Body:				
Greatest height of middle dorsal		38.5		37
Greatest width		7		
Least height of tail		9		9
Head:				
Greatest length		24.25		24
Width of interorbital area		1		1
Length of snout to upper eye		5		5
Length of maxillary		7.25		7
Length of mandible		10.25		10
Distance from snout to lower eye		4		4
Diameter of orbit, longitudinal		6		6
Dorsal (spinous):				
Distance from snout		4.75		5
Length of base		96		
Greatest height, posterior $\frac{1}{2}$		15		13
Anal:				
Distance from snout		28.75		27
Length of base		71		
Height at longest ray, posterior $\frac{1}{3}$		14		15
Caudal:				
Length of middle rays		25.50		23
Pectoral:				
Distance from snout		25		25
Length		19–7		17–9
Ventral:				
Distance from snout		22		21
Length		11		10
Dorsal		83		82
Anal		67		67
Caudal		16		
Pectoral		10–7		9–7
Ventral		5		5
Number of scales in lateral line, from root of ventral obliquely back		40		40
Number of transverse rows above lateral line				1

Citharichthys unicornis, new species.

Extreme length of the specimen described (No. 26003) 69 millimeters.

The greatest height of the body (47) is slightly less than its length, and is about $4\frac{1}{4}$ times its least height at the tail (11). The body is much higher than in *C. arctifrons*, its greatest height over the pectorals, the contours then descending in almost straight lines to the base of the tail. The thickness of the body (6) is less than in *C. arctifrons*, being contained nearly seventeen times in the standard length.

The scales are thin, deciduous, smaller than in *C. arctifrons*. There are about forty scales in the lateral line, which is slightly curved over the pectoral, and, as nearly as can be determined in the denuded specimens before me, about twelve rows above and twelve below the lateral line at the broadest part of the body.

The length of the head (25) is one-fourth of the standard length and about three times the diameter of the eye (9), or the distance from the snout to the upper eye (9). The interorbital space is wide (4), equal to the length of the snout, and diagonally crossed by a strong ridge, a continuation of two ridges which form the upper boundary of the lower and the lower boundary of the upper orbit.

The length of the maxillary (11) is less than half, that of the mandible

(13) more than half, that of the head. The teeth are minute, in single rows, closely set in the jaws, somewhat stronger upon the blind side. A strong short spine above the snout, at the anterior termination of the ridge at the lower margin of the upper eye. Hence the specific name *unicornis*.

The dorsal fin begins at the side of the preorbital spine, its anterior rays being slightly crowded over upon the blind side. It is composed of 73 to 75 simple rays. Its greatest height (13) is half the length of the head.

The distance of the anal from the snout (33) is one-third of the standard length. The number of rays is 60; their longest (13) equal in length to the longest dorsal rays.

The caudal is pointed, triangular, subsessile; its length (22) twice that of the maxillary (11) and two-thirds the distance from the snout to the anal (33). The pectorals are inserted far below the lateral line. The pectoral of the colored side is twice as long (18) as the diameter of the eye, that of the blind side as long (13) as the longest dorsal rays. The former is composed of 10 rays, the latter of 4.

The length of the ventrals (11) is half that of the caudal. They are asymmetrically placed, as is described under the generic diagnosis.

Radial formula: D. 73–75; A. 60; P. 4 right, 10 left; L. lat. 40.

Color ashy gray, with dark lateral line. Eyes black.

Current number of specimen	26,003.	
Locality	870 and 871.	
	Millimeters.	100ths of length.
Extreme length	69	
Length to origin of middle caudal rays	57	100
Body:		
Greatest height		47
Least height of tail		11
Head:		
Greatest length		25
Distance from snout to upper eye		9
Distance from snout to lower eye		5
Width of interorbital area		4
Length of snout		4
Length of maxillary		11
Length of mandible		13
Diameter of orbit, longitudinal		9
Dorsal (spinous):		
Distance from snout		5
Greatest height		13
Anal:		
Distance from snout		33
Height at longest ray		13
Caudal:		
Length of middle rays		22
Pectoral:		
Distance from snout		28
Length		18–13
Ventral:		
Distance from snout on colored side		26
Length		11
Dorsal		75–73
Anal		60
Pectoral		4 R., 10 L.
Number of scales in lateral line		40

Thyris,* new genus.

I feel much hesitation in describing as a member of a new genus this little heterosome fish, which has all the appearance of being the larval form of some larger species. Since, however, it has attained almost the size at which one of the associated species begins breeding, and since I am unable to assign it to any genus already described, it seems desirable to give it a name which may serve to designate it, at least for the time being.

DIAGNOSIS.—A genus of heterosome fishes, with soft, transparent, elongate body. Head very short (in the single species contained about 5½ times in total length of body). Mouth small, toothless. Eyes upon left side, close together, the lower slightly in advance of the upper. Pectoral fin upon blind side shorter and with fewer rays than upon colored side. Ventrals crowded together upon median keel of body, their bases prolonged upon this keel. Dorsal fin commences in front of the eye upon the snout. Dorsal and anal rays simple. Caudal fin subsessile, almost confluent with dorsal and anal. Scales very small, thin, easily detached. Dorsal line marked, straight. Body translucent, colorless (except for three longitudinal stripes in the single species). The vertebræ can almost be counted through the flesh when the fish is held up to the light, and the arrangement of the gills is clearly visible through the opercular bones.

Thyris pellucidus, new species.

The length of the specimen described (No. 26005) is 72 millimeters.

The height of the body (32) is about one-third of its length (without caudal), the least height of the tail (7) one-fourteenth. The body is thin, pellucid, larval-like, divided into three longitudinal tracts by depressions at the bases of the rows of interspinous processes, as in *Glyptocephalus*.

The scales are small, thin, easily detached (none remain upon the specimen except a few in the lateral line). The number of transverse rows is estimated at one hundred and twenty, the number of rows above and below the lateral line at the widest portion of the body seventeen or eighteen. The scales in the lateral line are provided with a large central canal. The lateral line is straight on both sides.

The head is very small; its length (18) contained about five and one-half times in the total length of the body. The eyes are small, protruding, the upper almost perpendicularly above, though perhaps slightly posterior to the lower. The diameter of the eye (2) equals the width of the interorbital space (2) and is double the distance (4) from the snout to the upper eye, that from the snout to the lower eye (3) being intermediate. The mouth is small, the shape of the opening being somewhat like that in *Solea*, the upper jaw being somewhat hook-shaped. The length of the upper jaw (4) is two-thirds that of the mandible (6).

The dorsal commences on the snout in advance of the eye, and is com-

*Etymology: θῦρίς=a window.

posed of 96 to 102 long, flexible, simple rays, their tips apparently extending far beyond the connecting membrane. The length of the longest rays (14) is double the least height of the body at the base of the tail (7).

The anal fin originates at a distance (22) from the snout contained four times and one half in the length of the body. It is composed of 76 to 81 rays, the longest of which are as long as the head.

The pectoral is inserted close to the gill-opening and far below the lateral line (midway from the black stripe upon the lateral line to the black stripe at the base of the interspinous processes of the anal fin). The pectoral upon the blind side is short, its length (2) equal to the diameter of the orbit, composed of about four or five rays; that upon the colored side longer, its length (3) equal to that of the snout, and composed of about twelve rays. The ventrals are both crowded upon the ventral keel, their bases prolonged upon the keel, their tips embracing the origin of the anal.

Radial formula: D. 96–102; A. 76–81; P. 12 left, 4–5 right.

Color: In life colorless, translucent. In alcohol yellowish white. Three prominent blackish longitudinal stripes or lines upon the left side. The stripe running from the branchial cleft to the base of the tail is less prominent than the two at the bases of the interspinous processes. On the lateral line of the right side there is no stripe, though the two lateral stripes are as prominent as upon the other side. Eyes black.

Current number of specimen	26,005.	
Locality	870, 871, and 872.	
	Millimeters.	100ths of length.
Extreme length	72	.....
Length to end of middle caudal rays	60	100
Body:		
Greatest height	.....	32
Least height of tail	.....	7
Head:		
Greatest height	.....	18
Distance from snout to upper eye	.....	4
Distance from snout to lower eye	.....	3
Width of interorbital area	.....	2
Length of maxillary	.....	4
Length of mandible	.....	6
Diameter of orbit	.....	2
Dorsal (spinous):		
Distance from snout	.....	2.5
Greatest height	.....	14
Anal:		
Distance from snout	.....	22
Height at longest ray	.....	18
Caudal:		
Length of middle rays	.....	19
Pectoral:		
Distance from snout	.....	18
Length	.....	3–2
Ventral:		
Distance from snout	.....	16
Dorsal	.....	96–102
Anal	.....	76–81
Pectoral	.....	12 L., 4–5 R.
Number of scales in lateral line	.....	*120

* Estimated from partial count.

Macrurus carminatus, new species.

A single specimen, 248 millimeters in length, was obtained, September 4, at station 871. It is most closely related to *M. cœlorhynchus* (Risso) Bonap. and to *M. atlanticus* Lowe, but differs in the number of fin-rays and in other characters.

The body is less elongate and stouter than in *M. Bairdii*, Goode & Bean, though its greatest height (12.5) is, as in *M. Bairdii*, one-eighth of total length. The difference in general appearance is due to the fact that in *M. carminatus* the ventral contour retreats less rapidly.

The scales are large, heavy, the free portions covered with long vitreous spines arranged in nine or ten rows. These scales resemble the old-fashioned wool cards. Hence the specific name, from *carmen*, a wool-card. The spines are thicker and more closely set than in *M. Bairdii*, and there is no specialization of the central row. The number of scales in the lateral line cannot be determined, though it probably does not exceed 100, but there are about five transverse rows above it and twelve below it, counting from the vent obliquely backward. In *M. Bairdii* there are 152 in the lateral line, six above and nineteen or twenty below.

Length of head (21) contained a little less than five times in total length. Width of interorbital area (4) about equal to vertical diameter of orbit, and about one-fifth of the length of the head. Length of snout, horizontal diameter of eye, length of postorbital portion of head about equal (7). Length of operculum (35) half that of snout.

Snout long, sharp, depressed, triangular, the lower surface more nearly parallel with the axis of the body than in *M. Bairdii*. The lateral ridges are pronounced and are contained in a straight line under the eyes and upon the preopercula. Strong horizontal ridges continue from the supra-orbital margins to the gill-openings, parallel with the subocular ridges. Nostrils immediately in front of the orbit. Barbel very short.

Teeth small, conical, somewhat recurved, arranged in villiform bands.

Distance of first dorsal from snout (23.5) about four and one-half times the length of its base (5), its distance from anterior margin of orbit much less than the length of the head. First spine very short, hardly perceptible above the skin. Second spine about half as long (11) as the head, slender, unarmed. When laid back, its tip reaches the origin of the second dorsal (the filament is destroyed). The decrease in the length of the spines is very gradual, the sixth being nearly as long as the second, so that the fin is not so triangular in shape as in *M. Bairdii*.

The second dorsal begins in the perpendicular from the seventh ray of the anal. The anal is much higher than in *M. Bairdii*, the length of the longest rays (2) nearly equal to half the width of the interorbital area.

Anal fin inserted under the eighteenth scale of the lateral line (as nearly as can be judged from the distorted specimen). Its longest rays are as long as the width of the interorbital area.

Distance of pectoral from snout equal to twice its own length (11),

which is about equal to the length of the dorsal spine. Its insertion is below the middle of the depth of the body and below the level of the center of the orbit. Its tip does not reach to the perpendicular from the origin of the anal.

Insertion of ventral behind pectoral and slightly in advance of the insertion of the dorsal. Its distance from the snout (22) is greater than twice its length (9). Its long filament does not reach to the origin of the anal fin.

Radial formula: D. I, IX, 80 +; A. 76 +; P. 13; V. 7.

Color silvery gray. The thick, closely-set spines are matted with oozy mud which cannot be removed. This is doubtless the result of the hard usage experienced in the trawl-net.

Current number of specimen	26,007.
Locality	871.

	Millimeters.	100ths of length.
Extreme length	248	100
Body:		
Greatest height under dorsal		12.5
Head:		
Greatest length		21
Width of interorbital area		4
Length of snout		7
Length of operculum		3.5
Length of mandible		7.25
Diameter of orbit		7
Dorsal (spinous):		
Distance from snout		23.5
Length of base		5
Height at first spine		11
Dorsal (soft):		
Distance from snout		35
Anal:		
Distance from snout		27
Pectoral:		
Distance from snout		21
Length		11
Ventral:		
Distance from snout		22
Length		10
Dorsal		I, IX, 80+
Anal		76+
Pectoral		13
Ventral		7
Number of scales in lateral line		[100]
Number of transverse rows above lateral line		(6)
Number of transverse rows below lateral line		(18)

Hypsicometes,* new genus.

A small specimen, much contracted and distorted from immersion in strong alcohol, is the only material upon which to base this description. Although not quite satisfied that the relations of this fish are most nearly with *Merluciidæ*, I venture to assign it temporarily to a position in this family, hoping that additional material may confirm my present belief. In some respects it resembles the *Blennioids*, but pseudobranchiæ are absent.

DIAGNOSIS.—A genus of fishes in general form closely resembling *Merlucius*, but with the elongate body covered with large scales (not

* Etymology: ὑψι = in deep water; κωμήτης = an inhabitant, a dweller.

much more than half as many in lateral line as in *M. bilinearis* nor one-third as many as in *M. vulgaris*). Mouth rather small. A separate caudal. Two dorsal fins, the first composed of a few long rays, the second with longer base. One elongate anal. Ventrals well developed, with broad base composed of six rays. Teeth on the vomer and in the jaws in two or three rows, rather feeble. The eyes large, near together, looking upward. No barbel.

Hypsicometes gobioides, new species.

The general appearance of the fish is suggestive of a species of *Gobius*.

Head rather broad and somewhat depressed; its greatest width (13) about equal to the greatest height of the body (12), and less than one-half its length (30), which is contained three times and one-third in the standard length. The cleft of the mouth is horizontal, extending to the perpendicular from the anterior margin of the orbit. The snout is broad, rounded, as long (10) as the longitudinal diameter of the eye. The interorbital space is narrow (2), one-fifth the length of the snout, the eyes large, very close together, looking upward. The length of the maxillary (13) is equal to the greatest width of the head. The mandible is much longer. Teeth minute, in two or three rows on jaws and on vomer. Gill-opening wide, the membranes united over the isthmus near the snout.

Body shaped much as in young of *Merluccius*, the least height of the tail (5) about half of the greatest width of the body (11). The scales are large, about 58 transverse rows from gill-opening to base of caudal. The character of the scales and the position of the lateral line cannot be decided from the specimen described.

The dorsal originates above the base of the pectoral, and consists of six or seven flexible rays as long (10) as the snout. The second dorsal has a base four times as long (10) as the snout, and extends nearly to the base of the caudal. It is composed of about seventeen rays, the longest slightly longer (11) than the longest in the first dorsal.

The origin of the anal is under that of the second dorsal; its base length (48) is equal to the distance of its anterior ray from the snout (48). It is composed of about sixteen rays, the longest of which (10) is equal to the longest in the first dorsal.

The caudal is truncate, its length (18) three-eighths of that of the base of the anal.

The insertion of the pectoral is distant from the snout (33) one-third of the distance from snout to base of caudal. Its length (10) equal to the height of the first dorsal.

The ventrals are far apart, with broad bases lying flat upon the ventral surface, composed of six rays. They are situated far in advance of the pectorals and their length (14) equals two-fifths of the distance from snout to first dorsal.

Radial formula: D. VI (or VII), 17; A. 16; V. 6; L. lat. 158.

Color grayish, with obscure cloudings. Belly lighter. A large black blotch upon the base of the upper caudal rays.

	Millimeters.	100ths of length.
Extreme length	54	.....
Lenght to end of middle caudal rays	46	100
Body:		
Greatest height	.....	12
Greatest width	.....	11
Least height of tail	.....	5
Head:		
Greatest length	.....	30
Greatest width	.....	13
Width of interorbital area	.....	2
Length of snout	.....	10
Length of maxillary	.....	13
Diameter of orbit, longitudinal	.....	10
Dorsal (spinous):		
Distance from snout	.....	35
Length of base	.....	8
Greatest height	.....	10
Dorsal (soft):		
Length of base	.....	40
Height at longest ray	.....	11
Anal:		
Distance from snout	.....	48
Length of base	.....	48
Height at longest ray	.....	10
Caudal:		
Length of middle rays	.....	18
Pectoral:		
Distance from snout	.....	33
Length	.....	10
Ventral:		
Distance from snout	.....	23
Length	.....	14
Dorsal		VI–[VII], 17
Anal	.....	16
Ventral	.....	6
Number of scales in lateral line	.....	[58]

Peristedium miniatum, new species.

Total length of type (No. 26023) 300 millimeters.

The greatest width of the body (20) is equal to its greatest height (19.5), being one-fifth of its total length without caudal. The general armature of the body is much like that described by Günther under *Peristethus brevirostre*.* The number of plates between the gill-opening and the base of the tail is from twenty-seven to twenty-nine. There are four series of spiny plates on each side, the spines of the abdominal series becoming very weak and obsolete towards the tip of the tail.

The length of the head (40.15) is two-fifths of the total length without caudal. The length of the preorbital processes (7) is contained about three times and one-half in the distance from their extremities to the anterior margin of the orbit. The interorbital space is deeply concave, its width (6.75) contained between six and seven times in the length of the head. Protuberance on the forehead *very* slight. The length of the snout (22.5) is more than half that of the head (in young less). The diameter of the eye (65) is contained between six and seven times in the length of the head. There is one pair of spines upon the upper surface of the snout behind the base of the preorbital processes, and another larger pair upon the preorbital processes, one upon each. The ridge of the preopercuhum terminates in a depressed, short, sharp-pointed spine. The number of small tentacles upon either side of the lower jaw is about

* Cat. Fish. Brit. Mus. ii, 1860, p. 218.

ten, the smallest nearest to the symphysis. The long tentacles at the angles of the mouth are fringed and extend to the base of the pectorals. In other respects Günther's description of *P. brevirostre* is ample for this species.

Color bright crimson.

Radial formula: D. VII, 18; A. 17; C. 16; P. 2 + 10; V. 6. L. lat. 27 on one side, 28 on the other.

Three other specimens had the following: D. VIII, 18; A. 17. D. VII, 18; A. 18. D. VII, 18; A. 18.

The measurements of adult and young specimens are given. The fish when taken seemed to be in the height of the spawning season.

Current number of specimen Locality	26,023. 869.		26,030. 871 (young).	
	Millimeters.	100ths of length.	Millimeters.	100ths of length.
Extreme length	300		53	
Length to end of middle caudal rays	272	100	45	100
Body:				
Greatest height at origin of dorsal		19.50		19
Greatest width under pectorals		20		15
Height at ventrals		19.50		18
Least height of tail		2.75		3
Head:				
Greatest length		40.50		39
Distance from snout to nape		32.75		36
Greatest width		29		30
Width of interorbital area		6.75		12
Length of snout		22.50		18
Length of operculum		10		7
Length of maxillary		12		14.50
Length of mandible		12.50		13
Distance from snout to orbit		21		19
Diameter of orbit, longitudinal		6.50		10
Width of mouth-opening		12		13
End of frontal spine to symphysis of maxillaries		7		6
Length of barbels		29		10
Dorsal (spinous):				
Distance from snout		38.25		40
Length of base		53.50		53.50
Greatest height, second spine		10.75		10.75
Height at first spine		10		10
Height at last spine		3		6
Width of upper surface of occipital plate		7		12.50
Length of upper surface of occipital plate		4.75		8
Width of upper surface of nexal plate		6.50		6.25
Length of upper surface of nexal plate		5		3
Anal:				
Distance from snout		53.50		51
Length of base		36		40
Height at first spine		3.50		3
Height at second spine		6.50		7
Height at third spine		8		8
Height at last spine		4		4
Caudal:				
Length of middle rays		9.50		14
Length of external rays		5		
Pectoral:				
Distance from snout		33		34
Length		18.25		14
Ventral:				
Distance from snout		31		30
Distance from symphysis of mandibles		37.25		40
Length		17.50		20
Isthmus		15.50		15
Dorsal		VII, 18		VII, 18
Anal		18		18
Caudal		16		
Pectoral		2+10		
Ventral		6		
Number of plates in lateral line		28		
From anterior edge of frontal plate to end of frontal spine		9.50		8

DESCRIPTION OF A NEW SPECIES OF ICTERUS FROM THE WEST INDIES.

By GEORGE N. LAWRENCE.

Icterus oberi.

Male: Head, neck, upper part of breast, back, wings, and tail black; lower part of breast, abdomen, under tail-coverts, and rump light-brownish chestnut, with the concealed bases of the feathers of a clear light yellow; the thighs are yellow, with a wash of chestnut; edge of wing and under wing-coverts yellow; bill black, with the sides of the under mandible bluish for half its length from the base; tarsi and toes black.

Length (skin), 8½ inches; wing, 3⅜; tail, 4; tarsus, ⅞; bill, ⅞.

The female has the upper plumage of a dull greenish olive, with a yellowish tinge, the front and rump inclining more to yellow; the tail feathers are yellowish green; quills brownish black; the primaries and secondaries are edged narrowly with dull yellowish gray; the tertiaries are margined with fulvous; wing-coverts dark brown, margined with fulvous; edge of wing yellow; the under plumage is of a rather dull dark yellow; the breast and under tail-coverts are of a deeper or warmer color; the sides are greenish olive; bill and legs as in the male.

The young male resembles the female in plumage, but has the back somewhat darker.

Types in National Museum, Washington.

It differs from all its allies, which are somewhat similarly colored, in having the shoulders black, instead of yellow or chestnut.

Seven specimens were obtained.

In the early part of March of the present year, Mr. Ober left for the West Indies, intending to explore as many of the islands not visited on his first expedition as his limited time would permit. He returned after an absence of six months, and his collections sent to the Smithsonian Institution were placed in my hands for examination. Among them I found but one new species, viz, the *Icterus* above described, procured in Montserrat.

It seems but a fitting compliment that the only new species commemorative of the second expedition of Mr. Ober should bear his name.

The catalogues of the birds obtained by him in the different islands will be published in the Proceedings of the National Museum as soon as he furnishes me with his notes and observations thereon.

OCTOBER 15, 1880.

DESCRIPTION OF A NEW SPECIES OF NOTIDANOID SHARK (HEXANCHUS CORINUS), FROM THE PACIFIC COAST OF THE UNITED STATES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Hexanchus corinus, sp. nov.

Head large, broad, depressed and very blunt anteriorly; the length of snout from front of mouth little more than half the interorbital space and rather less than the distance from the front of the mouth to angle of the mouth.

No median tooth in upper jaw. Two sharp, slender teeth in front of upper jaw, behind which is a row of four others similar but a little larger; the two outer larger than the inner, all without basal cusps. Behind these are four others similar and still a little larger. These are directed backward, and should not be considered as functional teeth.

The first of the large teeth in the upper jaw is larger than the succeeding teeth. It has a sharp point hooked outward, and a single strong cusp on its outer margin, its inner edge not serrate. The second tooth, on both sides, has the basal cusp obsolete. The third tooth is like the first, but a little smaller. The fourth tooth is slightly serrated on the inner margin, and has two strong cusps on the outer at base. The fifth and sixth are similar to the fourth, but more strongly serrate on the inner margin. The seventh, eighth, and ninth are small, and the number of cusps is increased, so that they approach the form of the teeth of the lower jaw.

The median tooth of the lower jaw is very small, with a slight median cusp and three cusps on the outer margin, the uppermost the largest. The first lateral tooth has six cusps; the first the largest, the others progressively decreasing; the long edge of the first cusp is finely serrated, but has no basal cusp. The second, third, fourth, and fifth teeth are precisely similar in size and form to the first. The sixth and seventh are somewhat smaller. In the smaller specimen, from Soquel, the inner edge of the teeth is not serrated. Behind the large teeth in each jaw is the usual series of small blunt teeth, which in this species are little developed.

Nostrils near the tip of the snout. Furrow of skin at angle of mouth reaching half way from the angle of the mouth to the gill-opening. Eyes large, $\frac{2}{3}$ the length of the snout. Spiracles small, far behind the eyes. Gill-openings 6. Pectoral moderate, as long as from first gill-opening to tip of lower jaw. Ventrals small, reaching past front of the small dorsal. Dorsal a little higher than anal, and terminating over the middle of the latter fin. Tail long, twice as long as head, a little less than $\frac{1}{3}$ the total length, little bent upward; its basal lobe little developed; the scales on its upper edge somewhat enlarged.

Color very dark sooty, almost black above, grayish black below, without spots or distinct markings. A very obscure grayish lateral streak. Inside of upper lip blotched with black. Young specimen clear brown.

This species is known to us from two specimens, the larger, a female 43 inches in length, the type of the present description, having been obtained by James G. Swan, assistant to the United States Fish Commission, at Neah Bay, near Cape Flattery. The other was secured by Mr. Gilbert at Soquel, on the Bay of Monterey.

This species is closely related to *Hexanchus griseus* Raf. of the Mediterranean and Eastern Atlantic. It differs chiefly in the form of the teeth of the lower jaw, which are serrated on the inner edge, and have on the upper or outer edge only six cusps instead of eight or nine.

Another Notidanoid shark, belonging to the related genus *Heptranchias*, distinguished by the presence of seven gill-openings instead of six, is found with the present species in the same waters. This is *Heptranchias maculatus*, the *Notorhynchus maculatus* or *Notorhynchus borealis* of Ayres and Gill. This species differs from *Heptranchias indicus*, with which it has been confounded by Günther and Duméril, in the lack of a median tooth in the upper jaw, and in the longer tail, which forms rather more than a third of the total length.

Heptranchias maculatus is rather common on the coast of California from Monterey northward. In Humboldt Bay it is especially abundant, and the pursuit of it for the oil in its liver is an industry of some importance.

The teeth in this species undergo some changes with age, and at least are subject to some individual variations, as will be seen from the following descriptions, which may be compared with Professor Gill's account of the jaws of *Notorhynchus maculatus* (Proc. Ac. Nat. Sci. Phila. 1862, 495) from Nisqually, Washington Territory.

Description of Heptranchias maculatus, juv., from Soquel.

Head rather depressed, broad, rounded. The nostrils almost at the tip of the snout. Length of the snout much less than the interorbital width. Spiracle rather large, nearer the gill-openings than the eye. A long furrow at the angle of the mouth, above which the upper lip extends backward in a broad fold.

In the upper jaw no median tooth; two small teeth near together, well in front, simple and pointed; two a little larger, behind and outside of these; then two more, similar, near together and directly within the first pair; then directly behind the second pair mentioned two much larger ones, pointed, each with a conspicuous cusp on the outer edge near the base on each side, and one or more denticulations. The next tooth is similar, rather larger and directed more outward. The remaining five or six grow still more oblique, but are otherwise similar in form and size, but a little more serrated.

The median tooth in the lower jaw is broad, with two (or three) strong dentations on each side, directed outward, and a very small *median cusp*

at tip. The other teeth are very similar to each other, six in number on each side and slightly increasing in size from the middle. They are much broader than high, and armed with about four sharp points turned outward, besides one or two smaller ones. The first point is longest, and has a small cusp on its side, so that strictly one might call the second cusp longest.

Gill-openings 7, high; pectorals moderate, truncate and slightly concave behind; ventrals moderate, rather backward; anal small, the single small dorsal just in front of it, covering most of the interspace between it and the ventrals.

Tail very long, forming a little more than one-third the length ($2\frac{3}{4}$). A notch near its tip below; the lower lobe a little developed. Upper edge of tail with about three series of scales, much enlarged, so that its entire edge is finely serrated.

Described from two specimens from Soquel, each 18 inches long, one male, the other female.

Description of the jaws of Heptranchias maculatus, adult, from Humboldt Bay.

No median tooth in upper jaw. Upper jaw with two transverse series of teeth on each side of symphysis, the outer series usually with two, the inner with four or five teeth, some of which are placed externally to the main row. They are lanceolate from a quadrate base, the points directed backwards and curved slightly outwards, without cusps or serrations. First tooth of main series similar to symphyseal teeth, but larger and broader, with a larger or smaller cusp at base on outer side and with or without minute serrations on base of inner side; from this towards corner of mouth there is much variation in the development of cusps and serratures, the teeth, however, constantly approximating in shape those of the lower jaw, always differing in being smaller, with external margins more inclined, and with the central cusp larger in comparison to others and more distant from them. Sometimes on each side are four or five teeth, bicuspidate and without serrations on inner edge; in other jaws the second or third tooth from symphysis has *three* or more cusps on the outer margin, and with serrulations or a single cusp at base on inner side. The last large tooth on each side usually broad and low, with the two margins subequal, without prominent median cusp; the inner margin minutely serrate; the outer with seven or eight cusps.

In lower jaw the teeth are much larger than in upper, and are uniform in shape and style of armature; they are wide from a quadrate base, the outer margins comparatively little inclined and with the cusps regularly and rapidly graduated, usually seven in number; the inner margins short, gibbous and much curved, always distinctly serrate; median tooth upright, without median cusp, and with three or four cusps on each margin.

Each jaw has laterally about 12 transverse series of small linear teeth,

scarcely elevated above surface of jaw, resembling the lateral teeth of *Heterodontus*, but *much* smaller and without median crest.

Teeth *ca.* $\frac{12-7-2-2-7-12}{12-6-1-6-12}$.

We may note here, as further additions to the list of sharks on our Pacific coast, the occurrence of *Somniosus microcephalus* (Bloch) Gill in Puget's Sound; of *Lamna cornubica* L. in Monterey Bay; and of a species closely related to *Eulamia lamia* (Risso) Gill in San Diego Bay. The shark recorded by us as *Pleuracromylon lævis* (Proc. U. S. Nat. Mus. 1880, 52) is *Rhinotriacis henlei* Gill. This species is not a genuine *Triacis*, and it appears to us to be congeneric with *P. lævis*, from which it differs in the greater development of the basal cusps of the teeth.

Table of measurements.

Species, *Hexanchus corinus* J. & G.; sex, ♀. Locality, Neah Bay, Washington Territory.

	Inches and 100ths.	100ths of length.
Extreme length	43	.....
Body:		
Greatest height	.....	8
Head:		
Greatest length	.....	16
Greatest width	.....	12
Width of interorbital area	.....	9
Length of snout	.....	5¼
Length of cleft of mouth	.....	6½
Distance from eye to spiracle	.....	5½
Length of nostril	.....	1⅜
Distance from mouth to nostril	.....	4
Height of first gill-opening	.....	7
Dorsal:		
Distance from snout	.....	53
Length of base	.....	6½
Greatest height	.....	0½
Anal:		
Length of base	.....	6
Greatest height	.....	4¾
Caudal:		
Length	.....	32
Pectoral:		
Length	.....	12
Ventral:		
Length of base	.....	8

INDIANA STATE UNIVERSITY,
Bloomington, October 11, 1880.

NOTICE OF RECENT ADDITIONS TO THE MARINE INVERTEBRATA, OF THE NORTHEASTERN COAST OF AMERICA, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES AND CRITICAL REMARKS ON OTHERS.

PART II.—MOLLUSCA, WITH NOTES ON ANNELIDA, ECHINODERMATA, ETC., COLLECTED BY THE UNITED STATES FISH COMMISSION.

By A. E. VERRILL.

The species included in the following paper, unless otherwise stated, have been collected by the parties employed by the United States Fish Commission for several years past in exploring the waters and investigating the marine animals of this coast.* This work has been under the immediate direction of the writer, who has personally taken a part in most of the very numerous dredging excursions. The total number of stations dredged or trawled amounts to over 1,200. Among the large number of persons who have taken a more or less important part in these explorations, in connection with the invertebrate department, I may particularly mention Prof. S. I. Smith, Prof. A. S. Packard, Mr. Sanderson Smith, Mr. Richard Rathbun, Prof. H. E. Webster, Mr. Oscar Harger, Mr. E. B. Wilson, and Mr. S. F. Clark.

During the last three years Mr. Sanderson Smith has given special assistance in caring for the testaceous Mollusca in the dredging season, and has also been engaged with the writer at various other times in the working up of the Mollusca of Northern New England for publication. Owing to the great accumulation of materials, this will necessarily take much time. In the mean time the following catalogue will afford much useful information as to the additions recently made to our molluscan fauna.

This season, the most interesting and prolific region of our coast hitherto explored was discovered upon the outer bank, or slope, situated from 70 to 80 miles south of Martha's Vineyard, and from 90 to 115 miles south of Newport, R. I.

In September and October three very successful trips were made to this region.

The first of these trips was made September 3 to 5, south of Martha's Vineyard, about 70 to 80 miles (stations 865 to 872), where the depth was from 65 to 192 fathoms. The bottom was mostly fine compact sand, with some mud, and with a large percentage of Foraminifera. The

* In this article 115 species of Mollusca are recorded as recent additions to the fauna of New England. Of these, 48 species are apparently undescribed (including 23 species just published in the American Journal of Science, for November). The number of species included in this article that are not contained in the last edition of Gould's Invertebrata of Massachusetts is 125. Many other species, not here included, have previously been added by me to those contained in Gould's work. Many of these are enumerated in the author's Preliminary Check List of the Marine Invertebrata of Northern New England, 1879. Many will be found in various articles in the American Journal of Science; others are contained in the Report on Invertebrates of Vineyard Sound, in Part I of the Reports of the United States Fish Commission, 1873.

second trip was made September 12 to 14, nearly south from Newport, 90 to 105 miles, where the depth was from 85 to 325 fathoms (stations 873 to 881). The third trip, October 1 to 3, was to the same region, but somewhat farther west and south, and in deeper water (stations 891 to 895). At all these stations, except 867, a large beam-trawl was used; at 867 a heavy "rake-dredge", of a new form, was used with good success.

All these stations are situated in the region designated on the charts as "Block Island soundings", and nearly all proved to be exceedingly rich in animal life, the vast abundance of individuals of many of the species taken being almost as surprising as the great number and variety of the species themselves.

In this region the slope is exceedingly gradual till the depth of 75 to 100 fathoms is reached, at about 90 miles from the coast; the slope then becomes much more rapid, but yet not steep, and the bottom is of very fine compact sand, mingled with more or less mud, fragments of shells, and sometimes with small stones,* and generally has a smooth and rather hard surface, well adapted to support a very great variety of animals of nearly all classes. In some places the material is softer mud and sand; in others it is covered with broken shells and great numbers of sponges, hydroids, and worm-tubes.

Many species owe their existence, on these bottoms, to the suitable places of attachment furnished by the large tubes of annelids, which formed a marked feature in many of the localities.

In several localities with muddy bottoms (869,879,880,894), we trawled large quantities (several thousands in all) of very singular, large, round, unattached worm-tubes, occupied by a large, undescribed species of *Hyalinœcia*.† These tubes are firm and translucent, composed of a tough substance resembling the quills of birds. They are open at both ends, but often have internal septa near the larger end; they are often more than a foot long, and about a third of an inch in diameter at the

* These stones, which were common in nearly every haul of the third trip, are of all sizes, from small pebbles up to bowlders 6 inches or more in diameter. They are of various kinds of rocks, like those found in the drift formation along the opposite shores of the mainland and on the shores of Block Island and the eastern end of Long Island. Their presence, so far from land and beneath the edge of the Gulf Stream, can easily be explained by supposing that they have been carried out to sea by the shore ice that forms along these coasts in winter in vast quantities and of considerable thickness. This ice, when it breaks up in spring, is carried out to sea, with its inclosed stones and gravel, by the tides and currents, till it comes in contact with the warmer waters of the Gulf Stream, where its loads of stones drop to the bottom. We have often met with large, loose, and fresh bowlders, sometimes of large size, in various localities, far from land, on muddy bottoms, off the coasts of Maine and Nova Scotia, where they have doubtless been recently dropped from shore ice.

† *Hyalinœcia artifex* Verrill, sp. nov. Closely related to *H. tubicola* of Europe, but much larger, with the buccal segment as long as the three or four following segments; anterior antennæ small, short, rounded, ovate; three median ones subequal, very long, reaching the 15th segment; eyes rudimentary; branchiæ slender, commencing at about the 28th to 30th segment; bidentate setæ with the hook terminal and less curved. Surface opalescent.

larger end, but taper gradually toward the smaller one, and are nearly straight. They may possibly at times stand erect in the mud, but this is doubtful; in most cases they probably lie free on its surface, and the large and powerful annelid inhabiting them probably has the power of dragging them about; otherwise it would be impossible to account for the numerous hydroids, actinians, sponges, &c., which often cover them.

On the harder bottoms, in the shallower localities, especially at stations 865 to 867, we obtained great quantities of a very different, unattached worm-tube, composed of bivalve shells, entire and broken, arranged so as to form a strong, flattened covering around a thin silken, central tube. These are made by a pale, opalescent species of *Nothria* (near *N. conchylega*), allied to *Hyalinœcia*. In the localities last named we also took large quantities of another very different kind of worm-tube, made by another Annelid of the same family, a large species of *Eunice* or *Leodice*.* This tube is sometimes half an inch in diameter, more or less attached, irregularly bent, often branched, or with side-openings at the angles. It is composed of a parchment-like material, and is usually covered with hydroids, sponges, actinians, ascidians, &c.

The sand and mud usually contain a large percentage of calcareous Foraminifera, many of which are remarkably large and handsome species, often more than 5^m or 6^m in diameter. In some of the localities (as at stations 869, 894, and 895) there were, in the mud, very large quantities of large sand-covered Rhizopods (*Astrorhiza*, *Rhabdammina*, &c.), which assume a variety of irregularly branched and often rudely stellate forms, but many of them are rod-like, and nearly an inch in length.

Fishes, Crustacea, Annelids, Anthozoa, and Echinoderms, as well as Mollusca, abounded in new and strange forms. Of many of these species, previously unknown in our waters, thousands of specimens were obtained. At several of the stations, especially at 880, 881, 893, and 894, large numbers of the handsome Mopsea-like coral, *Acanella Normani* V., were taken; to these many fine specimens of the rare *Pecten vitreus* were attached, and also several species of Actinians and Annelids. In many of the localities vast numbers of hermit-crabs (*Paguridæ*), of several species, occurred, inhabiting cases consisting of groups of the compound, sand-coated Actinians, mostly *Epizoanthus Americanus* V. The bases of these originally covered dead shells of Gastropods or Pteropods, occupied by the crabs, but by some chemical process they have, in most cases, wholly removed the substance of the shell, so that the polyp constitutes the entire residence of the crab. Large numbers of huge Actinians, such as *Bolocera Tuediæ*, *Urticina nodosa*, &c., oc-

* *Leodice polybranchia* Verrill, sp. nov. A stout species, resembling *L. vivida* (St.)= *L. Norvegica* (L.), but the branchiæ commence on the seventh or eighth segment, and continue to near the end of the body, on at least 120 segments; they have four to six branches; eyes large, round; three median antennæ, long, the middle one longest; tentacles long, reaching beyond the edge of the buccal segment, which is as long as the three following ones; ventral cirri at first conical, those beyond the fourth, short, with large swollen bases.

curred in most of the deeper dredgings. Large quantities of a large, handsome, but very fragile, cup-coral (*Flabellum Goodei* V.) occurred in the deeper localities, especially at stations 880, 894, 895, but most of the specimens were ruined by being crushed by the great weight of the contents of the trawl. The animal of this coral is bright orange, with a purple center.

While many of the species of every class obtained here are arctic, or belong to the cold waters found at similar or greater depths on the coasts of Europe and in the Mediterranean, a few genera, like *Avicula*, *Solarium*, and *Marginella*, are related to southern or West Indian forms. A number of the most abundant species of Crustacea and Echinoderms* had already been described from the collections made by Pourtalès, off Florida.

Many free-swimming species, belonging to the Pteropoda and Heteropoda, of which we dredged the dead but perfectly fresh shells, were not previously known to occur so far north. They were associated with others of the same groups which had previously been taken living at the surface along our shores, but they all belong properly to the Gulf Stream fauna.

The frequent occurrence of nearly fresh shells of *Argonauta Argo* was also a matter of surprise to us, and indicates that this species must often be very common near our coast.

The very large collections of specimens obtained on these three trips have, as yet, been only partially examined, but enough has already been done to prove this region to be altogether the richest and most remarkable dredging ground ever discovered on our coast. The large number of new forms, combined with others previously known only from remote regions, constitute a very distinct fauna, hitherto almost wholly unknown.

A considerable number of undetermined, and perhaps undescribed, shells from these localities are not included in this article.

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* A brief account of the Echinoderms obtained by us, with descriptions of several of the new species discovered, has been published by me in the American Journal of Science for November, 1880.

It is only necessary to say here that several of the star-fishes, Ophiuraus, and Crinoids occurred in such large numbers as to constitute one of the most conspicuous features of the fauna. The most abundant species were *Archaster Americanus* V., *A. Agassizii* V., *A. Floræ* V., *Luidia elegans* Perrier, *Ophiocnida olivacea* Lym., *Ophioscolex glacialis* M. & Tr., *Ophioglypha Sarsii* Lym., *Antedon Sarsii* (D. & Koren).

All these species, except the last two, are orange-colored, varying to orange-red. The same is true of *Acanella Normani*, of most of the Actinians, and of the majority of the crabs and shrimps, as well as of some of the fishes. It seems probable that the prevalence of orange and red colors among the deep-water animals is due to the fact that the luminous rays of those colors are completely absorbed by the thick, overlying stratum of sea-water, and consequently these animals, not being capable of reflecting such bluish and greenish rays as do reach them, would be nearly invisible at those depths beyond which white light penetrates. If this be true, such colors, being protective, may be due to the operation of natural selection, according to the principle so often exemplified in shallow-water animals having colors like their surroundings.

Dredging stations on the outer bank in 1880.

Number.	Locality.								Depth.	Nature of bottom.
	Latitude.				Longitude.				Fathoms.	
	°	′	″		°	′	″			
865	40	05	00	N.	70	23	00	W.	65	Fine compact sand, with some mud.
866	40	05	18	N.	70	22	18	W.	65	Do.
867	40	05	42	N.	70	22	06	W.	64	Do.
868	40	01	42	N.	70	22	30	W.	162	Do.
869	40	02	18	N.	70	23	06	W.	192	Mud and fine sand, soft.
870	40	02	36	N.	70	22	58	W.	153	Fine sand, with some mud.
871	40	02	54	N.	70	23	40	W.	115	Do.
872	40	05	39	N.	70	23	52	W.	86	Shells and sponges.
873	40	02	00	N.	70	57	00	W.	100	Fine sand and mud.
874	40	00	00	N.	70	57	00	W.	85	Do.
875	39	57	00	N.	70	57	30	W.	126	Do.
876	39	57	00	N.	70	56	00	W.	120	Do.
877	39	56	00	N.	70	54	18	W.	126	Do.
878	39	55	00	N.	70	54	15	W.	142½	Do.
879	39	49	30	N.	70	54	00	W.	225	Do.
880	39	48	30	N.	70	54	00	W.	252	Mud and fine sand.
881	39	46	30	N.	70	54	00	W.	325	Mud. Trawl partially fouled.
891	39	46	00	N.	71	10	00	W.	±500	Mud and fine sand.
892	39	46	00	N.	71	05	00	W.	487	Mud, fine sand, small stones.
893	39	52	20	N.	70	58	00	W.	372	Do.
894	39	53	00	N.	70	58	30	W.	365	Do.
895	39	56	30	N.	70	59	45	W.	238	Do.

The temperature determinations, owing to the violent motions of the steamer, are unreliable at stations 865 to 872. At stations 873 to 878 the bottom temperature was usually 51° to 53° F.; at 879 to 881 it was 42° to 43° F.; at 893 and 894, it was 40°.

CEPHALOPODA.

The great abundance of Cephalopods in the deep-water localities explored by us is a very interesting and important discovery. Eight species were taken this season. Some of these occurred in large numbers. This collection adds three genera to the New England fauna, two of them new and very curious.

Heteroteuthis tenera Verrill.

Amer. Journ. Science, xx, p. 392, for Nov., 1880 (published Oct. 25).

A small and delicate species, very soft and translucent when living. Body shortish, cylindrical, scarcely twice as long as broad, posteriorly usually round, but in strongly contracted, preserved specimens often narrowed and even obtusely pointed; front edge of mantle with a dorsal angle extending somewhat forward over the neck. Fins very large, thin, longer than broad; the outer edge broadly rounded; the anterior edge extending forward quite as far as the edge of the mantle and considerably beyond the insertion of the fin, which is itself placed well forward. The length of the fin is about two-thirds that of the body; the base or insertion of the fin is equal to about one-half the body length; the breadth of the fin is greater than one-half the breadth of the body. Head large, rounded, with large and prominent eyes; lower eye-lid slightly thickened. Arms rather small, unequal, the dorsal ones considerably shorter and smaller than the others. In the male the left dorsal arm is

greatly modified and very different from its mate. Lateral and ventral arms subequal. In both sexes, and even in the young, the suckers along the middle of the four lateral and two ventral arms are distinctly larger than the rest, but in the larger males this disparity becomes very remarkable, the middle suckers becoming greatly enlarged and swollen, so that eight to ten of the largest are often six or eight times as broad as the proximal and distal ones; they are deep, laterally attached, with a raised band around the middle and a very small, round aperture, furnished with a smooth rim. In the female the corresponding suckers are about twice as broad as the rest on the lateral arms. The suckers are in two regular rows on the lateral and ventral arms, in both sexes. In the male the left dorsal arm becomes thickened and larger from front to back, and usually is curled backward; its suckers become smaller and much more numerous than on the right arm, being arranged in four crowded rows, except near the base, where there are but two; the sucker-stalks also become stout and cylindrical or tapered, their diameter equaling that of the suckers. The right arm remains normal, with two alternating rows of suckers, regularly decreasing to the tip, as in both the dorsal arms of the female. Tentacular arms long, slender, extensible; club distinctly enlarged, usually curled in preserved examples. The suckers on the club are numerous, unequal, arranged in about eight close rows; those forming the two or three rows next the upper margin are much larger than the rest, being three or four times as broad, and have denticulated rims. Color, in life, pale and translucent, with scattered chromatophores. In the alcoholic specimens the general color of body, head, and arms is reddish, thickly spotted with rather large chromatophores, which also exist on the inner surface of the arms, between the suckers, and to some extent on the tentacular arms and bases of the fins; outer part of fins translucent white; anterior edge of mantle with a white border. Length of body 25^{mm} to 40^{mm}. Pen small and very thin, soft and delicate. It is angularly pointed or pen-shaped anteriorly, the shaft narrowing backward; a thin, lanceolate expansion or web extends along nearly the posterior half. Upper jaw with a strongly incurved, sharp beak, without a notch at its base. Lower jaw with the tip of the beak strongly incurved, and with a broad but prominent rounded lobe on the middle of its cutting edges.

Odontophore with simple, acute-triangular, median teeth; inner laterals simple, nearly of the same size and shape as the median, except at base; outer laterals much longer, strongly curved forward.

Over 150 specimens of this interesting species were secured by the writer and others of the dredging party on the United States Fish Commission steamer "Fish Hawk", September 4, 1880. It was particularly abundant at stations 870 and 871, in about 125 to 150 fathoms, on the rapidly sloping outer bank of the coast, under the inner edge of the Gulf Stream. Both sexes occurred in about equal numbers, and also the young, of various sizes. It was also taken in considerable numbers

at stations 865 to 867, in 65 fathoms; 872 to 880, in 86 to 252 fathoms. It was also obtained by Mr. A. Agassiz, at similar depths, in the same region, as well as farther south, earlier in the season, while dredging on the Coast Survey steamer "Blake".

This species was associated, at station 869, in 192 fathoms, mud, with *Octopus Bairdii* and *Rossia sublevis*. It can easily be distinguished from the latter and other species of *Rossia*, not only by the large suckers of the lateral arms, but still better by the inequality of the suckers on the tentacular club. The latter character is obvious in specimens of both sexes and of all ages.

Gonatus amœnus (Möller) Gray.

G. O. Sars, Mollusca Regionis Arcticæ Norvegiæ, p. 336, pl. 31; pl. xvii, fig. 2 (figures excellent).

A good specimen of this species, in nearly perfect preservation, was recently presented to the United States Fish Commission by Capt. William Demsey and crew, of the schooner "Clara F. Friend". It was taken from the stomach of a cod, off Seal Island, Nova Scotia.

Calliteuthis Verrill.

Amer. Journ. Sci., xx, p. 393, for Nov., 1880 (published Oct. 25).

Form much as in *Histioteuthis*, but without any web between the arms. Body short, tapering to a small free tip; fins small, united behind the tip of the body. Siphon united to the head by two dorsal bands; an internal valve. Mantle connected to the sides of the siphon by lateral elongated cartilages and corresponding grooves on the sides of the siphon. Arms long, free; suckers in two rows, largest on the middle of the lateral and dorsal arms. Eyes large, with oval openings. Buccal membrane simple, sack-like.

Calliteuthis reversa Verrill.

Loc. cit., p. 393.

Arms long, tapering, the lateral pairs equal; the dorsal and ventral about equal, somewhat shorter than laterals; tentacular arms slender, compressed (the ends absent). Fins small, thin, transversely rhomboidal, white. Color reddish brown. The ventral surface of the body, head, and arms is more ornamented than the dorsal surface, being covered with large, rounded verrucæ, their center or anterior half pale, the border or posterior half dark purplish brown; upper surface of body with much fewer and smaller scattered verrucæ; a circle of the same around the eyes; inner surfaces of arms and buccal membranes chocolate-brown. Total length, 133^{mm}; to base of arms, 67^{mm}; mantle, 51^{mm}; of fin, 17^{mm}; breadth of fins, 24^{mm}; of body, 20^{mm}; diameter of eye-ball, 16^{mm}.

Station 894, 365 fathoms.

Alloposus Verrill.

Amer. Journ. Sci., xx, p. 393 (published Oct., 1880).

Allied to *Philonexis* and *Tremoctopus*. Body thick and soft, smooth; arms all (in the male only seven) united by a web extending nearly to

the ends, the length of the arms decreasing from the dorsal to the ventral ones; suckers sessile, simple, in two rows; mantle united firmly to the head by a broad dorsal band and by a ventral and two lateral *commissures*, the former placed in the median line, at the base of the siphon; free end of the siphon short, well forward. In the male the right arm of the third pair is hectocotylized and developed in a sack in front of the right eye; as found in the sack it is curled up and has two rows of suckers; the groove along its edge is fringed; near the end the groove connects with a rounded, obliquely placed, lateral, concave lobe, with interior plications. The terminal portion of the arm is a lanceolate thickened process, with ridges on the inner surface.

The permanent attachment of the mantle and neck, by means of commissures, is a very distinctive character.

Alloposus mollis Verrill.

Loc. cit., p. 394.

Body stout, ovate, very soft and flabby. Head large, as broad as the body; eyes large, their openings small. Arms rather stout, not very long, webbed nearly to the ends, the dorsal 60^{mm} longer than the ventral arms; suckers large, simple, in two alternating rows. Color deep purplish brown, with a more or less distinctly spotted appearance. Length, total, 160^{mm}; of body to base of arms, 90^{mm}; of mantle, beneath, 50^{mm}; of dorsal arms, 70^{mm}; breadth of body, 70^{mm}. Seven specimens were taken. The sexes scarcely differ in size. Station 880, in 225 fathoms (2 ♂, 1 ♀); 892, 487 fathoms; 893, 372 fathoms; 895, 238 fathoms.

Argonauta Argo Linné.

The capture of a living specimen, probably of this species, on the coast of New Jersey, has been recorded by Rev. Samuel Lockwood.* It was, nevertheless, very surprising to us to find its shells, or fragments of them, very common in nearly all our deeper dredgings, 70 to 100 miles off the southern coast of New England. At station 894 two entire and nearly fresh shells were taken, and another nearly complete. They belong to the common Mediterranean variety.

GASTROPODA.

Bela (Leach) H. & A. Adams; G. O. Sars, &c.

Pleurotoma (*pars*) Jeffreys and many earlier authors.

The species of this genus are numerous on our coast, but their identification is difficult, owing to the very poor and insufficient descriptions of many European writers.† Möller's Greenland species, especially, are

*Amer. Naturalist, xi, p. 243, 1877.

†In Binney's edition of Gould's Invert. of Mass. there are included seven northern species of *Bela*. Of these the figures are mostly inadequate, and some are entirely erroneous. Fig. 620, given for *B. turricula;* Fig. 621, intended for *B. harpularia;* and Fig. 624, for *B. cancellata*, do not really represent those species. Fig. 620 represents *B. harpularia* better than "*B. turricula*", for which it was intended.

badly described. The publication of the excellent work of G. O. Sars has at length rendered it possible to identify many species, hitherto doubtful, with his Norwegian forms, though there may still be doubt as to the proper application of the names given by earlier writers, and even as to the actual specific distinctness of all the forms that he has described. The sexual variations he has not taken into account. During numerous dredging expeditions made in the past twenty years, the writer has obtained a large series of specimens of *Bela*, which he has reserved for a more complete revision hereafter; but some of the more conspicuous forms not yet recorded from New England, and in part not known as American species, are here mentioned. Figures of all these and others have been engraved for a more detailed paper and will, it is hoped, soon be published.

Bela Pingelii (Möller, 1842) H. & A. Adams, i, p. 92, 1858.

G. O. Sars, Moll. Reg. Arct. Norv., p. 223, pl. 16, fig. 5, 1878.

This very distinct species has been repeatedly dredged by me at Eastport, Me., and by the United States Fish Commission parties in Casco Bay, Massachusetts Bay, on George's Bank, and off Nova Scotia. It has not unfrequently been confounded by authors with *B. cancellata*. It is our most slender and elongated species, with evenly rounded whorls, strongly cancellated, over the whole surface, by numerous slender, longitudinal ribs and revolving raised lines or cinguli, which are about equally prominent, and form small, round nodules where they cross the ribs.

Bela Sarsii Verrill, sp. nov.

Bela cancellata G. O. Sars, op. cit., p. 224, pl. 23, fig. 31; pl. viii, fig. 9 (not of Couthouy).

This name is proposed for the species described and figured by G. O. Sars as *B. cancellata*. The same species was formerly collected by Dr. A. S. Packard at Labrador, and sent to us by him under the name of *B. exarata*. It is a small, strongly sculptured species, with obtuse, angular-shouldered whorls, and is especially distinguished by its few broad and strong ribs, crossed by rather distant revolving lines, giving it a coarsely cancellated surface.

Bela cancellata (Mighels) Stimpson, Check List.

Fusus cancellatus Mighels, Proc. Boston Soc. Nat. Hist., i, p. 50, 1841; Boston Journ. Nat. Hist., iv, p. 52, pl. 4, fig. 18, Jan., 1842.

Bela cancellata Gould, Invert. Mass., ed. ii, p. 355, description (not the figure, 624).

The true *Bela cancellata* (Mighels) is a common shell on the New England coast, in 20 to 60 fathoms. It is an elongated species, with long, acute spire, and with the whorls moderately and obtusely shouldered at some distance below the suture, the flattened portion above the shoulder being destitute of revolving lines, but crossed by the numerous oblique ribs, which are strongly bent at the shoulder and take a sigmoid form.

Below the shoulder the cinguli are numerous and prominent, crossing the prominent narrow ribs so as to produce a distinct, but not coarse, cancellation. It most resembles the figures of *B. elegans* and *B. angulosa* of Sars. It is perhaps the original *B. declivis* (Lovén), but does not agree with Sars's figure.

Bela tenuicostata M. Sars.

G. O. Sars, op. cit., p. 237, pl. 17, figs. 1 *a*, *b*; pl. ix, fig. 6 (dentition).

Specimens apparently identical with this species were dredged by me, in moderate depths, at Eastport, Me., in 1864, 1868, and 1870. It was also taken this season at stations 893 and 894, in 365 to 372 fathoms. It is closely related to *B. decussata* Couth., but has smaller and more numerous ribs, and is, therefore, more finely cancellated. It may be only a variety of *B. decussata*. The latter is easily distinguished from all our other species by its oval form, rounded, scarcely shouldered whorls, crossed by very numerous small, narrow, flexuous, sigmoid ribs, which are strongly bent backward near the suture, in conformity with the very distinct, rounded sinus of the lip. The whole surface, except close to the deep suture, is covered with numerous rather fine, close, raised, revolving cinguli, giving the surface a rather finely and regularly cancellated structure.

Bela Trevelyana (Turton) H. & A. Adams.

This has been recorded by Jeffreys from the Gulf of Saint Lawrence. He formerly united *B. decussata* with it, but has subsequently (in Mollusca of Valorous Expedition) distinguished them. I have myself seen no American shells agreeing clearly with English specimens of *B. Trevelyana*. The latter resembles *B. decussata* in form and size, but has the ribs nearly straight and the cancellation coarser than in our shell.

Bela impressa ? (Beck) Mörch, Catal. Moll. Spitzberg, p. 17, 1869.

Pleurotoma impressa Leche, Kongl. Svenska Vet.-Akad. Handl., Bd. 16, p. 54, pl. 1, fig. 16, 1878 (author's separate copy).

I refer doubtfully to this species a small but very distinct shell frequently dredged by us, in 10 to 70 fathoms, all along the coast, from off Cape Cod to Nova Scotia. It was also dredged this season at stations 812 to 815, in 27 fathoms, off Block Island.

The shell is greenish white, short-oval, with about five whorls, which are distinctly flattened and angularly shouldered near the deep suture. There are on the last whorl about twenty rather broad, flat ribs, which are a little prominent and usually slightly nodose at the shoulder, but they disappear a short distance below. The most characteristic feature is that the surface is marked by rather fine, but regular and distinct, revolving *grooves* or *sulci*, which are rather distant, with flat intervals. Of these there are usually about three or four on the penultimate whorl, and about twenty on the last, the greater number being below the middle, on the siphon, where they become closer; one of the sulci, just below

the shoulder, is more distinct, and crosses the ribs so as to give their upper ends a subnodulous appearance; below this there is usually a rather wide, smooth zone; no revolving lines above the shoulder. Aperture about half the length of the shell, rather wide, angular; canal short. There is a very distinct, moderately deep, posterior sinus; the middle of the outer lip projects forward strongly. Ordinary specimens are about 6.5mm long; 3.5mm broad; aperture, .3mm long.

Our shell is not so stout as that represented in the figure of Leche, but it agrees very well in other respects.

Bela exarata (Möller) H. & A. Ad., Genera, i, p. 92, 1858.
G. O. Sars, op. cit., p. 232, pl. 16, fig. 18; pl. ix, figs. 1 *a*, *b* (dentition, &c.).—Verrill, Trans. Conn. Acad., v, pl. 43, fig. 15.

A regularly cancellated species of *Bela*, agreeing with Greenland specimens sent under this name from the University Museum of Copenhagen, is not uncommon, ranging from off Massachusetts Bay to the Bay of Fundy and Nova Scotia. It does not agree perfectly, however, with G. O. Sars's figure of the shell, but its dentition agrees well with his figure and seems to be characteristic. The color of the shell is usually pale greenish or greenish white; texture thin; size medium; whorls turreted, flattened, angularly shouldered close to the suture, with the angle of the shoulder rather sharply nodose. Ribs numerous, regular, nearly straight, narrow but rounded, separated by concave intervals of equal or greater width. Whole surface covered with regular and rather strong, elevated, revolving cinguli, which cross the ribs and produce on them small, rounded nodes, and give a very regularly and strongly cancellated appearance to the whole surface. On the penultimate whorl there are about four cinguli below the angle. The flattened space above the shoulder is crossed by the ribs and covered with numerous fine revolving lines. Length, 10mm; breadth, 4.5mm; length of aperture, 5.5mm. A more elongated form, similar to the above, but with the angle of the whorls still more sharply nodose, also frequently occurs. This I have supposed to be the male of the same species, but it agrees closely with Sars's figure of *Bela mitrula* (Lovén). The dentition of *B. exarata* closely resembles that of the latter, as figured by Sars. The teeth are unusually long and large for the size of the shell, rather slender, somewhat curved, acute, with one side excavated to near the tip; basal part short, a little thickened, notched deeply on one side, obtuse.

Living specimens were also dredged this year at stations 880, 892, and 894, in 252 to 487 fathoms.

Bela rugulata (Möller) H. & A. Ad., Genera, i, p. 92, 1858.
G. O. Sars, op. cit., p. 230, pl. 23, fig. 6; pl. viii, figs. 13 *a–c* (dentition).

This is one of the several species that have commonly been confounded under the name of "*Bela turricula*".

Our shell agrees well with the figures and description given by G. O. Sars, both as to its external characters and dentition. The sculpture

is rather coarse, the ribs being strong, with wider and concave intervals; the whorls are strongly angularly shouldered, each of the ribs ending in a distinct nodule, formed by the first spiral groove below the shoulder, which is stronger than the rest; the flattened subsutural area is nearly or quite destitute of spiral lines, but is crossed by slight flexuous extensions of the ribs; the whole surface below the shoulder is covered with strong spiral lines, between the ribs. On the upper whorls a few of the revolving lines are stronger than the rest, forming with the ribs a coarsely cancellated structure.

The dentition is very characteristic, and entirely different from *B. exarata*, *B. harpularia*, and other allied forms. The uncini are broad, flat, lanceolate, with a sharp, slightly barbed tip, and with a broad bilobed base.

This species has frequently been dredged by us in Massachusetts Bay, Bay of Fundy, &c., in 5 to 50 fathoms.

Bela simplex (Middend.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 239, pl. 17, fig. 4; pl. 23, fig. 11; pl. ix, fig. 9 (dentition).

Bela lævigata Dall (teste G. O. Sars).

One dead, but fresh, small specimen, from station 894. The whorls are very convex and evenly rounded, nearly smooth, but covered with fine and close spiral lines, crossed by still finer lines of growth; subsutural zone smooth. The apex of the spire is acute. The three apical whorls are chestnut-brown; their surface is finely decussated by equal lines running in opposite directions.

Bela hebes Verrill, sp. nov.

Shell short-fusiform or subovate, with a short, blunt spire and five well-rounded, slightly turreted whorls: suture impressed. Sculpture numerous small, regular, raised, spiral ridges, with wider interspaces, those just below the suture stronger and more distant; lines of growth faint. Aperture narrow-ovate. Outer lip expanded below the suture, then regularly rounded, thin; the posterior sinus is broad and shallow; canal short and broad, straight; columella regularly incurved. Epidermis thin, greenish white. Length, 8^{mm}; breadth, 5^{mm}; length of aperture, 5^{mm}; its breadth, 1.80^{mm}; length of body-whorl, front side, 6.35^{mm}.

Stations 891 and 892, in 500 and 487 fathoms; four specimens.

Pleurotoma (Pleurotomella) Agassizii Verrill & Smith.

Amer. Journ. Sci., xx, p. 394, for Nov., 1880 (published Oct. 25).

This large and elegantly sculptured species occurred sparingly, living, in many of the off-shore localities (869, 871, 874, 877, 880), in 65 to 252 fathoms, but it was taken in larger numbers at stations 891 to 895, in 238 to 500 fathoms. The two nuclear whorls are very small, chestnut-brown, scarcely carinated, rounded, with the surface finely cancellated by lines running obliquely, in two directions, but close to the suture only the transverse lines appear.

Pleurotoma (Pleurotomella) Pandionis Verrill, sp. nov.

Shell large, thick, dull brownish yellow, with a very acute, elevated spire; whorls nine, very oblique, moderately convex, concave below the suture; whole surface covered with close lines of growth, which recede in a broad curve on the subsutural band; numerous fine, unequal, raised, spiral lines cover the whole surface, except the subsutural band. The upper whorls are also crossed by sixteen to eighteen blunt, transverse ribs, about as broad as their interspaces, most elevated on the middle of the whorls, fading out above and below. Aperture elongated, narrow; sinus broad and well marked, just below the suture; canal short, nearly straight. Operculum absent. Length, 43^{mm}; breadth, 14.5^{mm}; length of aperture, 19^{mm}; its breadth, 5.5^{mm}.

A large specimen was taken alive at station 895, in 238 fathoms.

Pleurotoma Carpenteri Verrill & Smith.

Amer. Journ. Sci., xx, p. 395 (published Oct., 1880).

Only a few specimens were taken, stations 871 to 873, in 86 to 115 fathoms.

This species very likely belongs to *Mangelia*, but I have had for examination no specimens with the animal.

Taranis Morchii ? (Malm) Jeffreys, Annals and Mag., v, 1870.

G. O. Sars, Moll. Reg. Arct. Norv., p. 220, pl. 17, fig. 8.

Two good examples of a prettily sculptured shell, which I refer doubtfully to this species, were taken at station 894, in 365 fathoms, off Newport, R. I. They do not agree fully with Sars's figure and description.

Whorls six, the lower ones sharply angulated and carinated. There are five revolving, nodulous carinæ on the body-whorl, one close to the suture; the second and most prominent surrounds the periphery; the other three are on the anterior half; some faint additional ones appear on the canal; the three preceding whorls have the subsutural and the sharp central carina, and usually the third carina is more or less exposed at the suture. Between the first and second carinæ the surface is flat or slightly concave. The whorls are crossed by numerous thin, delicate, flexuous, regularly spaced, raised ribs, which are conspicuous between the carinæ, and produce sharp nodules where they cross them. The nucleus is small, rounded, light chestnut-brown, minutely cancellated with microscopic lines running in two directions. Sinus of the lip shallow, rounded. Length, 4^{mm}; breadth, 2^{mm}.

The principal difference between our specimens and the form figured by Sars is that in the latter there are more carinæ, two of which surround the periphery, instead of one.

Taranis pulchella Verrill, sp. nov.

A smaller and more slender species than the preceding, with a more acute spire, and with the carinæ sharp, but not nodulous. Whorls seven, angular, the lower ones carinated and shouldered. Body-whorl

with six revolving carinæ, besides one or two on the canal; one is just below the suture; the three largest surround the periphery, the median one most prominent. Between the subsutural and second carinæ the surface is concave and crossed by numerous elevated, thin, curved riblets, corresponding to the labial sinus; similar but less prominent and less curved riblets cross the interspaces between the other carinæ, but do not cross the carinæ themselves. Penultimate whorl with the subsutural and two peripheral carinæ. Preceding whorls without distinct carinæ, except the subsutural one, but with the curved, transverse, raised riblets well developed. Nuclear whorls very small (surface eroded). Aperture narrow, angular; canal short, slightly turned to the left; outer lip with a distinct, evenly rounded sinus below the subsutural carina. Columella slightly incurved and flattened. Length, 2.20^{mm}; breadth, .90^{mm}; length of body-whorl, 1.40^{mm}; of aperture, .95^{mm}.

Station 892, in 487 fathoms; one specimen.

Marginella roscida (?) Ravenel.

A single dead specimen, closely resembling this species, was taken at station 865, in 65 fathoms.

Tritonofusus latericeus (Möll.) Mörch.

Sipho latericeus G. O. Sars, Moll. Reg. Arct. Norv., p. 276, pl. 15, fig. 8; pl. x, fig. 24 (dentition).

Several specimens, apparently of this species, were taken at stations 894 and 895, in 238 to 365 fathoms, off Newport. It had previously been dredged in the Gulf of Saint Lawrence by Dr. J. W. Dawson.

Our shell is long-fusiform, with an elevated, acute spire; whorls eight, moderately convex, crossed by strong, prominent, rounded ribs (about eighteen on the last whorl), separated by concave interstices, wider than the ribs; whole surface covered with fine and regular spiral grooves, defining raised spiral lines of about double their width; these lines cross the ribs as well as their interspaces. Nuclear whorl small, a little eccentric and incurved. Aperture long-ovate, narrow. Canal somewhat elongated, nearly straight, narrow; the outer lip is contracted or incurved at its base. Length, 20^{mm}; breadth, 8^{mm}; length of aperture, 10^{mm}; its breadth, 3^{mm}.

Neptunea (Sipho) cælata Verrill, sp. nov.

Shell resembling the last, small, subfusiform, with an elevated spire, which is less acute than in the preceding, while the aperture is shorter and the canal is shorter and more recurved than in that species. Whorls six, moderately convex, with impressed sutures, the upper whorls decreasing more rapidly. Nuclear whorls very small, regular, smooth, not distinctly incurved. Sculpture broad, rather prominent, rounded ribs, with wider concave interspaces, and over the whole surface numerous small, narrow, unequal, raised spiral lines, separated by wider grooves The whole surface is also covered with very fine and regular raised lines of growth, which cross and roughen the spiral raised lines, and are more

conspicuous in the grooves, producing a fine decussated structure. On the last whorl are fourteen to sixteen of the transverse ribs or folds; these become obsolete just below the periphery, so that on the base there are only spiral lines and lines of growth. Aperture narrow-ovate. Outer lip evenly rounded in the middle, but contracted at the base of the canal, which is short, rather narrow, and distinctly recurved. Columella decidedly curved. Epidermis thin, yellowish white, closely adherent, with distinct lines of growth. Length, 14.5mm; breadth, 7mm; length of aperture, with canal, 7mm; its breadth, 3mm; length of body-whorl, front side, 10mm. Stations 891 to 895, 238 to 500 fathoms, with the preceding; several specimens, living.

Neptunea (Sipho) arata Verrill, sp. nov.

Stations 869 to 880, 893 to 895; common. Nearly all our deep-water specimens related to *N. Stimpsoni* Mörch (= *Fusus Islandicus* Gould) differ widely from the common shallow-water form, in having the whole surface much more strongly sulcated by broader, deeper, and less numerous spiral grooves. On the upper whorls there are seven or eight of these broad grooves, separating flattened spiral ridges of about the same width; on the last whorls the ridges become broader, and each of them is divided at summit by a smaller secondary groove. The canal is rather long, slightly recurved. Columella twisted, but not much bent. Epidermis not pilose, yellowish brown, often in raised lines along the lines of growth. Color within aperture bluish white, the columella and canal tinged with flesh-color or pale salmon. Length, 80mm; breadth, 30mm; length of aperture, with canal, 45mm; its breadth, 14mm.

The typical, nearly smooth variety of *N. Stimpsoni* Mörch is perhaps the same as *N. glabra* Verkruzen, sp. (= *Sipho glaber* G. O. Sars).

Neptunea (Sipho) propinqua (Alder).

Fusus propinquus Alder, Catal. Moll. North. & Durh.; Jeffreys, British Conch., iv, p. 338; v, pl. 83, fig. 3.

Neptunea propinqua Verrill, Amer. Journ. Sci., xvi, p. 210, 1878.

This shell was first taken by us, in 1877, off Cape Sable, and off Halifax, Nova Scotia, in 88 to 100 fathoms, where it was common. This season it occurred in abundance, living, and of good size, in most of our outer dredgings, being the most common species of this family, except *N. pygmæa*. It occurred at all the stations from 865 to 874, 876 to 880, 893 to 895, ranging in depth from 65 to 487 fathoms. It was most abundant at 869 to 871, 894 and 895, in 115 to 365 fathoms.

Although it does not agree perfectly with the European specimens of *N. propinqua* that I have had for comparison, I have recorded it under this name, largely in deference to the opinion of Mr. W. H. Dall, who has made a special study of this group, and who has had some of our specimens for comparison.

This shell is somewhat stouter and more ventricose than the ordinary forms of *N. Stimpsoni* and *N. arata*, from which it differs, also, in having

an olive-colored, ciliated epidermis; the canal is shorter and more curved and twisted; the suture is slightly channeled, and the aperture is broader than in either of these species. The sculpture consists of regular, narrow, spiral grooves. The aperture is white.

Buccinum cyaneum Brug.; Stimpson.

Buccinum Grönlandicum G. O. Sars, op. cit., p. 259, pl. 25, fig. 1; pl. x, fig. 11 *a*, *b* (*non* Stimpson).

This species was dredged in the summer of 1879, by the "Speedwell", off Cape Cod, in 90 fathoms. It was dredged by us in 1877, off Cape Sable, Nova Scotia, in 80 to 90 fathoms, compact sand, and off Halifax, in 100 fathoms, and has often been brought in from the banks off Nova Scotia by the Gloucester fishermen, but it was not previously actually known from the New England coast.

Nassa nigrolabra Verrill, sp. nov.

Shell minute, long-ovate, nearly smooth, pale olive, with the edges of the lips blackish. Whorls five, slightly rounded, with shallow sutures; spire elevated, not very acute. Surface covered with close, regular, microscopic lines of growth, and with less distinct revolving lines; canal with a few minute, distinct, spiral grooves. Aperture short-ovate; canal wide and very short; outer lip rounded, with edge flaring, thickened and revolute, with a row of minute nodules on the inside; inner lip consisting of a broad, smooth, glossy, brownish-black deposit of enamel on the body-whorl and columella; columella nearly straight; no umbilicus. Length, 2.85^{mm}; breadth, 1.40^{mm}; length of aperture, 1.20^{mm}.

Station 870, in 155 fathoms; one specimen. It is referred to *Nassa* only provisionally. The animal is not known.

Lunatia nana (Möller).

G. O. Sars, op. cit., p. 159, pl. 21, figs. 16 *a*, *b*; pl. v, fig. 14 (dentition).—Verrill, Proc. Nat. Mus., ii, p. 197, 1879.

In addition to the localities off Cape Cod and on Le Have Bank, previously cited by me, this species has been taken at other localities on our coast. It was taken by Prof. S. I. Smith and myself at Eastport, in 1864; by Prof. H. E. Webster at Seal Cove, Grand Menan, in 1872; by Mr. J. F. Whiteaves in the Gulf of Saint Lawrence; and by our party in 1880, twenty miles south of Block Island, in 28 fathoms.

Lunatia levicula Verrill, sp. nov.

Shell light, thin, and rather delicate, broad-ovate; spire moderately elevated, subacute. Whorls five, evenly rounded; suture distinct. Aperture ovate, well rounded below. Outer lip short, sinuous along the edge, the upper portion considerably advancing where it joins the body-whorl. Inner lip partially reflexed over a rather small, deep umbilicus, but not thickened, and forming a mere film on the body-whorl, above the umbilicus. Surface covered with distinct and rather coarse, sinuous lines of growth, parallel with the edge of the lip, and, like it, advancing as they approach the suture. Color (of a dead but fresh

shell) pale brownish yellow; the spire, when worn, and the interior, yellowish brown. Other specimens are white or yellowish white. Length, 32mm; breadth, 25mm; length of aperture, 27mm; its breadth, 15mm.

This shell was first dredged by me near Eastport, Me., in 1870. It has since been dredged by the United States Fish Commission parties in Casco Bay, Me., and also off Block Island, stations 812 to 814, in 26 to 28 fathoms. It is still a very rare species. It has some resemblance to *Acrybia flava*, on account of the lightness and thinness of the shell, as well as in form, but the shape of the aperture is different, and there is a distinct umbilicus. The columella is also much less incurved.

Lamellaria pellucida Verrill.

Amer. Journ. Sci., xx, p. 395, for Nov. (published Oct. 25, 1880).

Animal broad-elliptical, well rounded, both anteriorly and posteriorly; back convex or somewhat swollen, smooth, without tubercles; branchial sinus, in anterior edge of mantle, shallow but distinct; tentacles slender, tapered; eyes small, black, on the outer basal portion of the tentacles; foot oblong, well developed, reaching nearly to the posterior end of the mantle when extended. Color of the mantle yellowish brown, blotched irregularly with dark brown; some specimens were paler, others darker brown.

Odontophore long and narrow, with three rows of teeth; central tooth much smaller than the lateral, its basal part oblong, with nearly parallel sides and squarely truncate at the end; tip acute-triangular, strongly curved forward, with a prominent, sharp, median denticle, and a row of four or five much smaller denticles on each side. Lateral teeth very large, strongly incurved, and hollowed out on the concave surface, with both edges serrate; the inner edge has the serrations coarser, not reaching the tip, which is smooth, stout, acute. The basal portion of the lateral teeth is furnished with a broad, sinuous, aliform lobe on the outer edge; the basal end is slightly expanded and obtusely round or subtruncate.

The most important difference between the dentition of this species and that of *L. perspicua* and *L. latens* (Müll.) is in the form of the basal portion of the median teeth; in both the European species this is divided into two divergent lobes, separated by a deep notch.

Shell ovate, with a well-formed spire, very thin and delicate, smooth, lustrous, and transparent. Aperture broad-ovate, much larger than the body of the shell, but not so large and open as in *L. latens*. The interior of the spire cannot be seen in a ventral view, but is visible in an end view from the front. The spire is oblique, somewhat elevated, and slightly pointed, with a minute nucleus. Whorls three, well rounded; sutures impressed. Outer lip very thin, sloping or somewhat flattened posteriorly, somewhat expanded and well rounded anteriorly; inner lip receding in a deep, regular incurvature of the body-whorl, which has a sharp, thin edge that winds spirally into the interior of the spire. Sculp-

ture none, except indistinct lines of growth; surface smooth and shining throughout.

Length of the animal in life about 15mm to 20mm; length of shell, 12.5mm; breadth, 10mm.

Stations 870 to 872, south of Martha's Vineyard, in 86 to 155 fathoms, fine sand (16 specimens, living).

The shell of this species, in form, closely resembles that of the European *L. perspicua* (not of Gould), but the differences in the mantle and dentition will clearly separate it. Specimens of both sexes occurred, and they had the same form and color externally.

The "*Lamellaria perspicua*" of Gould was based, in part at least, upon *Marsenina glabra*. A species of *Lamellaria* occurs at Eastport, Me., which may be distinct from the preceding.

Marsenina prodita (Lovén) Bergh.

G. O. Sars, Moll. Reg. Arct. Norv., p. 151, pl. 12, figs. 5 *a–c*; pl. v, figs. 7 *a*, *b* (dentition).—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 2, 2 *a*.

This species was taken, living, at Eastport, Me., by Prof. S. I. Smith and myself, in 1864 and 1868. It is easily recognized by its comparatively prominent, acute spire, turned to one side, by its obliquely elongated aperture, and by the margin of the outer lip being slightly inflexed near the suture. It has not been previously recorded from the American coast, south of Greenland.

Marsenina glabra Verrill.

Oxinoë glabra Couthouy, Boston Journ. Nat. Hist., ii, p. 90, pl. 3, fig. 16, 1838.
Lamellaria perspicua (*pars*) Gould, Binney's ed., p. 337, fig. 607 (?).
Marsenina micromphala Bergh.—G. O. Sars, op. cit., p. 151, pl. 21, figs. 10 *a–d*.—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 1, 1 *a*.

This species is not uncommon at Eastport, Me., where I collected it in 1859, 1861, 1863, 1864, 1868, 1870, and 1872. It was dredged last year by our party, on the "Speedwell", off Cape Cod, in 34 fathoms. It has a much smaller and less prominent spire than the preceding, and a more regularly oblong-oval aperture. The shell is smooth, white, thin, and delicate in both species, but more translucent in the present one.

There can be no doubt, from the description and figure, that the *Oxinoë glabra* of Couthouy was a *Marsenina* indistinguishable from this species, which is the commonest of the group on our coast. The *M. micromphala*, well described and figured by Sars, appears to agree perfectly with our form, both in the animal and shell.

Gould appears to have confounded two or more species under his *L. perspicua*. His figure (158) in the first edition does not represent this species; the figure 607 of Binney's edition is different, and may be this shell. As a genuine *Lamellaria*, having its shell entirely inclosed in the mantle, also occurs on our coast, not rarely at Eastport, Me., it is not improbable that Gould may have had its shell among those examined by him. Its identity with *L. perspicua* of Europe is very doubtful, however.

Marsenina ampla Verrill, sp. nov.

Trans. Conn. Acad., v, pl. 42, figs. 3, 3*a*.

Shell broad-oval, white, nearly opaque, fragile, with conspicuous lines of growth, but otherwise smooth; whorls scarcely two; last whorl very large, constituting nearly the entire shell, and nearly concealing the first whorl, which appears only as a minute incurved nucleus, situated in an apical depression. Aperture broad, oblong-oval, showing the interior of the spire to the apex. Outer lip thin, distinctly expanded and slightly shouldered near the suture, somewhat straight along the right and left sides, regularly rounded in front, slightly excurved where it joins the inner lip, which consists of a narrow and thin coating, conformable to the columella surface, but with a distinct, narrow groove, and with the edge slightly raised as a narrow lamina in the umbilical region. The columella-edge is sigmoid and very much incurved in the umbilical region.

Length, 11^{mm}; breadth, 8^{mm}; depth of last whorl, 5^{mm}.

Eastport, Me. Dredged in 1868, by the writer.

Velutella cryptospira (Middend.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 149, pl. 21, figs 9 *a–c*.

A good living example of this shell was taken by us in 1877, off Halifax, Nova Scotia, in 57 fathoms (station 82).

The shell is very thin, translucent, yellowish horn-color, flexible, and but slightly calcified, with no sculpture except fine lines of growth. The spire is small, incurved, and depressed, so that the apical whorl is not visible in a front view. The aperture is elongated. The outer lip expands rather abruptly posteriorly, and is prolonged anteriorly.

Length, 8^{mm}; breadth, 5^{mm}; length of aperture, 6.5^{mm}.

Trichotropis conica Möller.

Kröyer's Tidss., iv, p. 85, 1842.—G. O. Sars, op. cit., p. 163, pl. 13, fig. 3.

A single dead, but large and characteristic, specimen of this very distinct species was taken in the Gulf of Maine, off Cape Sable, Nova Scotia, in 75 fathoms, by the United States Fish Commission party, on the "Speedwell", in 1877. It is easily recognized by its conical spire and its flattened base, covered with revolving grooves and ridges. The revolving ribs on the spire are stronger than those on the base, and unequal.

Rissoa (Cingula) harpa Verrill, sp. nov.

Shell small, white, translucent, acute-conical, with five very convex, rounded whorls and deeply impressed sutures; body-whorl large; apical whorl very small, smooth, regular. Sculpture very regular, well-raised, rounded, transverse ribs, about twenty-six on the last whorl, separated by spaces rather wider than the ribs; and fine, close, microscopic spiral lines, which cover the interspaces. Aperture nearly circular, slightly effuse in front. Outer lip thin, regularly rounded; inner lip reflexed in the umbilical region, and continued on the body-whorl only

as a thin layer of enamel. Umbilicus a small but distinct chink. Length, 2.75mm; breadth, 1.80mm. Animal unknown.

Dredged by us off Massachusetts Bay, 1877, station 34, in 160 fathoms; and off Newport, at stations 892 and 894, in 487 and 365 fathoms.

Cingula turgida (Jeff.) Verrill.

Rissoa turgida Jeffreys.—G. O. Sars, Moll. Reg. Arct. Norv., p. 183, pl. 10, figs. 12 *a*, *b*.

A very small, white species, with smooth, rounded whorls and distinct umbilicus. Station 892, in 487 fathoms.

Cingula Jan-Mayeni (Friele) Verrill.

Rissoa Jan-Mayeni Friele, Nyt. Mag. Naturv., 1877 (auth. cop., p. 4, fig. 4).
Cingula Jan-Mayeni Verrill, Amer. Journ. Sci., xvii, p. 311, Apr., 1879.

This species was common at stations 891 to 894, in 238 to 500 fathoms. A single specimen occurred at station 880. It was originally from off Greenland, 70 to 300 fathoms. Whiteaves has dredged it in the Gulf of Saint Lawrence, 200 fathoms, but it had not hitherto been taken on the New England coast.

Lepetella Verrill.

Amer. Journ. Sci., xx, p. 396, Nov., 1880.

Shell small, smooth, oval or oblong, limpet-shaped, conical, with a simple subcentral apex, not spiral. Animal much as in *Lepeta*, but with distinct eyes. Odontophore tænioglossate, with seven regular rows of teeth; median tooth a rather broad, thin plate, with incurved, smooth, convex edge, narrower than the base; inner lateral tooth stout, with a broad base and a single incurved, terminal denticle; second lateral tooth larger, with a broader flat base and two terminal incurved denticles; outer laterals smaller, flattened, subtriangular plates.

Lepetella tubicola Verrill & Smith.

Loc. cit., p. 396, 1880.

Shell thin, white, smooth, conical, with the apex acute and nearly central; aperture broad-elliptical, oblong, or subcircular, usually more or less warped, owing to its habitat; edge thin and simple. Sculpture none, lines of growth slight, outer surface dull white; inner surface smooth, with the pallial markings faint. Length of largest specimens, 3.75mm; breadth, 3mm; height, 2mm. On inside of old tubes of *Hyalinœcia artifex* V.; twenty-seven were taken from one tube. Stations 869, 192 fathoms, and 894, 365 fathoms.

Lovenella Whiteavesii Verrill, loc. cit., p. 396, 1880.

Cerithiopsis costulatus Whiteaves (*non* Möller).

A small and elegant species, allied to *L. metula* (Lovén). Elongated, subulate; spire regularly tapering to the acute apex; whorls nine, slightly convex, with a prominent, nodulous, revolving carina below the middle, and a smaller one just below the suture; on the body-whorl another less elevated and scarcely nodose carina revolves in line with

the edge of the lip; below this the base is smooth. Whorls crossed by numerous transverse, curved, elevated, rounded costæ, which are about as wide as their intervals, and in crossing the two upper cingulæ form small rounded nodes at their intersections. Aperture broad; columella much incurved above; canal distinctly excurved and twisted; outer lip with three angles corresponding with the three carinæ. Length, 4.5^{mm}; breadth, 1.5^{mm}. The largest specimen measures, in length, 6.25^{mm}; in breadth, 2^{mm}. Stations 891, 892, and 894, in 365 to 500 fathoms; Gulf of Saint Lawrence, 200 fathoms, J. F. Whiteaves.

Truncatella truncatula (Drap.).

Jeffrey's British Conch., iv, p. 85, pl. iv, fig. 1.—Verrill, Amer. Journ. Sci., xx, p. 250, Sept., 1880.

This species was found by the writer, living in considerable numbers, and of all ages, among the docks at Newport, R. I., July, 1880. It occurred among decaying sea-weeds thrown up at high-water mark, both among the vegetable matter and on the under sides of stones. It was associated with *Alexia myosotis*, *Assiminea Grayana*, *Anurida maritima*, *Orchestia agilis*, &c.

It may possibly have been introduced in recent times by commerce, like the *Littorina littorea*, now so common on our shores; but if so, it has, like the latter, become thoroughly naturalized. This is the first time that it has been observed on our coast, so far as known to me.

Solarium boreale Verrill & Smith, sp. nov.

A small, pretty, pale yellowish brown species, with a strong carina-like, rounded, nodulous rib around the periphery. Height, 2.5^{mm}; breadth, 5^{mm}.

Two living specimens from station 871, 115 fathoms. The spire is low and flattened; nuclear whorl smooth, obliquely incurved, reddish; body-whorl strongly keeled, triangular; above the keel, flattened, and near it, are about six small spiral ribs, separated by impressed lines; upper surface of whorls also crossed by numerous flexuous, transverse, low ribs, with shorter ones interpolated toward the periphery. Base a little convex, about as much so as the spire; toward the periphery covered with numerous fine spiral lines; also covered with many low ribs radiating from the umbilicus, around which they are nodulous. Aperture triangular, with a notch corresponding to the keel.

Scalaria Pourtalesii Verrill & Smith.

Amer. Journ. Sci., xx, p. 395, Nov., 1880.

Three fine specimens, one of them living, from stations 871, 873, and 874, in 85 to 115 fathoms.

Scalaria, sp.

An undetermined *Scalaria*, having the sculpture much as in *S. Grönlandica*, but more slender in form, was taken at station 873. The spiral lines are very distinct between the ribs, and also extend over them.

Scalaria Dalliana Verrill & Smith.

Amer. Journ. Sci., xx, p. 395, Nov., 1880.

Several specimens, living, from stations 869, 870, 871, and 874, in 65 to 155 fathoms.

Acirsa gracilis Verrill, sp. nov.

Shell white, with a long, slender, regularly tapered, rather acute spire and deeply impressed sutures. Whorls eight, evenly rounded, all except the last crossed by slightly raised but distinct rounded ribs, separated by wider interspaces; the ribs are most elevated just below the sutures and on the upper whorls. Lower whorls with numerous (eight or more) fine, slightly impressed spiral lines, producing narrow spiral cinguli, of which the lowest on the last whorl is strongest and borders the base of the shell, which is convex and smooth. The spiral lines are absent near the sutures. Mouth round-ovate, slightly effuse in front. Inner lip slightly reflected. No umbilicus.

Stations 873 and 894, in 100 to 365 fathoms.

This species is much more slender than *Acirsa costulata* Migh., sp., 1841 (= *A. borealis* and *A. Eschrichtii* of authors), and its ribs are more regular and distinct. *A. prælonga* Jeffreys has much finer sculpture.

Aclis Walleri Jeffreys.

G. O. Sars, Moll. Reg. Arct. Norv., p. 196, pl. 11, fig. 18.

Three living specimens were taken at stations 892 and 894, in 487 and 365 fathoms.

Aclis striata Verrill, sp. nov.

Shell small, white, somewhat lustrous, fragile, with moderately elevated spire; whorls six, well rounded, with deep sutures, the last one ventricose. Sculpture numerous fine, close, spiral grooves, covering the whole surface. Aperture simple, ovate. Outer lip thin, with a wide and rather deep sinus below the suture, but projecting strongly forward in the middle, where it is regularly rounded, then recedes somewhat anteriorly, joining the inner lip in an even curve. Inner lip discontinuous, slightly concave and reflected in the umbilical region, where it joins the body-whorl. Umbilicus narrow, but deep. Nuclear whorl small, regular, smooth. Length, 4^{mm}; breadth, 2^{mm}.

One specimen was dredged by me in the Bay of Fundy, near Eastport, Me., in 1868; another was dredged in deep water off Newport, R. I., this season, by the United States Fish Commission.

This species is provisionally referred to *Aclis* because of its general resemblance to known species of that genus. Both my specimens were dead, and I have, therefore, no means of knowing the structure of the animal. Its regular apical whorl shows that it is not an *Odostomia.* The marked sinus of the outer lip and the distinct umbilicus are features not found in any other shell of our coast of similar size and appearance. Dead and broken specimens might be taken for bleached *Cingula aculeus*,

but the latter has a different aperture, continuous lip, and no umbilicus, and its sculpture is coarser.

Calliostoma Bairdii Verrill & Smith.

Amer. Journ. Sci., xx, p. 396, for Nov., 1880 (published Oct. 25).

Stations 865 to 874, in 65 to 192 fathoms; many living specimens. Most common at stations 869 and 871, in 192 and 115 fathoms.

Margarita regalis Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, for Nov., 1880 (published Oct. 25).

Stations 870, 871, 880 to 895, from 115 to 500 fathoms. Most abundant at stations 892 to 894, in 365 to 487 fathoms.

Margarita lamellosa Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, for Nov., 1880 (published Oct. 25).

Stations 869 and 871, 115 to 192 fathoms. Only two specimens obtained.

Margarita, sp. nov.

A small, elevated, conical, nearly smooth, white, and iridescent species, with a small, narrow umbilicus, was dredged by us off Halifax, Nova Scotia, in 1877. The specimen is not now at hand for accurate description.

Machæroplax bella (Verk.).

G. O. Sars, op. cit., p. 137, pl. 9, figs. 5 *a–c*.

An elegant species, allied to *M. varicosa*, but with more elaborate sculpture. As in the latter, the whorls are crossed by oblique, flexuous, rounded, transverse folds, but there are, in addition, in *M. bella* four conspicuous revolving ribs on the last whorl; the upper one is large and nodulous, giving the whorls an angular or somewhat carinated form; the two lower ribs are smaller and close together, the third one at, and the fourth just below the basal angle of the whorl. On the other whorls only the two upper ribs are visible. Base with curved transverse ridges, crossed by fine revolving lines. Umbilicus moderately large and deep, with very distinct spiral lines within it.

Off Cape Sable, Nova Scotia (loc. 47), 90 fathoms, fine, compact sand, United States Fish Commission, 1877. One living and one dead specimen. New to the American coast.

Cyclostrema trochoides (Jeff. MSS.) Friele.

Arch. Math. Naturv., 1876, p. 308, pl. 4, figs. 2 *a, b*—G. O. Sars, op. cit., p. 131, pl. 8, figs. 9 *a–c*.

A few specimens of this little shell were trawled at stations 892 and 894, in 487 and 365 fathoms. In our specimens the umbilicus is, in most cases, a narrow chink, but in one it is closed. There are distinct spiral lines immediately around the umbilicus. It is new to the American waters.

Assiminea Grayana Leach.

Jeffrey's British Conch., v, p. 99, pl. 4, fig. 1; pl. 97, fig. 5.—Verrill, Amer. Journ. Sci., xx, p. 250, Sept., 1880.

This was found in July of this year, by the writer, living among decaying sea-weeds, at high-water mark, between the docks at Newport, R. I. It was associated with *Alexia myosotis* and *Truncatella truncatula*, and was rather more abundant than either of the latter. Drawings of the animal of this and the two species last named were made by Mr. J. H. Emerton. The animal agrees well with the figures and descriptions of the European examples. It has not been recognized as American before.

Eulima intermedia Cantraine.

G. O. Sars, op. cit., p. 210, pl. 11, fig. 20; pl. xviii, fig. 41.

Several living specimens were taken at stations 870, 871, 874, 876, and 877, in 85 to 155 fathoms. It has previously been known from deep water in the Mediterranean, and off the Canary Islands, Lofoden Islands, and Finmark (200 to 300 fathoms).

This shell is more slender than *E. oleacea*. The sutures are not at all impressed; the whorls are flattened so that the spire has a regular, long-conical form. Aperture regularly ovate. The surface is smooth, polished, and shining. Color of shell pure white, translucent; in life the animal shows through, giving it a pale orange or salmon color. Length, 5.6^{mm}; breadth, 1.6^{mm}.

Eulima distorta Deshayes.

G. O. Sars, op. cit., p. 210, pl. 11, fig. 23.

A single living specimen of this curious little shell was obtained at station 871, in 115 fathoms.

Turbonilla nivea Stimpson, Check List.

Chemnitzia nivea Stimpson, Proc. Boston Soc. Nat. Hist., iv, p. 114, 1851; Invert. Grand Manan, p. 23, 1853.

One perfect specimen of this very rare shell was dredged at station 871, in 115 fathoms.

It is distinguished by its very slender, elongated form, with twelve flattened, closely coiled whorls and slightly marked sutures. The sculpture consists of well-marked, regular, transverse, rounded ribs, with smooth interstices; no spiral lines. Color white; surface shining. Apical whorl small, incurved, and reversed. Length, 6.5^{mm}; breadth, 1.5^{mm}.

Turbonilla Rathbuni Verrill & Smith.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Several fine living specimens were taken at stations 865 to 867, in 64 and 65 fathoms, and at stations 893 to 895, in 238 to 365 fathoms.

Dedicated to Mr. Richard Rathbun, of the United States Fish Commission.

Turbonilla formosa Verrill & Smith.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

A few living examples of this elegant shell occurred at stations 891 and 892, in 487 to 500 fathoms.

Turbonilla Smithii Verrill, sp. nov.

Shell long and slender, smooth, polished, white, with a narrow spiral band of light yellowish brown or red just above the suture. Whorls up to twelve, much flattened, little oblique, closely coiled, with the sutures only slightly impressed; apical whorl small, incurved. Sculpture none. Aperture irregular oblong-ovate; outer lip nearly straight for about half its length, rounded and slightly prominent anteriorly. Columella lip nearly straight anteriorly, but curved inward and twisted posteriorly, with a slight spiral fold that winds into the shell. Length, 7.5^{mm}; breadth, 1.5^{mm}.

Stations 871, 873, and 876, in 100 to 120 fathoms.

This elegant and very distinct species I have dedicated to Mr. Sanderson Smith, of the United States Fish Commission party.

Eulimella ventricosa (Forbes).

G. O. Sars, op. cit., p. 209, pl. 11, fig. 19; pl. 22, fig. 16.

A single dead specimen, not in good condition, but apparently belonging to this species, was dredged by us at Eastport, Me., in 1868. A perfect specimen was dredged by us this season, at station 873, in 100 fathoms. This last has a distinctly incurved, small, nuclear whorl; whorls nine, smooth, polished, white, well rounded, with deep sutures. Aperture broad-ovate, slightly effuse in front. Outer lip broad, well rounded in the middle and projecting well forward. Length, 3.6^{mm}.

Odostomia unidentata (Mont.).

G. O. Sars, op. cit., p. 201, pl. 11, figs. 6–8.

Odostomia modesta Stimpson.—Gould, Invert. Mass., ed. ii, p. 327, fig. 596.

A single specimen occurred at station 871, in 115 fathoms. This shell appears to be much more rare on the American than on the European coasts.

Odostomia (Menestho) sulcata Verrill, sp. nov.

Shell small, white, long-ovate; spire regularly tapered, acute; whorls about six, moderately convex, covered with many regular, rather strong, revolving grooves. Nuclear whorl strongly inflexed and reversed. Aperture regularly ovate. No tooth on the columella. Length, 2.80^{mm}; of body-whorl, 1.80^{mm}; breadth, 1.40^{mm}; length of aperture, 1.10^{mm}; its breadth, .70^{mm}.

Stations 871 and 894, in 115 and 365 fathoms.

This differs from all other related species of our coast, except *O. striatula* Couth. (= *Menestho albula* Gould, *non* Fabr.), in being strongly grooved spirally; from the latter it differs in having fewer whorls and a regularly tapered, acute spire, and in having the spiral lines coarser and fewer. Perhaps it is more closely related to the real *Menestho*

albula of Greenland, which, according to Jeffreys, is distinct from our shell, so named by Gould. These three forms all belong to *Menestho* Möller (= *Liostomia* G. O. Sars).

Auriculina insculpta ? (Mont.).

G. O. Sars, op. cit., p. 204, pl. 11, figs. 11, 12; pl. xviii, fig. 38 (operculum).

A single dead and probably immature specimen, which I refer doubtfully to this species, was taken at station 892, in 487 fathoms. It agrees nearly, in form and sculpture, with the figure (12) given by Sars, but our shell is shorter, ovate-fusiform. There are five slightly convex whorls; the anterior half of the body-whorl is covered with distinct, fine, spiral grooves; nuclear whorl rounded, rather large, partially incurved. Aperture narrow-ovate; a slight fold on the columella; no umbilicus.

Diaphana Brown, 1827 (restricted); H. & A. Adams.

Utriculus (*pars*) Brown, Ill. Brit. Conch., 1844 (*non* Schumacher, 1817).

Utriculus G. O. Sars, Moll. Reg. Arct. Norv., p. 285.

In 1827 Brown proposed the name *Diaphana* for certain species of shells figured by him (but not described), which now are known to belong partly to the restricted modern genus *Utriculus* and partly to *Amphisphyra* Lovén, 1846. But he did not then define the genus, and in a later edition of his work (1844) he discarded the name and substituted *Utriculus* for it.* But *Utriculus* had been used by Schumacher, in 1817, for a different genus (*Conidæ*). Lovén's name (*Amphisphyra*), established by him for Brown's second section of *Utriculus*, should, therefore, be retained for that group, which is a good genus. *Diaphana* and *Utriculus*, as used by Brown, were absolutely synonymous, but *Diaphana*, as used by G. O. Sars, is a synonym of *Amphisphyra*. In its original sense, *Diaphana* might be rejected, because undefined. But since *Utriculus* had been preoccupied, it seems necessary to retain *Diaphana* for the first section of Brown's genus, corresponding nearly with *Utriculus* of G. O. Sars. This is also in accordance with the nomenclature in H. & A. Adams's Genera of Shells.

The absence of an odontophore in *Diaphana* H. & A. Adams = *Utriculus* Sars, is certainly a very important character by which the genus can easily be distinguished from *Cylichna* and *Amphisphyra*. But this genus cannot always be distinguished from *Cylichna* by the shell alone. On that account Lovén, Jeffreys, and other able conchologists have referred some of the species of "*Utriculus*" to *Cylichna*.

Diaphana nitidula (Lovén) Verrill.

Cylichna nitidula Lovén, op. cit., p. 142, 1846.

Utriculus nitidulus G. O. Sars, op. cit., p. 286, pl. 17, fig. 13; pl. 26, fig. 3; pl. xi, figs. 6 *a*, 6 *b* (gizzard, &c.).

This shell has been dredged by us in several localities in deep water off the coast of New England and Nova Scotia, and by Mr. Whiteaves in the Gulf of Saint Lawrence. This season it was taken at stations 891, 892, and 894, in 365 to 500 fathoms.

* This change was probably first made in the edition of 1834, which I am unable to consult.

It is a small, very smooth, white shell, in form closely resembling young specimens of *Cylichna alba*, for which it may easily be mistaken. It lacks the fine spiral lines usually seen on the latter, and is rather more narrowed posteriorly. The apex of the spire is occupied by a shallow depression, and there is no umbilicus.

Diaphana gemma Verrill.

Amer. Journ. Sci., xx, p. 399, Nov., 1880.

Shell oblong, suboval, widest a little in front of the middle, truncate posteriorly and obliquely rounded anteriorly, with a distinct umbilicus, and also with a narrow, deep pit at the apex. Texture of shell rather solid, somewhat thickened. Outer lip rising somewhat above the spire, forming a rounded posterior angle; throughout most of its length only slightly convex, often nearly straight; anteriorly, a little expanded and produced, well rounded, thickened. Inner lip more thickened, with the edge a little revolute, but leaving a small and regular umbilicus. Aperture narrow posteriorly, ovate anteriorly. Surface smooth and glossy, without any sculpture over the middle region, but with several well-defined, not crowded, but fine spiral grooves at each end, visible with a lens. Color grayish white. Length, 4.2^{mm}; breadth, 2.5^{mm}.

Stations 871 and 873, 100 to 115 fathoms, fine sand, south of Martha's Vineyard and Newport, R. I.

I have had no opportunity to examine the animal of this species, and refer it to *Diaphana*, provisionally, because of its resemblance to *D. umbilicata*. It may prove to be a *Cylichna*. It has some resemblance to *C. occulta* Mighels (= *C. propinqua* Sars). The latter is, however, destitute both of the pit at the summit of the spire and of the umbilicus, and its surface is everywhere covered with distinct spiral lines. Our shell is shorter and stouter than *D. umbilicata*.

Diaphana conulus (Desh.).

Utricalus conulus G. O. Sars, op. cit., p. 287, pl. 17, figs. 17 *a–c*.

A perfect living specimen of this very distinct species was taken at station 870, in 155 fathoms. It has not been recorded hitherto from the American coast.

Amphisphyra globosa Lovén, 1846.

Diaphana globosa G. O. Sars, op. cit., p. 290, pl. 18, figs. 3 *c*, 4; pl. xi, fig. 12 (dentition).

Specimens agreeing in all respects with Sars's figures, referred to above, were dredged at stations 870, 871, and 894, in 115 to 365 fathoms, south of Martha's Vineyard and Newport.

Amphisphyra pellucida (Brown) Lovén, 1846.

Diaphana pellucida Brown, Ill. Recent Conch., pl. 19, figs. 10, 11, 1827.

Bulla hyalina Turton, Mag. Nat. Hist., vii, p. 353, 1834 (*non* Gmelin).

Bulla debilis Gould, Invert. Mass., ed. i, p. 164, fig. 95, 1841.

Utricalus hyalinus Jeffreys, Brit. Conch., iv, p. 427; v, pl. 94, fig. 7.

Diaphana hyalina G. O. Sars, op. cit., p. 289, pl. 18, figs. 1 *a*, *b*; pl. xi, fig. 10 (dentition).

Diaphana debilis Gould, Invert. Mass., ed. ii, p. 216, fig. 507.

This species occurred at stations 876 and 894, in 120 and 365 fathoms.

The name *pellucida* clearly has priority for this species, and should be adopted; moreover, *hyalina* had been previously used. Jeffreys, although he admits the priority of Brown's name, claims that it is "obsolete" because no one has used it, "except its author". But Lovén, A. Adams and others have correctly adopted it. Moreover, Jeffreys himself does not apply this idea in regard to "obsolete" names in many other cases, as, for example, in the case of *Margarita olivacea* (Brown), an "obsolete" name revived by him to replace *argentata* Gould.

Cylichna Gouldii (Couth.) Verrill.

Bulla Gouldii Couthouy, Bost. Journ. Nat. Hist., ii, p. 181, pl. 4, fig. 6, 1838.
Utriculus Gouldii Stimpson.—Gould, Invert. Mass. (second ed.), p. 217, fig. 508.

Living specimens of this species, of large size and in considerable numbers, were dredged by us in 1879, off Cape Cod, and especially on the sandy portions of Stellwagen's Bank, Massachusetts Bay, in 15 to 25 fathoms.

An examination of the animal shows that it has a gizzard, with calcareous plates, while its dentition agrees with *Cylichna*, to which it should be referred, notwithstanding the character of the spire of the shell. The median teeth are deeply bilobed; the inner lateral ones large and hooked; outer laterals four on each side, slender, spiniform.

This species is very distinct from *Diaphana pertenuis* (= *Bulla pertenuis* Migh.), with which it has sometimes been confounded. The latter occurred at station 894.

Philine amabilis Verrill.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Animal large, about an inch long, even in alcoholic specimens. In preserved specimens the anterior lobe is large, oblong, truncate behind, obtusely pointed in front, slightly narrowed backward; lateral lobes large; posteriorly the thin membrane covering the shell projects backwards beyond it, and its free edge is divided into several wide, but short, lobes; foot large.

Odontophore with a large inner lateral, hook-shaped tooth on each side, having its inner edge very finely serrulate and each of its lateral edges bordered by a sharp ridge; outside of these there is on each side a single, very much smaller, slender, spiniform, very sharp, slightly bent tooth.

Shell large, but exceedingly thin and delicate, diaphanous, lustrous, and iridescent, with a very wide aperture. The outline is broad-oblong, rounded at both ends; the outer lip, forming the greater part of the shell, is evenly rounded posteriorly, and scarcely projects beyond the level of the spire; in the middle it projects forward in a regular curve, and recedes rapidly in front, where it also becomes slightly broader, and forms a very obtuse, rounded angle; the anterior end is broadly rounded and very much cut away, so that in an end view, from the front, the whole interior of the spire is visible. The inner lip is thin and sharp-

edged, and recedes in a broad curve anteriorly, so that the body of the shell is relatively very small. There is a small, shallow pit in the place of the spire. Sculpture inconspicuous; many lines of growth, and very fine, wavy, spiral striæ, visible with a lens, cover the whole surface, which has a glistening and opalescent or pearly luster.

Length of the entire animal, 25mm or more; length of shell, 15mm; breadth of shell, 10mm.

Several living specimens from station 876, about 100 miles south of Newport, R. I., in 120 fathoms.

This is one of the largest species of the genus, and one of the most beautiful and delicate.

Philine Finmarchica M. Sars.

G. O. Sars, op. cit., p. 296, pl. 18, figs. 10 *a–d;* pl. xii, fig. 1 *a, b* (dentition).

Off Cape Sable, Nova Scotia, 90 fathoms, fine sand, 1877; 70 to 75 miles south of Martha's Vineyard, 65 to 192 fathoms.

Philine fragilis G. O. Sars.

G. O. Sars, op. cit., p. 296, pl. 18, figs. 11 *a–c;* pl. xii, fig. 2 (dentition).

Off Cape Sable, Nova Scotia, 90 fathoms, fine, compact sand, 1877; Jeffrey's Ledge, Gulf of Maine, 88 to 92 fathoms, 1874, several large living specimens.

Philine cingulata G. O. Sars.

G. O. Sars, op. cit., p. 297, pl. 26, figs. 7 *a–c;* pl. xii, fig. 3.

Off Cape Sable, Nova Scotia, 90 fathoms, with the preceding. Taken this season at stations 892 and 894, in 487 and 365 fathoms.

These four species of *Philine* are new to the American coast. Probably additional species of this genus will be detected when all our collections shall have been fully examined.

Pleurobranchæa tarda Verrill.

Amer. Journ. Sci., xx, p. 398, Nov., 1880.

Body subovate, stout, thick, often nearly half as broad as long, usually less, tapering backward and blunt posteriorly; front broad, convex or subtruncate; back more or less convex or swollen in the middle, with the surface wrinkled or irregularly reticulated, with the sunken lines brown, the reticulations smaller posteriorly. Dorsal tentacles short, stout, wide apart, ear-like, subtubular, having a slit on the outer side, with the edges often rolled in. Gill rather large, well exposed in a dorsal view, situated on the right side, behind the middle, and equal in length to nearly one-fourth the body, plumose, bipinnate, with 15 or 16 pinnæ on the upper side. Foot broad, often nearly as wide as the mantle, subtruncate or rounded in front, narrowed and obtuse posteriorly, ordinarily not extending beyond the mantle. The mantle edge is but little prominent, except along the right side. Proboscis protruded in most of the specimens, large, thick, obtusely tapered close to the end, which is emarginate, showing the large odontophore in a

broad, vertical notch. Reproductive organs large and prominent; the two orifices are situated on a large tubercle in front of the gill. The male organ, in extension, is long, slender, usually curled, truncate, about equal in length to half the breadth of the body; it is a tubular organ, with a slit along the lower side, formed by the rolling up of a long, thin, membranous process. At the posterior edge of the tubercle there is a shorter, flat-pointed process, connected with the female organs. Color of dorsal surface yellowish brown, lighter or darker, and reticulated with dark brown, often speckled with flake-white; gill and proboscis dark purplish brown; the proboscis with a darker dorsal patch; tentacles sometimes crossed by dark brown bands. Foot salmon-color. Odontophore very large and broad, with 150 to 170 rows of teeth; no median teeth; all the teeth are similar in structure, and show only a gradual change in form and size from the inner to the outer ones. The inner ones are elongated, slightly curved, narrow-lanceolate, with a very acute point and with a smaller, narrow, sharp denticle on the inner edge, parallel to but shorter than the main point; the outer teeth gradually become shorter, blunter, with a smaller denticle, which finally nearly disappears. Length, usually 30^{mm} to 40^{mm}; breadth, 10^{mm} to 14^{mm}.

About 20 miles south of Block Island (stations 814 to 817), in 38 fathoms; about 70 to 74 miles south of Martha's Vineyard (stations 865 to 872), in 65 to 192 fathoms, fine, compact sand, very abundant (140 specimens). Also 90 to 100 miles south of Newport, R. I., in 85 to 225 fathoms (stations 873 to 879). Closely resembles *Pleurobranchæa Novæ-Zealandiæ* in form and color. The latter is a littoral species.

Dendronotus elegans Verrill, sp. nov.

Form and general appearance nearly as in *D. arborescens*, but rather more slender. Branchiæ with rather longer stems and less numerous branches than in the latter, but similarly arranged. Tentacle sheaths with the terminal lobes not so finely divided, and with a smaller branch on the outer side, near the base. Frontal processes of the head numerous, large, with elongated stems, and not so much branched as in *D. arborescens*. Color everywhere nearly uniform pale salmon; tentacles more yellowish. The dentition is peculiar and distinguishes it easily from both our other species. Median tooth stout, smooth, entirely destitute of lateral denticles; its free portion, in a dorsal view, is broad-triangular, almost as broad as long, acute at tip; base transversely elliptical, a little broader than the free portion. Lateral teeth about ten on each side, slender, the outer two or three shorter, blunt or subacute; the others are successively longer and larger, and each has a more acute and more oblique tip than those that precede it, except the inner one, which has a shorter tip, with longer spinules. These lateral teeth are rather suddenly curved inward where they begin to taper, and beyond the curve the tip becomes nearly straight again, and very acute, while the anterior edge of the curvature is covered with slender, sharp spinules.

The dentition of this species is very different from that of *D. robustus* and *D. arborescens*. Both of these have the median teeth serrated, and different in form; the latter has broader and less acute lateral teeth.

Off Cape Cod (station 330), 26 fathoms, September 6, 1879.

Doris complanata Verrill.

Amer. Journ. Sci., xx, p. 399, Nov., 1880.

Body depressed, broad-elliptical, well rounded, both in front and behind, the mantle extending much beyond the foot all around, its edge usually undulated. The lower side of the mantle is stiffened with spicules; upper surface slightly convex, nearly smooth, but covered with small, rather distant, and but slightly prominent, conical elevations. Dorsal tentacles large, stout, subclavate (not seen in full extension), with very numerous, crowded, thin, high, lamelliform plications or folds over the entire upper portion; retractile into cavities having plain, sharp edges Gills large, the two lower, on each side, partially confluent at base, bipinnately and tripinnately divided, retractile into a large common cavity, which has plain edges. Anal papilla a prominent, cylindrical tube in the center of the branchial wreath. Foot relati /ely small, obtusely rounded posteriorly, emarginate in front, and with a transverse sulcus on the front edge. Head small, rounded in front, with a free, short, thick, ovate tentacle on each side. Odontophore broad, with about seventy to eighty rows of teeth; no median teeth; about twenty-two to twenty-four lateral teeth, on each side, are stout, hook-shaped, with sharp points, and a slight lobe on the outer curvature and another on the inner side; outside of these there are twelve or more shorter, flattened teeth, with obtuse or rounded, incurved, and sharply denticulated or spinulated ends; the outermost teeth are smallest. Length, 50^{mm}; breadth, 25^{mm}.

Color, above, dull yellowish brown to dusky brown, irregularly finely specked and blotched with dark brown; gills dark brown.

About 70 miles south of Martha's Vineyard, station 872, in 85 fathoms, among sponges (eleven specimens).

This large species is closely related to *D. Johnstoni* and *D. planata* of Europe. It differs from both in its dentition, in having stouter and blunter dorsal tentacles, with more numerous lamellæ, and in having shorter and blunter oral tentacles.

Polycerella Verrill, gen. nov.

Body elongated-ovate, having the same form as *Polycera*. Mantle little developed. Dorsal tentacles (rhinophores) not laminated and not retractile, without sheaths. A row of papillæ along each side of the back, extending beyond the gills. Gills three, pinnate, situated in the middle of the back, nearly as in *Polycera*. Foot auricled. Odontophore with six rows of teeth; median row absent; inner laterals large, curved, with three denticles; two outer rows much smaller, simple, hook-shaped.

Polycerella Emertoni Verrill, sp. nov.

Body small, elongated-ovate, rather narrow, somewhat angular, about as high as broad, sometimes higher than broad, tapered and somewhat acute posteriorly, narrowed a little at the neck. Head high, convex above, sometimes bilobed, but often rounded in front, capable of changing its form to a great extent, the part in front of the dorsal tentacles being capable of considerable elongation and of contracting to a truncate form. Foot high and narrow, obtuse posteriorly, the anterior angles prolonged into short but prominent auricles, often curved backward and pointed, at other times short and blunt. Dorsal tentacles rather long, not retractile, but capable of considerable contraction; in extension their length is often equal to the breadth of the neck; they are fusiform or subclavate, blunt, smooth or showing only slight, transverse, irregular wrinkles, changeable in form, sometimes nearly cylindrical, at other times swollen in the middle or toward the tip. Edge of the mantle indicated only by a slight, often crenulated, ridge along each side and around the head. Above this edge there is a row of small papillæ, of which two on each side are in advance of the dorsal tentacles; two are opposite to them, and four or five on each side occupy the space between the tentacles and gills; a row of five or six, on each side, extends beyond the gills to near the end of the body, the posterior ones becoming very small. Behind the gills there are three or four pairs of larger and longer papillæ, situated more dorsally; of these the two pairs next to the gills are longest, and are often nearly equal to the dorsal tentacles in size and length; they are usually somewhat swollen in the middle and blunt at the tip. Two or three pairs of much smaller papillæ are situated on the back, in front of the gills. Gills three, narrow, elongated, pinnate, subplumose, not finely divided, curved backward, not retractile, about equal in length to the dorsal tentacles; the pinnæ are few, alternate, generally incurved, those toward the base more slender.

Color yellowish green to olive-green, varied with lemon-yellow, and blotched and specked with darker green or blackish; foot, tentacles, gills, and dorsal papillæ lighter greenish yellow, sparingly specked with dark green.

Length, 5^{mm} to 6^{mm}; breadth, 1^{mm}; height, 1.12^{mm}; length of rhinophores, $.88^{mm}$.

The odontophore is very minute. The teeth of the inner row, on each side, are relatively very large and long, stout, with the shaft bent backward and the end abruptly curved forward and divided into two sharp denticles; another sharp denticle is situated laterally, below the others. The two outer lateral rows of teeth are much smaller and less than half the length of the inner ones, nearly equal in size and form, simple, strongly curved forward, and very acute.

This species was first taken by the writer at Wood's Holl in September, 1875, at the surface, among eel-grass; and on hydroids from the piles of Long Wharf, New Haven, Conn., October, 1875. At Newport, R. I., it has been found several times by Mr. J. H. Emerton and the writer, in

July and August, on filamentous algæ, especially *Ceramium rubrum*, growing on the mooring buoys and piles of wharves in the harbor.

In confinement it often leaves the algæ and creeps at the surface of the water, foot upward.

The eggs of this species were laid in confinement, July 24, at Newport, R. I. They form a long, narrow, oblong or strap-shaped, white mass, attached by one edge to filamentous algæ; the eggs are arranged in numerous rows.

Coryphella nobilis Verrill, sp. nov.

A large and elongated species, with stout dorsal tentacles and large, flattened, pale-salmon dorsal papillæ. Foot broad, elongated, tapering and acute posteriorly; anterior angles considerably elongated, in the form of acute tapering processes, having a distinct longitudinal groove or fold. Head rather small, rounded, in front slightly convex or nearly straight, lower side concave. Oral tentacles very stout, flattened, gibbous near the end, with a small, somewhat upturned, round, acute tip. Dorsal tentacles (rhinophores) very large and stout, arising close together, longer than the oral ones, tapered, subacute, thickly covered with small, conical papillæ or warts. No eyes could be detected. Dorsal papillæ arranged in numerous transverse, oblique rows, each of eight to ten or more papillæ (except posteriorly); they are small and much crowded along the sides; the upper ones are much longer, stout, mostly flattened, widest beyond the middle, tapering to the lanceolate tip.

Color of foot and body translucent white; on the back there are visible, through the integument, salmon-colored vessels, running from one group of dorsal papillæ to another and connecting with their nuclei; the dorsal papillæ are pellucid white externally, with a pale-salmon nucleus, becoming paler and whitish near the tip; dorsal tentacles pale yellowish green; oral ones pellucid white.

Length, about 63^{mm}, or 2.5 inches; length of dorsal tentacles, 15^{mm} (.6 inch); of longest dorsal papillæ, 12^{mm} (.5 inch).

The odontophore has a central row of large teeth, with a moderately prominent, acute, central denticle, and usually six smaller denticles on each side; lateral teeth without distinct denticles on the edge, rather large, wide at the base, which is emarginate, the outer lobe extending further back, inner edge slightly wavy and uneven, but not denticulate.

Off Cape Cod, in 75 fathoms, mud and broken shells, 1879. One specimen only.

In form and color this species resembles *C. salmonacea*, but the latter, which occurs at Eastport, Me., has the dorsal papillæ more crowded, and its dentition is very different, for the lateral teeth are strongly denticulated along the edge to near the tip.

Coryphella Stimpsoni Verrill.

Cuthona Stimpsoni Verrill, Amer. Journ. Sci., xvii, p. 314; Trans. Conn. Acad., v, pl. 42, fig. 14.

The dentition of this species is peculiar, but agrees better with that

of *Coryphella* than with that of any of the related genera. It was originally referred to *Cuthona* on account of the lateral expansions of the head. The odontophore is remarkably high and narrow; the central teeth are dark brown, large, strong, with the median point very large, compressed, and curved forward, projecting far beyond the small, sharp, lateral denticles, of which there are usually eight or nine on each side; lateral teeth thin, pale, comparatively small, narrow, acute, without any denticles, or rarely with some very small ones near the base, which is rounded and but little expanded.

This species occurs from Massachusetts Bay to Halifax, Nova Scotia, and from low-water to 50 fathoms.

Facelina Bostoniensis (Couthouy) Verrill & Emerton.

This species has been very much misunderstood, and totally different species* have often been confounded with it. It is, however, very easily distinguished from all of our other species. It is the only known species from the New England coast that has the dorsal tentacles distinctly laminated or plicated.

It is a true *Facelina*, having only a single row of teeth, with the central denticle prominent.

It is common from above low-water to 20 fathoms, on *Obelia* and other hydroids, from Massachusetts Bay to Block Island and Newport, R. I. This season it occurred abundantly among *Obelia geniculata*, on *Laminaria*, off Block Island, in 18 to 20 fathoms, associated with large numbers of *Lamellidoris muricata*.

This species is very closely related to the European species, *Facelina Drummondii* (Thomp., 1843) and *F. elegans* (Alder & Hancock).

Facelina pilata (Gould) Verrill & Emerton.

In its dentition this species agrees closely with the preceding, having but a single row of teeth, of nearly the same form. It should be referred properly to *Facelina*, although it does not agree strictly with the diagnoses of that genus, especially in respect to the lamination of the dorsal tentacles, which are, in this species, nearly smooth. This character is, however, variable in this genus, the laminæ being very prominent in *F. coronata*, rudimentary in *F. elegans*, and absent in *F. pilata*.

Cratena Veronicæ Verrill, sp. nov.

Size moderate, about 25^{mm} in length, rather stout. Dorsal papillæ cylindrical, obtuse, moderately slender, arranged in twelve to fifteen regular transverse series on each side, the middle ones containing eight to ten or more papillæ; anterior groups smaller, situated well forward,

*The species described by Bergh (Anat. Bid. til Kundskab. om Æolidierne, p. 102, pl. 5 *a*, 1864) under the name of *Coryphella Bostoniensis* is entirely distinct. It has three rows of teeth, and is closely related to *Coryphella Manancnsis* Verrill (Stimpson sp.), common on our northern coasts.

in front of the dorsal tentacles. Oral and dorsal tentacles nearly equal in length, moderately long, tapered, blunt. The dorsal tentacles appear slightly wrinkled transversely. Eyes black, conspicuous, near together, just behind the bases of the dorsal tentacles. Foot narrow, with broad, rounded anterior angles. Head moderately large, its outline nearly semicircular in front, and projecting considerably in advance of the bases of the oral tentacles.

Color variable. In some specimens the nuclei of the dorsal papillæ and the biliary ducts from them are dark green, the nuclei appearing to be lobulated or floculent; the outer sheath is translucent whitish, with an interrupted streak of flake-white on the distal half, and with unequal specks and spots of the same scattered over the surface, while on the outer side, near the end, there is a patch of orange; tip translucent white. In front of the bases of the dorsal tentacles there is a dark green patch. Tentacles white.

In other specimens, taken at the same time, the nuclei of the dorsal papillæ were salmon-colored, but the subterminal patch of orange and the streak and specks of flake-white were as in the green variety; the body was translucent white; dorsal tentacles white, tinged or faintly reticulated with flake-white; oral tentacles with a streak of flake-white on the posterior side.

Odontophore narrow, with a single row of teeth; these have thirteen sharp denticles, the median one scarcely as long as those next to it; the anterior border of the tooth is nearly semicircular, with a notch on each side near the outer ends, which run backward, as short processes, somewhat enlarged and emarginate at the end.

Off Cape Cod (station 328), in 23 fathoms, among hydroids, September 6, 1879.

This species is nearest allied to *Cratena olivacea* (Alder & Hancock), but differs in the form of its teeth, as well as in its coloration. It is also allied to *Cratena viridis*, of Europe. In case either of the older names (*Carolina* and *Montagua*) be retained for this group, this species should be so named. But both of these names having been previously used for other genera, they should be discarded.

Cratena gymnota (Couthouy) Verrill & Emerton.

Montagua Gouldii Verrill, Invert. Viney. Sound, p. 667 (author's copies, p. 373), 1873.

This species, which is common on littoral hydroids, from Massachusetts Bay to New Haven, Conn., is a typical *Cratena* Bergh* (= *Cavolina* Alder & Hancock = *Montagua* auth.), and is very closely allied to *C. aurantiaca* (A. & H.) of Europe, with which its dentition agrees very nearly, even in minute details. In *C. gymnota* the coloration, also, is often similar to that of *C. aurantiaca*, but the dorsal papillæ are fewer

*In the excellent work of G. O. Sars this generic name has been, by some oversight, misapplied, in place of *Cuthona*, to include *C. nana*, which was the original type of *Cuthona* Alder & Hancock.

and longer, and their clusters are less numerous and less crowded. In case it be thought necessary to unite the two forms, Couthouy's name has priority.

Tergipes despectus (Johnst.) Alder & Hancock.

The genuine *despectus* was distinguished from *G. exigua* by Mr. J. H. Emerton, at Salem, Mass., in 1879, when he made characteristic drawings of both and preparations of the odontophores, which I have examined. During the present year he has found the former near Newport, R. I., on hydroids (*Obelia*) at low-water. The species described and figured by Gould (Binney's edition) under this name is really the *Galvinia exigua* Alder & Hancock, differing widely in its dentition, there being three rows of teeth, instead of the single row, seen in *Tergipes*. But the *T. despectus* of my report on Invertebrates of Vineyard Sound, 1873, was correctly named. Both species are found under the same conditions, but, according to Mr. Emerton, *G. exigua* is found in the spring and early summer, while *T. despectus* occurs later in the summer and in autumn.

Acmæa rubella ? (Fabr.).

Tectura rubella G. O. Sars, Moll. Reg. Arct. Norv., p. 121, pl. 8, figs. 5 *a*, *b*; pl. ii, fig. 11 (dentition).—Jeffreys, Ann. and Mag. Nat. Hist., for March, 1877, p. 231.

One specimen, without the animal, was dredged at station 894. It appears to agree closely with the species referred to, except that the apex is not obtuse, and its color is pale yellowish white. There is no sculpture except irregular and rather distinct lines of growth. The apex is acute, bent directly backward, and situated at about the posterior fourth. The base is oblong-oval. Length, 5.5^{mm}; height, 2.75^{mm}.

HETEROPODA.

Carinaria Atlantica Ad. & Reeve (?).

Fragments occurred at station 865. They may have belonged to *C. Mediterranea*.

Atalanta Peronii Lesueur.

D'Orbigny, Voy. Amér. Mérid., Moll., p. 171, pl. 12, figs. 1–15; Hist. l'Isle de Cuba, Moll., i, p. 102, 1853.

Near George's Bank, latitude 41° 25′ north, longitude 65° 5′ to 65° 30′ west (Messrs. S. I. Smith and O. Harger, 1872).

PTEROPODA.

Although the Pteropods are all, properly speaking, oceanic species, it is undoubtedly true that a certain group of species will be found to be characteristic of the waters adjacent to each coast. Hitherto those observed and recorded from near the shores of New England have been chiefly northern or arctic species, which follow the course of the arctic current along our coast. For this reason, in the winter and spring, the beautiful *Clione papilionacea* is frequently found as far south as Vineyard

Sound and the shores of Rhode Island. The *Spirialis Gouldii* Stimp. is probably also an arctic species, and is very closely related to, if not identical with, *S. balea* of the Arctic Ocean.* There are, however, a few of the more tropical species that have been already recorded as occasionally cast ashore dead, upon the southern shores of New England. Of these *Diacria trispinosa* and *Cavolina tridentata* are the most common. Of the former, I have also received numerous examples, with the animal in good condition, obtained by Mr. Samuel Powell, at Newport, R. I., several years ago, from the stomach of a blue-fish. This season two living specimens of it were taken off Block Island by Messrs. V. N. Edwards and N. P. Scudder, of our party. The fresh shells of this species were dredged by us in 1871, near Martha's Vineyard, and this year we found it in abundance and perfectly fresh, in all our outer dredgings, 70 to 100 miles off shore. It was associated with *Diacria trispinosa* Gray and several other species, named below, but was far more numerous than any of the others. The following species are here introduced because of their common occurrence, evidently in large numbers, within a few miles of our coast. Several of them have not been recorded from so far north before, even in mid-ocean.

Cavolina longirostris (Les. MSS., Bv.) H. & A. Ad.

Hyalæa longirostris Blainv., Dict. Sci. Nat., xxii, p. 81.—Rang, Hist. Nat. Pterop., p. 41, pl. 2, figs. 7–10, 1852.

Carolina longirostra Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 8.

This small but elegant species occurred frequently in our dredgings, but not in large numbers (stations 867, 870, 876, 891, 894, &c.).

Cavolina uncinata (D'Orb.) Gray, 1850; H. & A. Ad.

Hyalæa uncinata D'Orb., 1836.—Rang, Hist. Nat. Pterop., p. 37, pl. 2, figs. 11–14, 1852.

This occurred in many localities, with the last. Our specimens differ from the figures referred to in having the median posterior spine more hooked and more abruptly bent, so as to make nearly a right angle with the shell.

Cavolina inflexa (Les.) Gray.

Hyalæa inflexa Lesueur; Blainv., Dict. Sci. Nat., xxii, p. 80.

One perfect and full-grown specimen from station 894.

Clio pyramidata Browne; Linné; Gmelin.

Cleodora pyramidata Peron & Les.; Lamarck.

Cleodora lanceolata Rang, Ann. des Sci. Nat., xvi, p. 497, pl. 19, fig. 1.

Clio pyramidata Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 12, 1850.

Several fresh but somewhat broken specimens of this species occurred at stations 865, 891 to 894.

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* It is very distinct from *S. retroversus*, to which Jeffreys has formerly referred it. Both the figure and description give it spiral lines, while the latter is very smooth. G. O. Sars identifies it with *S. balea*.

Balantium recurvum Children.

Journ. Roy. Inst., xv, p. 220, pl. 7, fig. 107, 1829.—Gray, Catal. Moll. Brit. Mus., Pteropoda, p. 14, 1850.

Cleodora balantium Rang, Mag. Zool., 1834; Hist. Nat. Pterop., p. 52, pl. 5, fig. 12; pl. x, fig. 7, 1852.

Fragments occurred at stations 865 and 869.

Styliola recta (Lesueur, MSS.) Blainv., Man. Mal., 1825.

Creseis acicula Rang, Ann. des Sci. Nat., I, xiii, p. 318, pl. 17, fig. 6, 1828.

Creseis clava Rang, Ann. des Sci. Nat., I, xiii, p. 317, pl. 17, fig. 5, 1828.

Creseis acus Esch., Zool. Atlas, iii, pl. 15, fig. 2, 1831.

Cleodora acicula Rang, Hist. Nat. Pterop., p. 56, pl. 7, figs. 5, 7, 1852.

Near George's Bank, latitude 41° 25′, longitude 65° 5′ to 65° 30′, September, 1872, at surface (Messrs. S. I. Smith and O. Harger).

Styliola virgula (Rang) Gray.

Creseis virgula Rang, Ann. des Sci. Nat., I, xiii, p. 316, pl. 17, fig. 2, 1828.

Cleodora virgula Rang, Hist. Nat. Pterop., p. 57, pl. 13, figs. 20–24, 1852.

Near George's Bank, with the preceding.

Spirialis MacAndrei Forbes & Hanley, ii, p. 384.

Spirialis retroversus (Flem.), variety *? MacAndrei*, Jeffreys, Brit. Conch., v, p. 115, pl. 4, fig. 4; pl. 98, fig. 5.—G. O. Sars, Moll. Reg. Arct. Norv., p. 330, pl. 29, figs. 3 *a–f*; pl. xvi, fig. 19 (dentition).

Several entire and perfectly fresh specimens occurred at station 894. They agree with the form called var. *MacAndrei* by Jeffreys.

Cymbulia calceolus Verrill.

Amer. Journ. Sci., xx, p. 394, Nov., 1880.

Test thick, transparent, broad-ovate or elliptical, rounded at both ends, covered, above and below, with low, rounded verrucæ; aperture large, occupying more than half the length of the test, broad-ovate, posterior margin nearly straight; edges simple, unarmed. Animal pale pink, with a brown nucleus; fins very large, connate, broadly rounded; their outline taken together forms a long ellipse, considerably longer and somewhat broader than the test. Length of test of a medium-sized specimen, in alcohol, 19^{mm}; breadth, 11^{mm}; expanse of fins, 23^{mm}; their breadth, 12^{mm}. The largest specimens have the test about 40^{mm} long, 20^{mm} broad. Stations 865 to 872 (near the surface), common; about 30 miles east-southeast of Block Island, at surface, October 2, 1880 (Messrs. Scudder and Edwards).

Halopsyche Verrill, nom. nov.

Psyche Rang, 1825 (*non Psyche* Linné, 1735, *nec Psyche* Schrank, 1801).

The name *Psyche* having been twice used before it was employed by Rang, it will be necessary to substitute another name for this genus of Pteropods. I therefore propose *Halopsyche*.

The type, and only known species, *Halopsyche globulosa* (Rang), inhabits the waters of Newfoundland and Nova Scotia.

SOLENOCONCHA.

Dentalium occidentale Stimp.

Shells of New England, 1851 (based on *D. dentale* Gould, 1st ed., p. 155, fig. 5, *not* of European authors).

Dentalium dentale Gould, Invert. of Mass., 2d ed., p. 236.

Dentalium abyssorum M. Sars, 1858.

Dentalium striolatum Jeffreys (*non* Stimpson).

Antalis striolata G. O. Sars, Moll. Reg. Arct. Norv., p. 101, pl. 7, fig. 1; pl. 20, figs. 10 *a, b*; pl. i, figs. 1 *a–e*, dentition (*non* Stimpson sp.).

This species is abundant on muddy bottoms, in 50 to 300 fathoms, all along the coast of New England and Nova Scotia.

Mr. Jeffreys, misled by a singular and unaccountable mistake, has constantly applied to this sulcated species the name given by Stimpson to our common, shallow-water, *nearly smooth form*. In this mistake G. O. Sars and others have followed him.

The question as to the *specific* distinctness of these two forms I do not propose to discuss at this time, but it is equally desirable that the respective *names* should be correctly applied, whether we regard the forms as varieties or species. Of *D. striolatum*, I have dredged thousands of specimens in shallow water in the Bay of Fundy, in the same region where Stimpson's original specimens were taken, and among them no specimens of "*D. occidentale*" are to be found. In other localities, however, both species occur together. Both were taken this season on the outer banks, off Newport. But *D. occidentale* was by far the most common, and was abundant in the deeper stations, where *D. striolatum* did not occur at all.

Among the specimens taken by us there are many that are more strongly ribbed and sulcated than usual, the ribs being more or less angular and elevated. In some of these, which are slender and about an inch long, the internal surface of the shell has grooves corresponding to the external ribs, the shell being thin, but of uniform thickness, so that the two surfaces are parallel. In others of the same size the bore of the shell is smooth and round, the shell being thickened opposite the ribs. I am not prepared, however, to say that this is anything more than a varietal difference.

The form of the posterior notch varies in all our species (or varieties) from a shallow notch to a triangular cut, and even to a deep slit.

Siphonodentalium vitreum Sars.

G. O. Sars, op. cit., p. 103, pl. 7, figs. 2 *a–e*; pl. i, figs. 2 *a–f* (dentition).—Verrill, Trans. Conn. Acad., v, pl. 42, fig. 19.

A fine, large specimen, probably belonging to this species, was dredged by the party on the "Bache", in 1873, in the Gulf of Maine (station 12 B), in 60 fathoms, mud.

The shell is smooth, round, very thin, transparent, and lustrous. It is slightly curved and expands gradually to the anterior end. The posterior opening is small and round, without lobes, but it probably has

been broken off squarely. Length, 12mm; diameter of larger end, 2.5mm; of small end, .5mm.

Another specimen of similar character, 10mm long and 2.5mm broad, was dredged in the Gulf of Maine, 107 fathoms (station 9 B), 1873. With the last-named specimen there was, however, a perfect living specimen, 7mm long and 2mm broad, having the posterior end perfect and provided with the characteristic digitations around the opening.

Siphonentalis affinis (Sars).

G. O. Sars, op. cit., p. 104, pl. 20, fig. 12.—Verrill, Trans. Conn. Acad., v, pl. 42, figs. 20 *a–b*.

A specimen smaller and more slender than the preceding species, and which I refer to *S. affinis*, was dredged by us, in 1877, in Bedford Basin, near Halifax, Nova Scotia, 35 fathoms, soft mud. It is 6mm in length, 1mm in breadth, slightly curved, round, smooth, glossy, and translucent. The posterior opening is small and appears to be perfect; it shows only a faint indication of a notch on the convex side.

Siphonentalis Lofotensis (M. Sars).

G. O. Sars, Moll. Reg. Arct. Norv., p. 104, pl. 20, figs. 11 *a*, *b*; pl. i, fig. 3.

A few specimens that agree well with the figures and description of this species were taken at station 891, in 500 fathoms.

It is longer and more tapered than the last, and much less translucent.

Cadulus propinquus G. O. Sars.

Moll. Reg. Arct. Norv., p. 106, pl. 20, figs. 15 *a*, *b*; pl. i, fig 5 (dentition).

This shell occurred in considerable numbers, living, at station 871, in 115 fathoms. It is a small, polished species, rather stouter and more swollen than the next.

Cadulus Jeffreysii Monterosato.

Cadulus subfusiformis? Jeffreys, British Conch., v, p. 196, pl. 101, fig. 3 (*non* Sars, teste Monter.).

Several specimens of a small *Cadulus*, somewhat swollen in the middle and rather strongly bent, I refer to the above species. The posterior aperture is simple in most of them, but slightly notched in others.

Station 871.

Cadulus Pandionis Verrill & Smith.

Amer. Journ. Sci., xx, p. 397, Nov., 1880.

A very much larger, highly polished species occurred at many of the stations, but most abundantly at 869 to 871 and 873 to 877 in 85 to 192 fathoms. It is swollen on the convex side, in the middle, and slightly angulated or gibbous at about the anterior third. It is transversely elliptical in section; the anterior end decreases to the aperture, which is oblique, the lip being prolonged on the concave side. Posterior aperture small, with a semicircular notch above and below. Length, 10mm; breadth, 2.25mm; of mouth, 1.75mm; of posterior aperture, .40mm.

LAMELLIBRANCHIATA.

Poromya granulata (Nyst) Forbes & Hanley.

G. O. Sars, op. cit., p. 90, figs. 6 *a, b.*—Verrill, Trans. Conn. Acad., v, pl. 44, figs. 3, 4.

Several adult living examples of this shell were dredged in 1872 by Dr. A. S. Packard and Mr. C. Cooke, on the Coast Survey steamer "Bache", in the Gulf of Maine, in 150 fathoms, mud. This season it was taken at station 865, in 65 fathoms. It has not previously been recorded as American.

In form and size it somewhat resembles *Thracia myopsis*, but is easily distinguished by the small granules scattered over the exterior, and by the peculiar hinge, very different from that of *Thracia*. The right valve has a prominent, recurved, cardinal tooth. On the European coast it ranges from the Lofoden Islands to the Mediterranean, in deep water.

Poromya rotundata Jeffreys.

Annals and Mag. Nat. Hist., Dec., 1876, p. 494 (Valorous Expedition, Mollusca).

Shell rounded, thin, translucent, pearly within. External surface closely covered with small, rounded, obtuse granules, arranged mostly in close quincunx, and distinctly forming radiating lines, but in some parts appearing to be also in concentric lines. The narrow intervals between these lines of granules show the iridescent surface of the shell. These granules give a shagreen-like appearance to the shell. The granules show through on the inside, giving a finely tessellated appearance. The shell is but little longer than broad, convex; ventral and anterior edges evenly rounded; posterior dorsal edge a little sloping, and forming an obtusely rounded angle where it meets the curvature of the posterior end. Hinge of right valve with a prominent conical tooth, fitting into a corresponding pit in the left valve.

South of Martha's Vineyard, stations 865 and 871, 65 to 115 fathoms, living; North Atlantic, 1,450 fathoms (Jeffreys).

Lyonsiella abyssicola M. Sars; Friele.

Pecchiolia abyssicola G. O. Sars, Remarkable Forms Anim. Life, i, p. 25, pl. 3, figs. 21–43; Moll. Reg. Arct. Norv., p. 108, pl. 20, figs. 5 *a–d.*

A few good living specimens of this interesting addition to the American fauna were dredged by our party this season, south of Martha's Vineyard and Newport, in 192 to 500 fathoms, fine, compact sand and mud (stations 869, 880, 891, 892, 894).

Lyonsiella gemma Verrill, sp. nov.

Shell small, iridescent, white, with raised radii, broad-oval, widest and broadly rounded anteriorly, expanded and broadly rounded ventrally, posterior end short, narrowed, and tapered to an obtuse point. The beak is subcentral, but a little nearer the anterior end, prominent, inflated, strongly curved inward and forward. Dorsal margin abruptly incurved opposite the beaks and decidedly expanded and excurved in

front of them, so as to rise nearly to a level with the umbos; internally, opposite the tips of the beaks, there is a smooth swelling within the margin. Hinge margin thin, toothless, but with an internal scar behind the beaks, where the ligament and ossicle were attached (the ligament is gone). Palial sinus very small, angular. Shell less thin than in the preceding species. Sculpture numerous, very delicate, slightly raised lines, which radiate from the beaks over the whole surface; they are separated by much wider interspaces, which are smooth and iridescent, and not at all excavated. Length, 4.5^{mm}; height (beak to ventral margin), 4^{mm}.

One perfect specimen, station 892, 487 fathoms, associated with *L. abyssicola*.

From the latter it differs widely in shape, having nothing of the rectangular form so characteristic of that species; the latter is also much less expanded anteriorly and much more so posteriorly, being far more inequilateral and more elongated.

Kennerlia glacialis (Leach) Carpenter.

Pandora glacialis Leach, Rosse's Voyage, appendix, p. 174.—Leche, Kongl. Vetensk.-Akad. Handl., Band 16, p. 11, pl. 1, figs. 1 *a*, *b*, 1878 (author's copy).

Living specimens of this arctic shell were dredged at station 873, in 100 fathoms. It had previously been recorded from the Gulf of Saint Lawrence by Whiteaves, but was not known to occur on the New England coast. It differs widely from the common *Clidiophora trilineata* Cpr. (= *Pandora trilineata* Say), in the absence of the internal radiating ridges, in its more inequilateral and irregular form, and in the greater convexity of the upper valve. The lower valve is very flat, or even concave, and is marked externally with several distinct radiating lines.

Neæra glacialis.

G. O. Sars, op. cit., p. 88, pl. 6, figs. 8 *a–c*.—Verrill, Trans. Conn. Acad., v., pl. 44, fig. 10 *b*.

A form of *Neæra*, agreeing perfectly with this, is common on muddy bottoms, in 50 to 192 fathoms, off the coasts of New England and Nova Scotia. We have dredged it off Cape Cod, off Cape Ann, off Casco Bay, in the Bay of Fundy, and in numerous localities in the Gulf of Maine and off Nova Scotia, since 1872; and recently, south of Newport and Martha's Vineyard, in 65 to 500 fathoms. The larger specimens exceed an inch in length.

Among our numerous examples there is, however, considerable variation, both in the form of the shell and in the size and shape of the cartilage-pit and lateral teeth. Moreover, the variations in the hinge are not correlated with the differences in the breadth and length of the rostrum. Therefore, it seems to me probable that this shell should be considered merely a variation of *N. arctica*. The latter, in its typical form, occurs in the same localities and in about the same numbers, and

some examples grow to even greater size, being 1.25 inches long. In our specimens (see Trans. Conn. Acad., v, pl. 44, fig. 10 *a*) the rostrum is usually longer and narrower than in the specimen figured by Sars, approaching in this respect his figure of *N. glacialis*, but with the cartilage-pit as large and broad as in his *N. arctica*. In fact, the majority of our specimens may be described as intermediate between the two forms figured by Sars.

Neæra obesa Lovén (1846)=**N. pellucida** Stimpson (1852).

Associated with the preceding, in most of the localities named, I have found another form, often .5 of an inch or more in length, which I consider identical with *Neæra obesa* of Lovén, and which often agrees well with the figures of this species given by G. O. Sars, but with the rostrum more commonly somewhat shorter. The cartilage-pit has the same form as the one figured by Sars. The young of this shell is the *Neæra pellucida* of Stimpson, without doubt. I have repeatedly dredged it in his original locality.

Neæra obesa, as thus determined, is closely allied, in form and structure, to *N. arctica* and var. *glacialis*. Its texture is thinner, more delicate, more translucent, and smoother, or with less conspicuous lines of growth, and freer from adherent mud. These differences are not merely due to age, for I have examined both forms, of various sizes, from .10 of an inch or less, in length, up to the full-grown specimens.

The largest specimens of *N. obesa* are, however, rarely more than .50 of an inch in length. The shell is usually very swollen and ventricose, rather abruptly contracted posteriorly at the base of the rostrum, which is rather narrow and not very long, but varies considerably in length and breadth. The cartilage plate is prominent, and projects inward so as to form a distinct angle.

Neæra jugosa S. Wood.

G. O. Sars, op. cit., p. 88, pl. 6, figs. 9 *a–c*.

This species is easily distinguished from all others found on our coast by its concentric raised lamellæ. Station 894, 365 fathoms, off Newport, R. I.

Neæra rostrata (Spengler) Lovén.

G. O. Sars, op. cit., p. 89, pl. 6, figs. 7 *a*, *b*.

Several fine, large specimens of this species were dredged by us about 70 to 75 miles south of Martha's Vineyard, in 85 to 115 fathoms, and 90 to 100 miles south from Newport, R. I., in 120 to 500 fathoms. It is easily distinguished from the forms above mentioned by its very long and narrow posterior beak or rostrum, and by the oval form of the shell. It has a nearly smooth surface.

Neæra multicostata Verrill & Smith, sp. nov.

This is a large and very distinct species, easily distinguished from all others known on our coast by the strong radiating ribs which cover the

whole surface of the shell. The shell itself is rather large, swollen, subovate, well-rounded ventrally, but obliquely subtruncate anteriorly. Rostrum rather short, narrow, well defined, tapered; on the rostrum there are eight or nine rather broad, low, radiating costæ. The body of the shell is covered with regular, raised and strong, radiating costæ, over fifty in number, separated by deep grooves of about the same width as the costæ; anteriorly these ribs become small; posteriorly, near the base of the rostrum, five or six become much larger than the rest, and have smaller ones alternating with them.

Color yellowish white; in life rosy, from the internal organs showing through. Length, 19mm; beak to ventral edge, 12mm.

South of Martha's Vineyard, 115 fathoms; about 90 to 100 miles south of Newport, 85 to 120 fathoms, stations 871, 873, 874, 876, &c. Several living specimens of various sizes.

Cardium, sp.

A roundish species of *Cardium*, about 18mm in diameter, is represented by a single valve, in good condition. The surface is rather closely and regularly cancellated. The ribs are smooth, without scales or spines. It was taken at station 865.

Astarte crenata Gray.

Parry's Voyage, app.—Friele, Catal. Norv. Nordmeer-Exp. Spitzb., Möll., p. 267, 1879.

? *Astarte crebricostata* Forbes; Jeffreys; G. O. Sars; and other European writers.

Astarte crebricostata Gould, Invert., Mass., 2d ed., p. 126, fig. 440 (var. *lens*).

Astarte lens (Stimp., MSS.) Verrill, Amer. Journ. Sci., iii, p. 287, 1872.

Large numbers of specimens, which seem to agree closely with the typical arctic and deep-water form of this species, were taken at nearly all the stations, in 65 to 500 fathoms. It was most abundant at stations 880, 894, 895.

These form series that appear to graduate into the large, broad, flattened form to which the name *lens* has been applied, which is abundant in the Bay of Fundy and Gulf of Maine, in 50 to 150 fathoms.

The typical form is smaller, more swollen, with the edges more rounded, and less expanded posteriorly. All the forms have the edges regularly crenulated.

Cryptodon Sarsii (Phil.).

Axinus Sarsii G. O. Sars, op. cit., p. 60, pl. 19, figs. 5 *a*, *b*.

A single dead specimen of a shell agreeing very closely with this form, as figured by G. O. Sars, was dredged by our party, in 1879, off Cape Cod.

Crypton obesus Verrill.

Amer. Journ. Sci., iii, p. 287, pl. 7, fig. 2, 1872.

I may take this occasion to remark that Sars's figure (pl. 19, fig. 7) of *C. obesus* Verrill does not represent the large form described by me under that name, which is remarkable not only for its swollen form, but

also for its great height (from beak to ventral edge), as compared with its length, while the shell figured by Sars is broadly rounded, more like our typical *C. Gouldii*, of which I am inclined to consider it the adult state.

Very large and characteristic specimens of the typical *C. obesus*, several of them more than 15[mm] broad, but mostly dead, have been frequently dredged this season, off Newport, R. I., in 12 to 20 fathoms, and especially at stations 865–871, 873, 876, and 877, in 65 to 192 fathoms, south of Martha's Vineyard and Newport.

Cryptodon ferruginosus? (Forbes).

Axinus ferruginosus G. O. Sars, Moll. Reg. Arct. Norv., p. 63, pl. 19, figs. 10 *a*, *b*.

Living specimens were taken at station 871, in 115 fathoms. They were thickly incrusted with iron-oxide, which adheres very tenaciously; beneath this crust the shell is usually much eroded.

Loripes lens Verrill & Smith.

Amer. Journ. Sci., xx, p. 400, Nov., 1880 (published Oct.).

Shell rather thin, moderately convex, well rounded, nearly equilateral; beaks acute, a little prominent, curved forward; lunule small, deeply excavated, cordate; ligamental area long, narrow-lanceolate, a little sunken, so that the ligament scarcely rises to a level with its edges. The posterior dorsal outline of the shell is nearly straight or but slightly convex; the posterior end is very obtusely rounded or subtruncate, making a slight angle with the dorsal edge and a very obtusely rounded one with the ventral edge, which is evenly curved and continuous with the regularly rounded anterior end; dorsal edge in front of the beaks incurved. Surface rather smooth, especially toward the umbos, but with more or less numerous and irregular lines of growth, marked by thin and slightly raised lines, which become more regular and more conspicuous at each end of the shell, and especially posteriorly. A faint ridge runs from the beak to the posterior ventral angle. A slight undulation or depression (often obsolete) runs from the beak to the upper part of the anterior edge, bounding a small anterior dorsal area. Hinge without any distinct teeth. Anterior muscular scar elongated, somewhat sinuous; posterior one small, ovate. Shell usually yellowish white; young specimens, when living, are translucent, flesh-color, owing to the animal showing through. Length of the larger specimens, 14[mm]; breadth or height, 12.5[mm].

Dredged in 1879 in many localities off Cape Cod, in 50 to 100 fathoms; in 1880 common at nearly all the outer stations, in 65 to 192 fathoms (stations 865 to 877). Most of the specimens are dead, but fresh.

Tellimya ferruginosa (Mont.).

G. O. Sars, Moll. Reg. Arct. Norv., p. 70, pl. 20, figs. 1 *a–c*.

Montacuta ferruginosa Jeffreys, Brit. Conch., ii, p. 210; v, pl. 31, fig. 9.

Several living specimens from stations 892, 893, and 894, in 365 to 487 fathoms. They were all thickly coated with a brown ferruginous crust, beneath which the shell is usually eroded.

Leda unca Gould.

Proc. Bost. Soc. Nat. Hist., viii, p. 282, 1832.—Otia Conch., p. 239 (= ? *Leda acuta* Conrad, described as fossil).

Many of our specimens are much larger than the shells described by Gould and Conrad. Our larger specimens are 13^{mm} long, 8^{mm} broad.

This shell is rather strong and thick, oval, swollen, rounded anteriorly, but posteriorly narrowed to an acute, short, angular beak, at the base of which there is a slight incurvature of the ventral edge. The nearly straight posterior dorsal edge slopes regularly to the beak, and is somewhat compressed or keeled. The whole surface is covered with numerous prominent, regular, rounded, concentric ribs, separated by deep grooves of about the same width. On the posterior dorsal area these ribs are smaller, and are often nearly obsolete close to the edge.

Taken in considerable numbers, alive and dead, at many of the stations, both south of Martha's Vineyard and south of Newport, R. I., in 85 to 155 fathoms, especially at stations 871, 873, 874, and 876.

This species appears to be allied to *L. Messanensis* Cant. (= *L. acuminata* Jeff.), from deep water in the Mediterranean.

Leda pernula (Müller).

G. O. Sars, op. cit., p. 35, pl. 5, fig. 1 *a–d*.

A specimen that appears to be a typical example of this species was dredged by us in 1877, off Halifax, in 59 fathoms. It has a smooth, lustrous, yellowish-green epidermis. The concentric grooves are irregular and mostly obsolete, except anteriorly, where they are fine and close. The form is similar to that of *L. tenuisulcata*. Length, 23^{mm}; height, 10^{mm}.

Yoldia frigidia Torell.

Spitz. Moll., p. 148, pl. 1, fig. 3, 1859.—G. O. Sars, Moll. Reg. Arct. Norv., p. 39, pl. 4, figs. 11 *a, b*.

This species occurred at station 894. It had not previously been obtained off the New England coast, but had been dredged in the Gulf of Saint Lawrence, by Whiteaves, in 200 fathoms.

Arca glacialis Gray.

G. O. Sars, op. cit., p. 43, pl. 4, figs. 1 *a–c*.—Verrill, Trans. Conn. Acad., v, pl. 44, fig. 5.

This species has been dredged in numerous localities by the various dredging parties of the United States Fish Commission, since 1872, in the Bay of Fundy, Gulf of Maine, off Cape Cod, on George's and Le Have Banks, and off Halifax, Nova Scotia, at various depths from 90 to 430 fathoms; about 70 to 75 miles south of Martha's Vineyard, in 115 to 192 fathoms, and south of Newport, in 85 to 500 fathoms. It attaches itself to pebbles or gravel-stones by a small but strong ventral byssus.

The shorter and more rounded form, known as *Arca pectunculoides* Scacchi, also occurs on our coast, as well as the deformed variety called var. *septentrionalis* by G. O. Sars. These appear to me to be mere vari-

ations of *A. glacialis*. The shortest and most rounded forms that we have taken were dredged south of Martha's Vineyard and south of Newport, in 85 to 225 fathoms, this season.

Limopsis cristata (?) Jeffreys.

Ann. and Mag. Nat. Hist., 1876, p. 434; Proc. Zool. Soc. London, 1879, p. 585, pl. 46, fig. 8.

A few dead specimens, referred doubtfully to this species, occurred at stations 865 to 867 and at 870 and 871, in 65 to 155 fathoms.

Limopsis minuta (Philippi).

G. O. Sars, Moll. Reg. Arct. Norv., p. 44, pl. 3, figs. 5 *a–c*.

Limopsis borealis Jeffreys, Brit. Conch., ii, p. 164; v, p. 174, pl. 100, fig. 3.

This shell was taken in abundance, living, at stations 893, 894 and 895, in 238 to 372 fathoms; in smaller numbers at 891 and 892, in 487 to 500 fathoms; and sparingly at several other localities in 115 to 252 fathoms.

Modiola polita Verrill & Smith.

Amer. Journ. Sci., xx, p. 400, for Nov., 1880 (published Oct. 25).

Two living specimens were taken at station 895, in 238 fathoms.

Avicula hirundo (?) L., var. **nitida**, nob.

The shell is very inequivalve, the right shell being smaller and flatter, and much bent inward near its ventral edge. The form is very oblique, with the anterior ear small and short, in the left valve, and separated from the body of the shell by a slight incurvature of the edge, from which a depression runs to the beak; right valve with a shallow byssal notch. Posterior ala short, triangular, with a rounded incurvature of the posterior edge of the shell, separating it from the body of the shell, which is produced and rounded at the end. Surface nearly smooth, glossy, and somewhat iridescent, with regular but inconspicuous lines of growth, which on the anterior ears rise up into thin, wavy lamellæ.

Color translucent, pale yellowish, usually with a brown streak radiating from the beak to the outer edge.

Length, beak to outer edge, 13^{mm}; length of hinge-line, 11^{mm}; beak to end of posterior ala, 8^{mm}.

This shell was found in considerable numbers adhering to hydroids, in 65 to 192 fathoms, south of Martha's Vineyard (stations 865 to 867, and 869 to 873). In form it resembles the young *Avicula hirundo* of Florida and the West Indies. It is, however, much smoother and more lustrous than any specimens of that species which I have hitherto seen, and may well prove to be a distinct species, for which I would, in that case, propose the name *nitida*.

Limæa subovata (Jeffreys).

Lima subovata Jeffreys, Annals and Mag. Nat. Hist., Nov., 1876, p. 427.

Shell small, white, ovate, nearly equilateral, with the valves convex, much swollen in the middle; beaks prominent, incurved; hinge-line straight, shorter than the shell; ligament-pit narrow, elongated, lunate.

Sculpture very numerous (70 to 80 or more) radiating ribs, fine laterally, increasing in strength on each side to the middle, where there are two or three ribs considerably larger than the rest, with wider intervals; the ribs and intervals are crossed by fine, close, raised lines of growth.

Interior with radiating lines corresponding to the external ones. Length, 4^{mm}; height (beak to ventral edge), 7^{mm}; thickness, 4^{mm}. Station 880, 255 fathoms, scarce; 891 to 894, 365 to 560 fathoms, common.

Limæa gibba (=*Lima gibba* Jeffreys, op. cit., p. 428) also differs but little from our specimens.

Pecten fenestratus Forbes (?).

Report on Mollusca, &c., of Ægean Sea, p. 146, in Proc. British Assoc. for 1843.
Pecten inequisculptus Tiberi (teste Jeffreys).

A small, but elegantly colored and sculptured, inequivalve *Pecten* was taken living at station 872. This I refer doubtfully to the above-named, Mediterranean deep-water species. In our two examples the upper valve is finely and regularly cancellated, with fine radiating and concentric lines; the under valve is covered with fine, raised, concentric ribs only. Ears prominent. Color whitish and different shades of red and brown, irregularly mottled.

Pecten, sp. (near *P. opercularis*).

Fragments of a large and peculiar *Pecten* occurred at stations 873 and 874. They closely resemble, in sculpture, the *P. opercularis* of Europe, except that the large ribs are triangular and carinated at summit, instead of rounded. These large ribs are separated by equally wide, concave interspaces, which, like the ribs, are marked by slightly concave, radiating furrows, and the surface of these furrows is covered with thin, concentric, slightly raised, wavy plates, the waves being limited by the fine radiating ridges between the grooves. Interior of valves with broad, flat grooves, alternating with flat ribs of the same width. Color grayish white, the ribs pale reddish.

List of species enumerated in the preceding article.

[One asterisk signifies that the species is an addition to the New England or North American fauna; two, that it is a newly discovered species; E = European; G = Greenlandic; M = middle region of New England, or both north and south of Cape Cod; N = northern coasts of America (Cape Cod to Labrador); S = southern; O = oceanic; P = North Pacific.]

* *		*Heteroteuthis tenera* V.
*	G. E.	*Gonatus amœnus* (Möll.) Gray.
* *		*Calliteuthis reversa* V.
* *		*Alloposus mollis* V.
*	O. E.	*Argonauta Argo* Linné.
*	G. E.	*Bela Pingelii* (Möller).
*	N. E.	*Bela Sarsii* Verrill.
*	E. N.	*Bela tenuicostata* Sars.
	N. E.	*Bela Trevelyana* (Turton).
	N.	*Bela cancellata* (Migh.) St.
*	N. E.	*Bela impressa* Möreh.
*	N. G. E.	*Bela exarata* (Möller).
*	G. E.	*Bela rugulata* (Möller).
*	P. E.	*Bela simplex* (Middend.).
* *		*Bela hebes* Verrill.
* *		*Pleurotoma Agassizii* V. & S.
* *		*Pleurotoma Pandionis* V. & S.
* *		*Pleurotoma Carpenteri* V. & S.
* *		*Taranis pulchella* V.
*	E.	*Taranis Mörchii* (Malm) Jeff.
*	S.	*Marginella roscida?* Rav.
*	G. E.	*Tritonofusus latericeus* (Möll.) Morch.
* *		*Neptunea* (*Sipho*) *cælata* Verrill.

* * *Neptunea (Sipho) arata* Verrill.
* E. N. *Neptunea propinqua* (Alder).
* N. G. E. *Buccinum cyaneum* Brug.
* * *Nassa nigrolabra* V.
N. G. E. *Lunatia nana* (Möller).
* * N. *Lunatia levicula* V.
* * *Lamellaria pellucida* V.
* G. E. *Marsenina prodita* Bergh.
N. G. E. *Marsenina glabra* (Couth.) V.
* * N. *Marsenina ampla* Verrill.
* P. E. N. *Velutella cryptospira* (Middend.).
* G. E. N. *Trichotropis conica* Möller.
* * M. *Cingula harpa* Verrill.
* E. *Cingula turgida* (Jeff.) V.
* N. G. E. *Cingula Jan-Mayeni* (Friele) V.
* * *Lepetella tubicola* V. & S.
* * N. S. *Lovenella Whitcavesii* Verrill.
* E. *Truncatella truncatulus* (Drap.).
* * *Solarium boreale* V. & S.
* * *Scalaria Pourtalesii* V. & S.
* * *Scalaria Dalliana* V. & S.
* * *Scalaria*, sp.
* * *Acirsa gracilis* Verrill.
* N. E. *Aclis Walleri* Jeff.
* * N. S. *Aclis striata* Verrill.
* * *Calliostoma Bairdii* V. & S.
* * *Margarita regalis* V. & S.
* * *Margarita lamellosa* V. & S.
* * N. *Margarita*, sp.
* E. N. *Machæroplax bella* (Verk.) Friele.
* E. *Cyclostrema trochoides* (J.) Sars.
* E. *Assiminea Grayana* Leach.
E. *Eulima intermedia* Cant.
* E. *Eulima distorta* Desh.
N. S. *Turbonilla nivea* (Stimp.).
* * *Turbonilla Rathbuni* V. & S.
* * *Turbonilla formosa* V. & S.
* * *Turbonilla Smithii* Verrill.
* E. N. *Eulimella ventricosa* (Forbes).
* * *Odostomia (Menestho) sulcata* V.
N. E. *Odostomia unidentata* (Mont.).
* E. *Auriculina insculpta?* (Mont.) G. O. Sars.
* N. E. *Diaphana nitidula* (Lovén).
N. E. *Diaphana pertenuis* (Migh.) V.
* * *Diaphana gemma* V.
* E. *Diaphana comulus* (Desh.).
* E. *Amphisphyra globosa* Lovén.
N. S. *Amphisphyra pellucida* (Br.) Lovén.
N. *Cylichna Gouldii* (Couth.) V.
* * *Philine amabilis* Verrill.
* E. N. *Philine Finmarchica* Sars.
* E. N. *Philine fragilis* G. O. Sars.
* E. N. *Philine cingulata* G. O. Sars.
* * *Pleurobranchæa tarda* V.
* * N. *Dendronotus elegans* V.
* * *Doris complanata* V.
* * S. *Polycerella Emertoni* V.
* * N. *Corypheila nobilis* V.
N. *Corypheila Stimpsoni* V.
M. *Facelina Bostoniensis* (Couth.) V. & Em.
M. *Facelina pilata* (Gould) V. & Em.
* * N. *Cratena Veronicæ* V.
M. *Cratena gymnota* (Couth.) V. & Em.
* N. E. *Tergipes despectus* (Johnst.) A. & H.
N. E. *Galvinia exigua* A. & H.
* N. E. G. *Acmæa rubella* (Fabr.) Dall.
* O. *Atlanta Peronii* (Les.).
* O. *Carinaria Atlantica* Ad. & R.
* O. *Carolina longirostris* (Les.).
* O. *Carolina uncinata* (Gray).
* O. *Carolina inflexa* (Les.) Gray.
* O. *Clio pyramidata* Linné.
* O. *Balantium recurvum* Children.
* O. *Styliola acicula* (Rang).
* O. *Styliola virgula* (Rang).
* O. *Spirialis MacAndrei* Forbes & Han.
* * O. *Cymbulia calceolus* V.
N. *Halopsyche globulosa* (Rang) V.
N. E. *Dentalium occidentale* Stimpson.
* N. E. *Siphonodentalium vitreum* Sars.
* N. E. *Siphoncntalis affinis* Sars.
* E. *Siphoncntalis Lofotensis* G. O. Sars.
* E. *Cadulus propinquus* G. O. Sars.
* E. *Cadulus Jeffreysii* (Monteros.).
* * *Cadulus Pandionis* V. & S.
* E. *Poromya rotundata* Jeff.
* N. E. *Poromya granulata* (Nyst) Forbes & H.
* E. *Lyonsiella abyssicola* Sars.
* * *Lyonsiella gemma* Verrill.
* N. E. *Kennerlia glacialis* (Leach) Carp.
* N. E. *Neæra glacialis* G. O. Sars.
N. E. *Neæra arctica* Lovén.
N. E. *Neæra obesa* Lovén (= *N. pellucida* St.).
* E. *Neæra jugosa* S. Wood.
* E. *Neæra rostrata* (Speng.) Lovén.
* * *Neæra multicostata* V. & S.
* * *Cardium*, sp. ind.
* E. *Tellimya ferruginosa* (Mont.).
* E. *Cryptodon Sarsii* (Phil.).
M. *Cryptodon obesus* Verrill.
* E. *Cryptodon ferruginosus?* (Forbes).
* * N. S. *Loripes lens* V. & S.

N. E. *Astarte crenata* Gray (=*A. lens* Stimp.).
* S. *Leda unca* Gould.
* N. E. *Leda pernula* (Müll.).
* E. *Yoldia expansa* Jeff.?
* N. E. *Yoldia frigida* Torell.
* N. G. E. *Arca glacialis* Gray.
N. E. *Arca pectunculoides* Scacchi.
* E. *Limopsis cristata* Jeff.?
* E. *Limopsis minuta* (Phil.).
* * *Modiola polita* V. & S.
* S. *Avicula hirundo?* var. *nitida* V.
* N. E. *Pecten vitreus* (Gmel.) Wood.
N. E. *Pecten Hoskynsi* Forbes, var. *pustulosus* V.
* E. *Pecten fenestratus* Forbes?
* * *Pecten*, sp. (near *opercularis*).
* E. *Limæa subovata* (Jeff.) Monter.

PART III.—CATALOGUE OF MOLLUSCA RECENTLY ADDED TO THE FAUNA OF SOUTHERN NEW ENGLAND.

By A. E. VERRILL.

The following lists include 130 species of Mollusca that have recently been added to the fauna of Southern New England, mainly through the researches of the dredging party of the United States Fish Commission on the steamer "Fish Hawk". The greater portion of these, with several others undetermined or not yet described, were taken on September 4 and 13 and October 2, on the outer bank or slope, 70 to 115 miles south from Martha's Vineyard and Newport, R. I., in 65 to 500 fathoms. For a list of these localities see p. ——.

In these lists those species which were unrecorded from or entirely new to New England or to the northeastern coast of America are indicated by an asterisk; previously undescribed species by two asterisks; those known previously from our northern coasts have N prefixed; those from the middle parts of the coast have M, and are neither specially southern nor northern; those oceanic species belonging to the surface fauna have O prefixed; southern forms are designated by S; those that are also known from Europe are designated by E; those peculiar to America by A.

In the tables, living specimens are indicated by an *asterisk;* dead ones by a *dagger; m* signifies many; *sv*, several; *r*, rare; *l*, unusually large; *j*, young.

List of Mollusca from the outer banks previously unknown south of Cape Cod.

	Stations	865 to 867	872 to 874	870 to 878	869	879 880 895	893 894	891 892
	Depths in fathoms	64 to 65	85 to 100	115 to 155	192	225 to 252	365 to 372	487 to 500
	CEPHALOPODA.							
**	Calliteuthis reversa Verrill	.....	.....	.....	.....	.....	* 1	.....
**	Heteroteuthis tenera Verrill	* m.	* m.	* m.	* m.	* sv.	.....	.....
N. A.	Rossia sublevis Verrill	.....	.....	* 2	* sv.	* 3	* 2	.....
N. E.	Octopus Bairdii Verrill	.....	*	* sv.	* sv.	* sv.	* sv.	* 1
**	Alloposus mollis Verrill	.....	.....	.....	.....	* 3	* 2	* 1
* O. E.	Argonauta Argo Linné	†	.....	†	.....	.....	.....	† 3

List of Mollusca previously unknown south of Cape Cod—Continued.

	Stations	865 to 867	872 to 874	870 to 878	869	879 880 895	893 894	891 892
	Depths in fathoms	64 to 65	85 to 100	115 to 155	192	225 to 252	365 to 372	487 to 500
	GASTROPODA.							
N. E.	Admete Couthouyi Jay (= A. viridula Gld.)	.....	.....	* sv.	* m.	* sv.	* sv.	* m.
**	Pleurotoma Pandionis V	.....	.....	.....	.....	* 1	.....	.....
**	Pleurotoma Agassizii V. & S	.....	† 1	*†	† 1	* sv.	* m.	* m.
**	Pleurotoma Carpenteri V. & S	.....	*†	* 2	.....	.....	.....	.....
* N. E.	Bela impressa Mörch (27 to 29 fathoms)	.....	.....	.....	.....	.....	.....	.....
* N. E.	Bela tenuicostata Sars	.....	.....	.....	.....	.....	* 3	.....
* N. E.	Bela simplex Midd. (smooth)	.....	.....	.....	.....	.....	† 1	.....
**	Bela hebes Verrill	.....	.....	.....	.....	.....	.....	* sv.
N. E.	Bela violacea (Migh.) Ad. (27 to 29 fathoms)	.....	.....	.....	.....	.....	.....	.....
N. E.	Bela exarata (Möll.) Ad	.....	.....	.....	.....	* 1	* 2	* 1
**	Taranis pulchella V	.....	.....	.....	.....	.....	.....	* 1
* N. E.	Taranis Mörchii Sars	.....	.....	.....	.....	.....	† 2	.....
*?S.	Marginella roscida? Rav	† 1	.....	.....	.....	.....	.....	.....
N. A.	Neptunea decemcostata (Say) Ad	† 1	.....	† sv.	.....	.....	.....	.....
* N. E.	Neptunea propinqua (Alder)	†	† sv.	* m.	* m.	* m.	* m.	.....
**	Neptunea arata V. & S	.....	† sv.	* sv.	* sv.	†	* 1	.....
**	Neptunea cælata V	.....	.....	.....	.....	* sv.	* m.	* m.
* N. E.	Tritonofusus latericeus (Möll.) Mörch	.....	.....	.....	.....	* sv.	† sv.	.....
**	Nassa nigrolabra V	.....	.....	* 1	.....	.....	.....	.....
N. E.	Anachis costulata (Cant.)	.....	.....	.....	* m.	* sv.	* m.	.....
N. E.	Lunatia Grönlandica (Möll.) Ad	.....	† 1	† sv.	† sv.	† sv.	* sv.	.....
N. E.	Lunatia nana (Möll.) (27 to 29 fathoms)	.....	.....	.....	.....	.....	.....	.....
** N.	Lunatia levicula V. (27 to 29 fathoms)	.....	.....	.....	.....	.....	.....	.....
**	Lamellaria pellucida V	.....	* sv.	* sv.	.....	.....	.....	.....
* N. E.	Cingula Jan-Mayeni (Friele) V	.....	.....	.....	.....	* 1	* m.	* m.
N. A.	Cingula carinata Migh	.....	* 2	* 2	.....	.....	.....	.....
** N.	Cingula harpa V	.....	.....	.....	.....	.....	† 2	* 1
* N. E.	Cingula turgida (Jeff.)	.....	.....	.....	.....	.....	.....	† 1
** N.	Lovenella Whiteavesii Verrill	.....	.....	.....	.....	.....	* 2	* sv.
N. A.	Aporrhais occidentalis Beck	.....	†	* m.	† 2	† 2	† 2	.....
N. E.	Torellia vestita Jeff	.....	† 1	* sv.	*†	.....	.....	.....
**	Lepetella tubicola V. & S	.....	.....	† 1	* m.	* 3	* m.	.....
* N. E.	Acmæa rubella (Fabr.)	.....	.....	.....	.....	.....	† 1	.....
*?	Scalaria Dalliana V. & S	.....	† 1	* sv.	* 3	.....	.....	.....
**	Scalaria Pourtalesii V. & S	.....	*†	† sv.	.....	.....	.....	.....
*	Scalaria (sp. ind.)	.....	* 1	.....	.....	.....	.....	.....
**	Acirsa gracilis V	.....	.....	.....	.....	.....	† 2	* 1
**	Solarium boreale V. & S	.....	.....	*†	.....	.....	.....	.....
** N.	Aclis striata V	.....	.....	† 1	.....	.....	.....	.....
* N. E.	Aclis Walleri J	.....	.....	.....	.....	.....	* 3	* 1
N. E.	Calliostoma occidentale (Migh.)	.....	.....	.....	.....	.....	* 1	.....
**	Calliostoma Bairdii V. & S	†	* m.	* m.	* m.	.....	.....	.....
**	Margarita regalis V. & S	.....	† sv.	.....	.....	* m.	* m.	* m.
**	Margarita lamellosa V. & S	.....	† 1	† 1	.....	.....	.....	.....
* E.	Cyclostrema trochoides (J.)	.....	.....	.....	.....	.....	* 2	† 2
N. E.	Puncturella noachina (L.) Lowe	.....	.....	.....	.....	* 1	.....	.....
* E.	Eulima intermedia Cantr	.....	.....	* sv.	.....	.....	.....	.....
* E.	Eulima distora Desh	.....	.....	* 1	.....	.....	.....	.....
N. A.	Turbonilla nivea (St.) Ad	.....	.....	* 1	.....	.....	.....	.....
**	Turbonilla Rathbuni V. & S	.....	.....	.....	* sv.	* sv.	* 1	.....
**	Turbonilla formosa V. & S	.....	.....	.....	.....	.....	.....	* sv.
**	Turbonilla Smithii V	.....	* 1	* sv.	.....	.....	.....	.....
**	Odostomia sulcata V	.....	.....	† 1	.....	.....	*	.....
N. E.	Odostomia unidentata (Mont.)	.....	.....	† 1	.....	.....	.....	.....
* E.	Auriculina insculpta? (Mont.) Sars	.....	.....	.....	.....	.....	.....	.....
* N. E.	Eulimella ventricosa Forbes	.....	* 1	.....	.....	.....	.....	.....
N. A.	Rissoina nitida V	.....	.....	* sv.	.....	* sv.	* sv.	† 2
N. E.	Scaphander puncto-striata (Migh.) Ad	.....	.....	* m.	* sv.	* m.	* m.	* sv.
* N. E.	Philine Finmarchica Sars	.....	*	.....	.....	.....	.....	.....
* N. E.	Philine cingulata Sars	.....	.....	.....	.....	.....	* 1	* 1
**	Philine amabilis V	.....	.....	* sv.	.....	.....	.....	.....
* E.	Amphisphyra globosa Lovén	.....	.....	† 4	.....	.....	† 3	.....
N. E.	Amphisphyra pellucida (Brown) Lovén	.....	.....	† 2	.....	.....	*1	.....
**	Diaphana gemma V	.....	.....	.....	.....	.....	.....	.....
* E.	Diaphana conulus (Desh.) V	.....	.....	* 1	.....	.....	.....	.....
* N. E.	Diaphana nitidula (Lov.)	.....	.....	.....	.....	.....	* 4	* sv.
N. E.	Diaphana pertenuis (Mighels)	.....	.....	*	.....	.....	† 1	.....
N. E.	Cylichna occulta (Migh.) Ad	.....	*1	† 1	.....	.....	* sv.	* sv.
**	Pleurobranchæa tarda V. (27 fathoms)	* m.	* m.	* m.	*	* 1	.....	.....
**	Doris complanata V	.....	* sv.	.....	.....	.....	.....	.....
* O.	Carinaria Atlantica Ad. & R	†	.....	.....	.....	.....	.....	.....

List of Mollusca previously unknown south of Cape Cod—Continued.

		Stations	865 to 867	872 to 874	870 to 878	869	879 880 895	893 894	891 892
		Depths in fathoms	64 to 65	85 to 100	115 to 155	192	225 to 252	365 to 372	487 to 500
		PTEROPODA.							
**		Cymbulia calceolus V.	.....	.....	*	.....	* m.	.....	* 2
*	O.	Cavolina uncinata (D'Orb.) Gray	† 2	.....	† 2	.....	.....	† sv.	† 1
*	O.	Cavolina longirostris (Les.)	† 1	.....	† sv.	.....	.....	† sv.	† sv.
*	O.	Cavolina inflexa (Les.) Gray	.....	.....	.....	.....	.....	.....	† 1
*	O.	Clio pyramidata Linné	† 1	.....	.....	.....	.....	† 2	† 2
*	O.	Balantium recurvum Children	† 1	.....	.....	† 1	.....	.....	.....
*	O.	Spirialis MacAndrei Forbes	.....	.....	.....	.....	.....	† 3	† sv.
		SOLENOCONCHA.							
N.	E.	Dentalium occidentale Stimp. (=D. abyssorum Sars)	.....	† 2	* sv.	* sv.	*†	* sv.	* m.
*		Dentalium (slender var)	.....	.....	.....	.....	.....	† sv.	† sv.
**		Cadulus Pandionis V. & S	.....	* sv.	* m.	* sv.	.....	† 2	† 1
*	E.	Cadulus Jeffreysii (Monteros.)	.....	.....	* m.	.....	.....	.....	.....
*	E.	Cadulus propinquus G. O. Sars	.....	.....	* sv.	.....	.....	.....	.....
N.	E.	Siphonodentalium vitreum Sars	.....	.....	.....	.....	.....	.....	† 1
* N.	E.	Siphonentalis Lofotensis Sars	.....	.....	.....	.....	.....	.....	† 2
		LAMELLIBRANCHIATA.							
N.	E.	Saxicava Norvegica (Speng.) Woodw	.....	†	†	.....	.....	.....	.....
N.	E.	Cyrtodaria siliqua (Speng.) Woodw	†	.....	†	.....	.....	.....	.....
* N.	E.	Poromya granulata (Nyst) F. & Han	* 1	.....	.....	.....	.....	.....	.....
* N.	E.	Poromya rotundata Jeff	* 2	.....	* 1	.....	.....	.....	.....
N.	E.	Neæra obesa Lovén (=N. pellucida St.)	* sv.	* m.	* m.	* 1	.....	* sv.	* m.
N.	E.	Neæra arctica Lovén	.....	.....	.....	* sv.	* m.	* sv.	.....
* N.	E.	Neæra glacialis G. O. Sars	.....	.....	.....	* sv.	* sv.	* m.	* 2
*	E.	Neæra rostrata (Speng.) Lovén	.....	* sv.	* sv.	.....	.....	* sv.	†
*	E.	Neæra jugosa S. Wood	.....	.....	.....	.....	.....	* 2	.....
**		Neæra multicostata V. & S	.....	* sv.	* sv.	.....	.....	.....	.....
*	E.	Lyonsiella abyssicola Sars	.....	.....	.....	* 2	* 1	* sv.	* sv.
**		Lyonsiella gemma V	.....	.....	.....	.....	.....	.....	† 1
* N.	E.	Kennerlia glacialis (Leach.) Carp	.....	* 2	.....	.....	.....	.....	.....
N.	E.	Cardium Islandicum Linné	† sv.	.....	.....	.....	.....	.....	.....
**		Cardium, sp. n. (cancellated)	.....	.....	† 1	.....	.....	.....	.....
**	N.	Loripes lens V. & S	† m.	* m.	* m.	† 1	.....	.....	.....
*	E.	Cryptodon ferruginosus (Forbes)	.....	.....	*	.....	.....	* sv.	* sv.
*	E.	Tellinya ferruginosa (Mont.)	.....	.....	.....	.....	.....	* sv.	* sv.
N.	E.	Astarte crenata Gray (= A. lens St., var.)	* m.	* m.	* m.	* sv.	* m.	* m.	* 1
N.	E.	Nucula delphinodonta Mighels	.....	* sv.	* sv.	.....	* 1	* sv.	.....
*	E.	Yoldia expansa Jeff. (?)	.....	.....	.....	.....	.....	* 2	.....
N.	E.	Yoldia lucida Lovén	.....	.....	*	* sv.	* sv.	* m.	* 2
* N.	E.	Yoldia frigida Torell	.....	.....	.....	.....	..	* sv.	.....
N.		Yoldia thraciformis (Storer) Stimp	.....	.....	† 1	* sv.	* sv.	.....	.....
*	S.	Leda unca Gld	† sv.	* m.	* m.	.....	.....	.....	.....
*	E.	Limopsis cristata Jeff. ?	† 1	.....	† 3	.....	.....	.....	.....
*	E.	Limopsis minuta (Phil.)	.....	.....	* sv.	.....	* m.	* m.	* 3
N.	E.	Arca glacialis Gray	.....	* m.	* m.	* m.	* m.	* m.	* sv.
N.	E.	Arca pectunculoides Sc. (? var. of last)	.....	* m.	* m.	.....	.....	* m.	.....
N.	E.	Arca, var. septentrionalis	.....	.....	*	.....	.....	* sv.	.....
**		Modiola polita V. & S	.....	.....	.....	.....	* 2	.....	.....
N.	E.	Crenella decussata (Mont.) Macg	* r.	.....	* r.	.....	.....	.....	.....
N.	E.	Dacrydium vitreum (Möll.) Torell	.....	.....	.....	.....	.....	* m.	* m.
*	S.	Avicula hirundo? var. nitida V	* m.	* 2	* 2	* 1	.....	.....	.....
N.	E.	Pecten Islandicus Müller	.....	† r.	† sv.	.....	.....	.....	.....
**		Pecten (near opercularis)	.....	.....	†	.....	.....	.....	.....
* N.	E.	Pecten vitreus (Gmel.) Wood	* r.	.....	† sv.	* sv.	* m.	* m.	.....
* N.	E.	Pecten vitreus, var. abyssorum	.....	.....	.....	.....	*	*	.....
N.	E.	Pecten Hoskynsi Forbes, var. pustulosus V	.....	.....	* 1	.....	.....	* r.	.....
*	E.	Pecten fenestratus Forbes? = inequisculptus Tib	.....	* 1	* 1	.....	.....	.....	.....
*	E.	Limæa subovata (Jeff.) Monteros	.....	.....	.....	.....	* 1	* m.	* sv.
		BRACHIOPODA.							
N.	E.	Terebratulina septentrionalis (Couth.) (789 sv.)	.....	.....	.....	* 1	.....	* m.	.....

List of Mollusca from the outer banks previously known from the shallow waters south of Cape Cod.

	Stations	865 to 867	872 to 874	870 to 878	863	879 880 895	893 894	891 892
	Depths in fathoms	64 to 65	85 to 100	115 to 155	192	225 to 252	365 to 372	487 to 500
	CEPHALOPODA.							
N. A.	Ommastrephes illecebrosa (Les.) V	* 1					* 2	
	GASTROPODA.							
N. E.	Bela pyramidalis (Ström)							
N. E.	Buccinum undatum Linné			† 1				
N. A.	Neptunea Stimpsoni (Mörch)		† 1					
N. A.	Siphonella pygmæa (Gld.) V	†	† m.	* m.	* sv.	* sv.	* m.	
M. A.	Tritia trivittata (Say) Ad		* 1					† 1
N. E.	Astyris rosacea (Gld.) Ad	† 2	*	* m.	* 1			
N. A.	Astyris zonalis (Lins.) V			* m.			* m.	* m.
N. E.	Natica clausa Brod. & Sowerby			† sv.	† 2	* sv.	* sv.	* sv.
S. A.	Neverita duplicata (Say) Stimp			† 1				
M. A.	Lunatia heros, var. (wide umb.)		*†	† sv.		†		
M. A.	Lunatia heros, var. triseriata (Say)	† 1	† 1	† 3				
M. A.	Crucibulum striatum (Say) Ad		† 1	† 1				
M. A.	Crepidula plana Say			† 1				* † 2
N. E.	Machæroplax obscura (Couth.) Friele				† 1		* sv.	
S. A.	Turbonilla interrupta? Ad		† 1					
N. E.	Philine quadrata (Wood) Forb. & Han			† 1				* 1
N. E.	Cylichna alba (Brown) Lovén			* sv.			†	
N. E.	Dendronotus robustus V				* 1			
	PTEROPODA.							
O. E.	Cavolina tridentata Gray	†	† sv.	† m.	† sv.	† m.	† sv.	† m.
O. E.	Diacria trispinosa Gray	†		†			†	† sv.
	SOLENOCONCHA.							
N. E.	Dentalium striolatum Stimp			†				
	LAMELLIBRANCHIATA.							
N. E.	Teredo megotara Hanley		* m.			* m.		
M. A.	Ensatella Americana (Gld.) V	† 3						
M. A.	Clidiophora trilineata (Say) Carp	† 1		† 1				
M. A.	Periploma papyracea (Say) V		* 2	* sv.		* sv.		
M. A.	Thracia Conradi Couth	† sv.	† 2	† sv.				
M. A.	Spisula solidissima? Gray	† 1						
M. A.	Ceronia arctata (Con.) Ad	† sv.	† sv.	† sv.	*		† sv.	
N. E.	Macoma sabulosa (Speng.) Mörch		† 1	† sv.				
N. E.	Cyprina Islandica (Linné) Lam		† 1	* sv.				
M. A.	Callista convexa (Say) Ad		†					
M. A.	Cardium pinnulatum Conrad		†	* m.				
M. A.	Lucina filosa Stimp	† m.	†	* m.				
M. E.	Cryptodon Gouldii (Phil.) Stimp			*				
M. A.	Cryptodon obesus V	† sv.	† sv.	† m.	†			
M. A.	Solemya velum Say			† 1				
M. A.	Venericardia borealis (Con.) Carp	* m.	* m.	* m.	* 1†			
M. A.	Astarte castanea Say	†						
M. A.	Astarte quadrans Gld	?						
M. A.	Astarte undata Gld	† m.	* m.	* 1				
M. A.	Nucula proxima Say		* sv.	*		* sv.		
N. E.	Yoldia sapotilla (Gld.) Stimp	* sv.	* m.	* m.	†			
M. E.	Modiola modiolus (Linné) Turton			* 1				
M. A.	Crenella glandula (Totten) Ad	†						
M. A.	Pecten tenuicostatus Migh	* m.	* sv.	† sv.				
N. E.	Anomia aculeata Müll	* m.	* sv.	* sv.	*			

*List of recent additions to shallow-water Mollusca of Southern New England.**

Parasira catenulata Steenstrup. Oceanic. Mediterranean.

**Truncatula truncatulus* (Drap.). Littoral. European.

Littorina littorea. Littoral; abundant. European.

**Assiminea Grayana* Leach. Littoral. European.

Ancula cristata Lovén. Northern and European.

***Polycerella Emertoni* Verrill. Littoral.

Scyllæa Edwardsii Verrill. Littoral. Southern and oceanic.

Coryphella Mananensis (Stimp.) Verrill. Off Race Point, Long Island Sound, 40 fathoms.

Stiliger fuscata, (Gld.) Bergh. Massachusetts Bay.

Terebratulina septentrionalis (Couth.). Off Block Island, 15 fathoms. Northern.

DESCRIPTION OF A NEW SPECIES OF NEMICHTHYS (NEMICHTHYS AVOCETTA), FROM PUGET SOUND.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Nemichthys avocetta, sp. nov.

Color translucent white, the lower half of the body covered with small, round, black spots, sharply defined; among these some smaller spots. Belly near the median line black. Upper half of body plain, colorless. Pectorals and dorsal plain. Anal speckled.

Body band-shaped, but not strongly compressed; deepest in the middle, tapering behind to the long and very slender filament-like tail, and anteriorly to a very long and slender neck, which contracts immediately behind the head. Skin smooth. No lateral line.

Head proper small, short and rather broad; concave between the eyes, with two median ridges; full and broad behind the eyes, with three longitudinal ridges. Lower part of head narrow, sharp, so that the head would be triangular in a vertical section. Eye very large, vertically placed, its length one-third that of the head without snout. Nostrils each simple (two on each side), rather large, close in front of eye, without tube or flap. Maxillary extending to close behind the eye, the mandible somewhat farther. Jaws prolonged, becoming very slender, long, acuminate, needle-like at tip, somewhat recurved. Upper jaw the longer, and nearly four times the length of the rest of the head, being 7–8 times its greatest depth. Both jaws with small, very numer-

* Some of the species here included were discovered in 1875 and 1876, and have been recorded in the American Journal of Science. Those with an asterisk prefixed were first discovered on our coast this season, or else have not been previously recorded. For additional species, not included in my Report on Invertebrates of Vineyard Sound, &c., 1873, see American Journal of Science, x, pp. 40, 41, July, 1876.

ous, retrorse, close-set, sharp teeth. Jaws bony, their lateral surfaces with retrorse roughnesses. Head naked, covered with skin.

Gill-openings rather large, oblique, running downward and forward, separated by a rather narrow isthmus. Pectorals well developed, half longer than eye. No ventrals. Vent under middle of the length of the pectorals (when depressed); the anal fin beginning close behind it and extending to the tail; its rays soft and rather slender; the membrane delicate; its height greatest near the middle and anteriorly, where it is somewhat less than height of body, becoming obsolete on the long caudal filament. Dorsal similar to anal, but lower, beginning close behind the occiput and running to the tail.

Table of measurements.

	Inches	100ths of length.
Extreme length	21.40	100
Body:		
Greatest depth	.33	1.6
Depth at neck	.15	.8
Head:		
Greatest length	2.10	10
Greatest depth	.25	1.2
Length of snout	1.70	7.6
Diameter of orbit	.18	1
Anal:		
Greatest height	.28	1.3
Pectoral:		
Length	.30	1.5

The specimen which is the type of the present description was taken in May, 1880, in the harbor of Port Gamble, and was placed by its captor in the museum of the University of Washington Territory, at Seattle. The president of the university, Prof. A. J. Anderson, presented it to the United States National Museum. Its movements in the water are said to be extremely active.

Fishes of this type offer comparatively few specific characters, and we are able to separate this species from *Nemichthys scolopaceus* Rich. of the Atlantic by differences in proportion only. According to the detailed description and figure of the latter species given by Lowe and Brandt (*Leptorhynchus* or *Belonopsis leuchtenbergi*, Mém. Acad. St. Pétersb. Sav. Étrang., 1854, vii, 171–174), *Nemichthys avocetta* is distinguished by the much slenderer head, longer beak, and higher anal fin, the greatest height of the latter being nearly equal to the length of the pectoral and more than the depth of the head. So far as known to us, this is the first species of the genus thus far taken in the Pacific. A recent newspaper account of the capture of a sea-serpent at Victoria, British Columbia, perhaps refers to a second example of the same species.

SEATTLE, WASH., *June* 10, 1880.

DESCRIPTION OF A NEW SPECIES OF PARALEPIS (PARALEPIS CORUSCANS), FROM THE STRAITS OF JUAN DE FUCA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Paralepis coruscans, sp. nov.

Allied to *P. borealis* Reinh.

Head and body very elongate, compressed, almost ribbon-shaped, of uniform width throughout, and preserving its depth forwards to occiput and backwards to origin of dorsal fin. From the insertion of the dorsal the body is gradually narrowed to the very slender caudal peduncle, the base of anterior portion of anal projecting much beyond the ventral outline.

Abdomen compressed, subtrenchant.

Head long, wedge-shaped, its upper and lower outlines equally oblique. Snout very long and sharp, equaling half the length of the head, its tip on a line with the axis of the body. Eye large, its diameter one-third the length of the snout, placed high, with its upper margin on a level with the top of the head.

Head shaped somewhat as in *Sphyræna*. Jaws equal; gape very wide; maxillary reaching the vertical from the nostril; mandibular joint reaching the vertical from the anterior margin of the pupil.

Mandible closing inside the margins of the upper jaw, the latter being transversely much arched to receive it; tip of mandible fitting into an emargination between the intermaxillaries.

None of the teeth very large or fang-like. Intermaxillaries laterally with a single series of exceedingly minute teeth (as in *Engraulis*); anteriorly, however, on each side is a series of 4 or 5 rather long acicular teeth; the entire intermaxillary series is outside of the mandible in the closed mouth. Vomer with minute teeth. Palatine series long; the anterior teeth long and slender; the posterior short. Mandibular series working against the palatines; the teeth slender, distant, of different lengths.

Branches of the lower jaw transversely deeply concave. Maxillary and intermaxillary slender, intimately connected, sliding under a fold of the skin.

All the bones of the head very thin, flexible, membrane-like. Preorbital long, very narrow, arched, extending forwards from orbit, reaching maxillary midway of its length. Suborbital chain likewise narrow.

Head with numerous sharp ridges; two forwards from the orbit; two pairs on the top of the head, converging forwards. Orbital ring slightly raised. Preopercular margin very oblique. Opercle with concentric striæ and radiating lines.

Gill-openings very wide, extending forwards to vertical from nostril; isthmus anteriorly much compressed, thin and membrane-like, the gills of the two sides lapping over and meeting across the ridge. Mandibular rami and subopercles and interopercles of the two sides meeting below across the isthmus.

Gill-rakers similar on all the arches, short, immovable, much broader than long, each provided with 4 or 5 short needle-like spines. A slit behind fourth gill. Pseudobranchiæ developed, partly hidden by a fold of the membrane. Branchiostegals 7, the membranes overlapping anteriorly, as in the *Salmonidæ*.

Scales small, deciduous; those of the lateral line large, non-imbricate, plate-like, becoming smaller posteriorly, the series terminating abrubtly opposite middle of the base of the anal.

Fins all very small. Pectorals placed low, their length two-fifths that of the snout. Ventrals far back, entirely behind the dorsal, their distance from base of caudal half that from front of orbit. Distance from middle of dorsal basis to base of caudal half its distance from the tip of the snout.

Anal elongate, high anteriorly, its base terminating at a point distant one-half diameter of orbit from base of caudal. Adipose dorsal high and narrow, directly over the end of the anal.

Caudal small, widely forked, the middle rays two-fifths the length of longest. End of caudal peduncle emarginate, the caudal rays radiating from the upper and lower angles. (In the type specimen the two lobes of caudal are entirely separate, without trace of connecting membrane.) Rudimentary rays long, extending along upper and lower sides of caudal peduncle for a distance greater than diameter of orbit. Tips of adipose dorsal and posterior anal rays reach rudimentary caudal rays.

Dorsal rays 8; anal rays 31; pectoral rays 11; ventral rays 9; lateral plates 60. Vent slightly behind base of ventral fins.

Color, in spirits, light olive-brown, becoming darker on the back, belly, and towards the tail. Above with a few small, distinct, black dots. Sides with some light brownish-yellow shading, a very narrow, lengthwise, silvery streak along the middle of the abdomen. Base of pectoral silvery, with a dark spot above. Bases of other fins jet-black, the color usually extending on the bases of the rays.

Sides of head silvery; opercles, top of head, and tip of snout dark; mandibular rami bright silvery, and provided each with a double series of minute "phosphorescent" spots.

This species is known to us from a single specimen obtained in the harbor of Port Townsend, Wash., by Mr. Brown, assistant in the custom-office at Port Townsend, and by him presented to the United States National Museum. The type is 9¼ inches in length, and is in good condition.

Table of measurements.

Collector's number of specimen	150
Locality	Port Townsend, Wash.
	Inches and 100ths.	100ths of length.
Extreme length	9.25	.....
Length to end of middle caudal rays	8.75	.....
Body:		
Greatest height	.....	78
Height at ventrals	.....	6
Least height of tail	.....	2½
Head:		
Greatest length	.....	23½
Width of interorbital area	.....	2⅝
Length of snout	.....	11½
Length of maxillary	.....	9
Length of mandible	.....	12½
Diameter of orbit	.....	3½
Dorsal (*rayed*):		
Distance from snout	.....	55½
Length of base	.....	2½
Height at fourth ray	.....	5
Dorsal (*adipose*):		
Distance from dorsal	.....	29½
Height at longest ray	.....	2½
Anal:		
Distance from ventral base	.....	113
Length of base	.....	15
Height at longest ray (*ca.*)	.....	6
Caudal:		
Length of middle rays	.....	2½
Length of external rays	.....	6
Pectoral:		
Distance from snout	.....	24
Distance from dorsal outline	.....	5½
Length	.....	5
Ventral:		
Distance from snout	.....	59½
Length	.....	3½
Branchiostegals	7	.....
Dorsal	8	.....
Anal	31	.....
Pectoral	11	.....
Ventral	9	.....
Number of scales in lateral line	60	.....

PORT TOWNSEND, WASH., *September* 30, 1880.

PRELIMINARY NOTICE OF THE CRUSTACEA DREDGED, IN 64 TO 325 FATHOMS, OFF THE SOUTH COAST OF NEW ENGLAND, BY THE UNITED STATES FISH COMMISSION IN 1880.

By S. I. SMITH.

A general account of three short dredging trips of the United States steamer Fish Hawk to the region, off the eastern end of Long Island, known as the Block Island soundings, has already been given by Professor Verrill in these Proceedings, and also in the American Journal of Science for the present month (vol. xx, pp. 390–403), and need not be repeated here, further than that the region examined is in latitude 39° 46′ to 40° 06′ north, longitude 70° 22′ to 71° 10′ west, and that on the first trip, September 3 to 5, eight hauls (stations 865 to 872) were made, at depths ranging from 64 to 192 fathoms; on the second trip, September 12 to 14, nine hauls (stations 873 to 881) were made, in 85 to 325 fathoms;

and on the third trip, October 1 to 3, five hauls (stations 891 to 895) were made, in 238 to about 500 fathoms. At station 872, 86 fathoms, the bottom was covered with shells and sponges, but at all the other stations it was composed of fine sand and mud, varying in proportions and in compactness. The collections from the last trip have not yet been fully examined, and only a few of the species are recorded in the following pages. There was, however, a much smaller number of crustaceans obtained upon this last trip than upon the others.

The wonderful richness of the fauna of the sea-bottom in this region, in mollusks and echinoderms, has been shown in Professor Verrill's papers just referred to, and it is not less remarkable as regards the crustaceans. The richness, in both species and individuals, of this crustacean fauna would never have been suspected, and scarcely dreamed of, by one accustomed only to the meager fauna of the shallower waters of the south coast of New England. The larger part of the species secured from the great masses of material brought up in the trawl and dredge are Decapoda. There are comparatively few small species of Schizopoda, Cumacea, and Amphipoda, and further dredging will undoubtedly increase very greatly the number of species in these groups. The following enumeration is not complete even for the Decapoda, and much less so for the other groups, as several of the species are represented by specimens insufficient for proper determination, while others are omitted because not yet satisfactorily determined.

The exact location, depth, character of bottom, and temperature for each of the stations are given by Professor Verrill in the papers above referred to, and in the following pages I give only the serial numbers of the stations at which the species occurred, and the range in depth from the shallowest to the deepest of these stations. In occasionally referring to localities of dredgings carried on by the Fish Commission in previous years, I give the serial numbers of the stations according to the "Lists of the Dredging Stations of the United States Fish Commission from 1871 to 1879, inclusive, with Temperature and other Observations, arranged by Sanderson Smith and Richard Rathbun", in the Commissioner's Report for 1879.

BRACHYURA.

Hyas coarctatus Leach.

Several specimens from 86 fathoms, station 872, and 115 fathoms, station 871.

Collodes depressus A. Milne-Edwards, Crust. Région Mexicaine, p. 176, pl. 32, fig. 4, 1878.

I refer to this species a considerable number of specimens from stations 865, 871, 872, 873, 874, 875, 878; 65 to 142 fathoms. Most of these specimens are much larger than those described by Milne-Edwards, and in all the larger, and in some of the smaller, specimens examined the three dorsal spines of the carapax and abdomen are almost wholly obsolete,

but in other respects they all agree well with the figures. In a few of the smallest specimens examined the spines are very nearly or quite as prominent as in the figures, while in other respects they are indistinguishable from specimens of the same size in which the spines are very small and inconspicuous. In all the spineless specimens there is a more or less prominent tubercle in place of the spines of the carapax. As in the next species, the spines are probably specially characteristic of the young, and become more or less obsolete as the individual increases in size, the obsolescence being more rapid in some individuals than in others. I think there is very little doubt that this species is synonymous with *C. trispinosus* Stimpson, also described from very small specimens. The following measurements show the size of the specimens examined. In the largest males the chelæ* are stout, but little more than twice as long as broad, and the basal portion considerably swollen.

Station.	Sex.	Length of carapax.	Breadth of carapax.	Ratio.
		mm.	*mm.*	
874	♂	10.0	7.9	1: 0.79
871	♂	12.0	8.7	1: 0.73
865	♂	14.3	11.0	1: 0.76
871	♂	14.7	12.2	1: 0.77
874	♂	17.5	14.0	1: 0.80
873	♀	8.2	5.7	1: 0.70
871	♀	11.0	8.0	1: 0.73
865	♀	13.1	10.3	1: 0.78
878	♀	14.0	11.0	1: 0.78

Euprognatha rastellifera Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 123, 1870.—A. Milne-Edwards, Crust. Région Mexicaine, p. 183, pl. 33, fig. 2, 1878.

Stations 865, 869, 871, 872, 873, 874, 877, 878; 65 to 192 fathoms; at nearly all these stations in vast numbers.

Many of the specimens are much larger than those described by Stimpson and Milne-Edwards, males often being 15^{mm} in length of carapax. In all the large specimens the spines of the carapax are much less conspicuous than in the young; 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 often reduced to low and inconspicuous tubercles. In large males the chelæ are nearly as long as the carapax, more than a fourth as broad as long, and the basal portion considerably swollen. The whole animal is nearly naked and very free from foreign growths of all sorts, contrasting strongly in this respect with most of the Maioidea.

Lambrus Verrillii, sp. nov.

Allied to *L. Pourtalesii* Stimpson.

Female.—The carapax, including lateral spines, is about one and a fourth times as broad as long, with a broad longitudinal depression

* I restrict, as Huxley has done, the term *chela* to the two terminal segments of a chelate appendage.

either side, between the branchial region and the posterior part of the gastric and the cardiac region, and with the surface rough and tuberculose. The cardiac, with the posterior part of the gastric region, is raised into a continuous ridge, capped with a longitudinal line of four large spiniform tubercles, one on the gastric and three on the cardiac, besides a small one in the middle of the posterior margin. The cardiac and the two anterior gastric tubercles are erect and their tips nearly in the same horizontal line, while the posterior cardiac is situated much lower down on the posterior slope of the carapax and is directed upward and backward. In front of the gastric tubercle there are two much smaller ones, in a transverse line, and in front of these there are usually four still smaller ones similarly disposed, so as to make a submedian line of three small tubercles either side, between the large gastric tubercle and the erect and prominent tubercle upon the crest of the orbital arch. In one of the specimens the most anterior of these three pairs of tubercles back of the orbits is obsolete. There is a deep longitudinal depression between the orbits, and extending a little back of them and forward to the narrow part of the rostrum. The rostrum is prominent, directed forward and downward, suddenly contracted just in front of the antennal fossæ, leaving a dentiform tubercle either side, where the rostrum is suddenly narrowed; there is also a small tooth either side, near the tip of the rostrum. The antero-lateral margin is strongly incurved at the cervical suture, so as to approach closely and expose slightly from above the strongly tuberculo-dentate, infero-lateral carina, which is itself slightly incurved at this point; both in front of and behind the cervical suture, however, the margin recedes from the inferior carina, in front being directed upward at an oblique angle with the part behind the cervical suture. Above this angle there is a broad, conspicuous, and nearly smooth depression in the nearly vertical surface. The margin between the cervical suture and the orbit is armed with two small tubercles near the cervical suture, but the anterior two-thirds is unarmed and slightly concave in outline. Behind the cervical suture the margin is regularly and very strongly arcuate, and in front of the great branchial tooth, which really forms the lateral angle of the carapax, is armed with nine or ten teeth, of which the first three or four are small and somewhat tuberculiform; the six posterior are larger, acutely triangular, and strongly laciniated, the four anterior of these six being nearly equal in size, the fifth larger and the sixth smaller than the others. The greatest breadth of the carapax is between the tips of the large fifth laciniated tooth each side, or, excluding the teeth, between the bases of the third and fourth teeth each side. The great branchial tooth is larger than any other, laciniated, and has a small tooth at the base in front and a larger one near the base behind; and still behind this last there is first a small and then a much larger tuberculiform spine on the concave postero-lateral margin, while the short posterior margin is armed with three prominent tubercles, with several smaller ones between. The

branchial regions are prominent, tuberculose, and pitted, particularly upon the outer surface, and rise at the summit into a prominent spiniform tubercle either side, on a line with the anterior cardiac tubercle.

The chelipeds are very nearly as in *L. Pourtalesii*, but appear to be proportionally a little longer, and, judging from A. Milne-Edwards's figure of *Pourtalesii*, to have the marginal teeth more acute and more deeply laciniated. The meri of all the ambulatory legs are spinulose on both the upper and lower edges, as in *Pourtalesii*, while in the last pair there are, in addition, similar spines on the upper edge of the carpus and one near the middle of the upper edge of the propodus. The dactyli are about as long as the corresponding propodi, are very slightly compressed, and are covered with a dense velvet-like pubescence, except at the tips.

Measurements.

	♀ (Sta. 865–7.)	♀ (Sta. 872.)	♀ (Sta. 872.)
	mm.	*mm.*	*mm.*
Length of carapax	24.0	26.5	32.8
Breadth including lateral spines	30.0	33.0	41.0
Ratio of length to breadth	1 : 1.25	1 : 1.25	1 : 1.25
Breadth excluding lateral spines	26.0	28.0	35.3
Length of cheliped fully extended	57.0	65.0	85.0
Length of merus of cheliped	20.0	25.5	32.0
Length of propodus of cheliped	27.0	30.0	39.0

The conspicuous cervical emargination of the antero-lateral margin of the carapax, the cervical depression above the margin, the different antero-lateral margin in front of the cervical suture, and the spines or tubercles on the carpi and propodi of the last ambulatory legs appear clearly to distinguish this species from the *Pourtalesii*. The antero-lateral margin between the cervical suture and orbit appears to be more like *L. hyponeus*, as figured by A. Milne-Edwards, though in other respects the *hyponeus* is unlike the present species.

Stations 865 to 867, 872; 65 and 86 fathoms; three specimens, all females.

Cancer borealis Stimpson.—Smith, Trans. Conn. Acad., v, p. 39, pl. 8, 1879.

Stations 865, 871, 872, 875, 877, 878, 879; 65 to 225 fathoms. Most of the specimens are small, and the largest is only 56^{mm} in breadth of carapax.

Large specimens of this species were taken in abundance in the shallow waters off Newport.

Geryon quinquedens Smith, Trans. Conn. Acad., v, p. 35, pl. 9, figs. 1, 2, 1879.

Stations 881, 893; 252 and 372 fathoms.

This species grows to a much greater size than any of the specimens from which my original description was drawn. A male from 200 fathoms, off Nova Scotia, north latitude 42° 37′, west longitude 62° 55′, presented to the National Museum by Capt. G. A. Johnson and crew of

the schooner Augusta A. Johnson, of Gloucester, Mass., gives the following measurements:

	mm.
Length of carapax, including frontal teeth	88.2
Breadth, including lateral teeth	101.7
Breadth in front of lateral teeth	93.5
Length of posterior legs	180.0

Bathynectes longispina Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 146, 1870.—A. Milne-Edwards, Crust. Région Mexicaine, p. 234, pl. 42, fig. 1, 1879.

Stations 871, 872, 874, 879; 85 to 225 fathoms.

Stimpson's and Milne-Edwards's specimens were from the Straits of Florida.

Acanthocarpus Alexandri Stimpson, Bull. Mus. Comp. Zool. Cambridge, ii, p. 153, 1870.

Stations 870 to 874, 877, 878; 85 to 155 fathoms. At 878, 142 fathoms, forty-nine specimens were taken.

A large part of the specimens are much larger than those described by Stimpson, which were from 74 fathoms, in Pourtalès's dredgings in the Straits of Florida. A male, from station 878, gives the following measurements: Length of carapax, 16.9^{mm}; breadth, 16.8^{mm}; breadth between tips of carpal spines, with the chelipeds closed, 42^{mm}; length of carpal spine, 8^{mm}.

Ethusa microphthalma, sp. nov.

Female.—The carapax is as broad as long, but very much narrowed anteriorly, so that in front it is only half as broad as the widest part, which is at the swollen branchial regions posteriorly. The front between the orbits is less than half as wide as the entire front, and, as seen from above, is divided by a triangular median sinus and two slightly less deep sinuses at the extremities of the antennulary fossæ, and the angles between and outside of these sinuses are spiniform, so that the front between the eyes is armed with four similar and nearly equidistant spines, of which the lateral are slightly more prominent than the median. The orbital sinuses are nearly as deep as broad, and formed on the outside by the spiniform antero-lateral angles, which reach nearly as far forward as the spines of the front. The antero-lateral margins are long and nearly straight. The dorsal surface is slightly convex and not deeply areolated, though the cervical suture is well marked, and the whole surface is granular and slightly pubescent, except on the cardiac and gastric regions, where the granulation is nearly obsolete.

The eyes are small and on very short peduncles, so that they do not nearly reach the angles of the orbital sinuses; the cornea is terminal, not expanded, and the pigment is black.

The chelipeds are equal, small, and very slender; the chela is scarcely stouter than the carpus, the basal portion is smooth and nearly cylindrical, and the digits are alike, fully as long as the basal portion, strongly compressed, longitudinally grooved, slightly curved laterally,

and the prehensile edges straight and very regularly dentate. The two first pairs of ambulatory legs are nearly alike, twice as long as the chelipeds, and nearly or quite naked; the propodus is a little shorter than the merus, very slightly compressed, and smooth, but slightly grooved longitudinally; the dactylus is once and a half as long as the propodus, very much compressed vertically, slightly curved, of nearly uniform breadth to a short distance from the acuminate tip, and very smooth. The third and fourth pairs of ambulatory legs are nearly alike, scarcely half as long as the first and second, slender, and covered with short pubescence, except upon the dactyli. The propodus is much shorter than the merus, not very much shorter than the carpus, nearly cylindrical, and not expanded distally; the dactylus is very short and strongly curved.

The single specimen seen, from station 878 (142 fathoms), gives the following measurements:

	mm.
Length of carapax, including frontal spines	13.5
Greatest breadth of carapax	14.0
Breadth between antero-lateral spines	7.0
Breadth between tips of inner angles of orbital sinuses	3.1
Length of cheliped	18.0
Length of chela	8.0
Breadth of chela	1.7
Length of dactylus	4.0
Length of second ambulatory leg	38.0
Length of its propodus	8.0
Length of its dactylus	12.0
Length of fourth ambulatory leg	18.0
Length of its propodus	3.6
Length of its dactylus	1.5

The very small eyes and the great breadth and prominent antero-lateral angles of the carapax at once distinguish this species from *E. mascarone*, of the Mediterranean, and from the Japanese *E. sexdentata*. It is also evidently distinct from *E. granulata* Norman, which, however, has apparently not been fully described. The genus has not, I think, been recorded from America before, although a species occurs in the Bay of Panama.

ANOMURA.

Latreillia elegans Roux, Crust. Mediterranée, pl. 22, 1828.—Milne-Edwards, Hist. Nat. Crust., i, p. 277, 1834.—De Haan, Fauna Japonica, p. 108, 1837.—Lucas, Explor. de l'Algérie, Animaux Articulés, i, p. 3, pl. 1, fig. 1, 1849.—Heller, Crust. südlichen Europa, p. 147, pl. 4, fig. 14 (anterior part of carapax after Lucas).

Station 872, 86 fathoms (three females); 874, 85 fathoms (fragment of carapax).

I have had no European specimens for comparison, and have seen only a tracing of Roux's figure, with which the specimens before me agree well. In these specimens the propodus in the posterior pair of legs is a little more than two-thirds as long as the merus, and the dactylus is very short and closes against the somewhat oblique and spinous

distal extremity of the inferior edge of the propodus, which is ciliated along the rest of its length, while the merus is not ciliated. In Lucas's general figure the propodus is proportionally about a fourth shorter and the dactylus several times as long as in the specimens, the dactylus being very much as in the first three pairs of ambulatory legs; but the enlarged figure, 1 *c*, of the terminal portion of the posterior leg is very different. The part apparently corresponding to the dactylus in the general figure is represented as composed of two segments, a shorter terminal one like the dactylus in the specimens, and a longer basal one like the terminal part of the propodus. I think there is little doubt that these figures were drawn from a specimen in which the very slender and delicate propodus of the posterior leg was partially broken and bent at about a fourth of the way from the tip to the base, and that the artist mistook the break for a natural articulation, and so represented it. Supposing this to be the case, Lucas's enlarged figure agrees very well with the specimens before me.

Homola barbata White, List Crust. British Museum, p. 55, 1847.—*Cancer barbatus* Fabricius, Entomologia Systematica, ii, p. 460, 1793.—Herbst, Krabben und Krebse, pl. 42, fig. 3.—"*Dorippe spinifrons* Lamarck, Animaux sans Vertèbres, v, p. 245, 1818" (Heller).—*Homola spinifrons* Leach, Trans. Linnean Soc. London, xi, p. 324, 1815; Zoological Miscellany, ii. p. 82, pl. 88, 1815.—Desmarest, Considérat. Générales Crust., p. 134, pl. 17, fig. 1, 1825.—Milne-Edwards, Hist. Nat. Crust., ii, p. 183, pl. 22, figs. 1–4, 1837; Règne Animal de Cuvier, 3me édit., pl. 39, fig. 2.

Station 872; 86 fathoms; two males, the larger 19mm in length of carapax.

I have had no Mediterranean specimens for comparison, but the two before me agree perfectly with the figures and descriptions above referred to.

Lyreidus Bairdii, sp. nov.

Female.—The carapax is regularly and strongly convex transversely, about one and three-fourths times as long as the breadth at the antero-lateral angles, back of which it narrows only slightly for half the length of the lateral margins, which then curve regularly round to the articulation with the abdomen. The rostrum, or median tooth of the deeply tridentate front, is acutely triangular, the breadth at base being equal to about half the length and greater than the distance between its tip and that of either of the lateral spines, which are spiniform, very acute, and directed forward. The orbital sinuses left between the median and lateral teeth are nearly as deep as broad and broadly rounded behind. The edge of the antero-lateral margin is rounded, but is armed with a small tubercle about a third of the way from the lateral to the anterior angle, and in front of this tubercle the carapax is suddenly narrowed, so that the margin in front of the tubercle is concave in outline as seen from above. The posterior half of the lateral margin is marked above by a distinct carina, but the anterior half is smoothly rounded.

The eye-stalks scarcely reach the tips of the lateral teeth of the front,

are broad at base, and narrowed to triangular tips. The eyes themselves are very small, black, and situated on the outer and inferior edge of the eye-stalks.

The chelipeds are nearly as long as the carapax, and similar in form to those of *L. tridentatus*. The propodus is short and very much compressed; the distal margin is transverse and nearly as long as the length of the whole segment; the dorsal edge is thin and sharp, and terminates in a sharp tooth near the articulation of the dactylus; back of the thin digital process the inferior edge is armed with three or four acute teeth, decreasing in size proximally. The dactylus is compressed and very thin, with the outer edge regularly curved and sharp; the prehensile edge is sharp and slightly irregular in outline, but not dentate, although the opposing edge of the propodus is armed with about five low teeth inside the lip. The first, second, and fourth pairs of ambulatory legs are very nearly as in *L. tridentatus*, as figured by De Haan. In the third pair, however, the propodus is nearly twice as broad as long, the inferior edge being expanded into a very thin, broad, lamellar process nearly as large as the body of the segment, and with a ciliated and regularly curved margin nearly semicircular in outline. The dactylus is nearly as broad as the propodus, lamellar throughout, articulated at the upper end of the proximal margin, which, below the articulation, is concave in outline and ciliated to match the adjoining lamellar process of the propodus; the lateral margins are naked and convex in outline, except near the tip, which is sharply acuminate.

The abdomen is slightly more than two-thirds as long as the carapax, and agrees very closely with De Haan's figure of the abdomen of the male of *L. tridentatus* in the form and proportions of the somites. In its natural position, the abdomen is bent at the fourth somite, and this somite is armed with a small spiniform tubercle, projecting from the middle of the dorsal surface.

The dorsal surface of the carapax and of the abdomen, the sternum, and the exposed surface of the external maxillipeds and of the chelipeds and ambulatory legs are naked, smooth, and highly polished, though the dorsal surface of the carapax is minutely punctate, the punctations being more numerous on the anterior portions. The subhepatic and the adjacent anterior pleural regions are slightly hairy or pubescent.

Professor Verrill tells me that the color of the entire animal shortly after it was placed in alcohol, and before the color could have changed materially from that in life, was light orange-red.

The single specimen, from which the above description is drawn, gives the following measurements:

	mm.
Length of carapax, including rostrum	38.4
Breadth of carapax just back of lateral spines	22.0
Breadth of carapax between tips of lateral spines	22.5
Breadth of front between tips of lateral spines	6.8
Length of rostrum	4.0
Length of abdomen	25.0

Station 873; 100 fathoms.

Another and very much smaller specimen, from station 876, 120 fathoms, though differing very much from the larger specimen, is probably the young of the same species. The carapax of this specimen is proportionately longer; the orbital sinuses are much larger; the lateral spines of the front are more slender and much longer, longer even than the rostral tooth, and curved slightly outward and upward toward the tips; and the lateral spines are much longer and directed more outward. There is a small tubercle upon the third somite of the abdomen, and in place of the tubercle on the fourth somite there is an acute spine, much longer than the somite itself. There is also a small spiniform tubercle on the lower side of the ischium of the third pair of ambulatory legs.

	mm.
Length of carapax, including rostrum	10.3
Breadth of carapax just back of lateral spines	5.7
Breadth of carapax between tips of lateral spines	6.8
Breadth of front between tips of lateral spines	3.6
Length of rostrum	1.5

Hemipagurus, gen. nov.

The genus for which this name is proposed is allied to *Spiropagurus* Stimpson (Proc. Acad. Nat. Sci. Philadelphia, x, 1858, p. 236 (74), 1859), but differs conspicuously in the form and position of the sexual appendage of the last thoracic somite of the male. In *Spiropagurus* this appendage (formed by the permanent extrusion of a portion of the vas deferens) arises from the coxa of the *left* side of the last thoracic somite; while in the genus here proposed it arises from the corresponding coxa of the *right* side, is shorter than in *Spiropagurus*, and curved in one plane round the right side of the abdomen.

The carapax is short and broad, and the anterior margin is obtuse, and does not wholly cover the ophthalmic somite between the eyes. The portion in front of the cervical suture is indurated, but all the rest of the carapax is very soft and membranaceous, without any distinct induration along the cardiaco-branchial suture. The ophthalmic scales are well developed. The eye-stalks are short and the cornea expanded. The antennulæ, antennæ, and oral appendages are similar to those in *Eupagurus;* the exopods of all the maxillipeds are, however, proportionally much longer than in that genus. There are eleven pairs of phyllobranchiæ, arranged as in *Eupagurus bernhardus*, but the two anterior pairs connected with the external maxillipeds are very small and rudimentary, and composed of a few slightly flattened papillæ, so that they are, strictly speaking, trichobranchiæ. The chelipeds are slender and unequal. The first and second pairs of ambulatory legs are long, and have slender, compressed, and ciliated or setigerous dactyli; the third pair are only imperfectly subcheliform.

In the male, the second, third, and fourth somites of the abdomen bear small appendages upon the left side, as in most of the allied genera,

but the fifth somite is destitute of an appendage; in the female, the appendages of the second, third, and fourth somites are biramous and ovigerous, and there is usually a rudimentary uniramous appendage upon the fifth somite, as in the allied genera.* The uropods are very nearly or quite symmetrical, the rami of the right appendage being very nearly or quite as large as that of the left. The telson is bilobed at the extremity.

As might be expected, the unsymmetrical development of the external sexual appendages of the males of the two species here described corresponds to a like unsymmetrical development of the internal sexual organs, and the following incomplete observations, made on ordinary alcoholic specimens in which the abdominal viscera are not sufficiently well preserved for a full anatomical or histological investigation, appear of sufficient importance to notice here, especially as nothing appears to be known of the internal structure of either species of *Spiropagurus*.

The right testis and vas deferens are much larger than the left. The lower part of the right vas deferens, in all the adults examined, is much more dilated than the left, and is filled (as is also the external part of the duct) with very large spermatophores of peculiar form. The left vas deferens is slender, much as in *Eupagurus bernhardus*, terminates in a small opening in the left coxa of the last thoracic somite, as in ordinary Paguroids, and contains spermatophores somewhat similar in form and size to those of *Eupagurus bernhardus*. In alcoholic specimens of *H. socialis* the spermatophores from the left vas deferens are approximately 0.16^{mm} long and 0.035^{mm} broad, with a slender neck about a third of the entire length, and a very thin and delicate lamella for a base. The spermatophores from the right vas deferens are over 2^{mm} in total length; the body itself is oval, approximately 0.40^{mm} long and a third as broad; at one end it terminates in a very long and slender process, two or three times as long as the body; at the other end there is a similar but slightly stouter process, a little longer than the body, and expanding at its tip into a broad and very delicate lamella, approximately 0.35^{mm} long by 0.20^{mm} broad. The contents of the two kinds of spermatophores are, of course, not in a condition to show the structure of the spermatozoa, but they present a similar appearance in each case, and are apparently of about the same size.

Hemipagurus socialis, sp. nov.

Male.—The part of the carapax in front of the cervical suture is about a fifth broader than long; the sides nearly parallel; the front margin sinuous, curving slightly forward in the middle and each side between the eye-stalks and the peduncles of the antennæ, the middle lobe thus formed being scarcely more prominent than the lateral lobes, each of

* In many of the best preserved and most perfect females of *Hemipagurus socialis* examined I can find no trace whatever of this appendage of the fifth somite, while in others it is very easily seen.

which is armed with a minute spine, projecting forward just inside of the peduncle of the antenna; between these spines the edge of the front is upturned in a sharp marginal carina, which terminates each side in the spines themselves. The dorsal surface of this part of the carapax is convex in both directions, the protogastric lobes are protuberant and well marked, and nearly the whole surface is roughened, and more or less tuberculose, with transverse scabrous elevations, which give rise to numerous hairs. The branchial regions are slightly swollen, so that the breadth of the carapax posteriorly is greater than in front. All the portions back of the cervical suture are smooth and membranaceous.

The eye-stalks are about half as long as the carapax in front of the cervical suture, flattened and expanded distally, where they are about three-fourths as broad as long. The eye itself is black, and the cornea extends round either side so as to be crescent-shaped as seen from above. The ophthalmic scales are less than half as long as the eye-stalks, narrow, triangular, and acute.

The first and second segments of the peduncle of the antennula are subequal in length, and the ultimate segment nearly once and a half as long as the penultimate, and almost as long as the eye-stalks. The superior, or major, flagellum is nearly as long as the ultimate segment of the peduncle; the thick, ciliated basal portion consists of about fourteen segments, and the slender terminal portion, which is nearly once and a half as long as the basal, of about five very slender and subequal segments. The minor flagellum is about two-thirds as long as the major, and composed of about eight segments. The peduncle of the antenna reaches by the eye nearly the length of the last segment, which is about as long as the greatest diameter of the eye. The acicle is slender, acute, and slightly longer than the last segment of the peduncle. The flagellum reaches beyond the tips of the ambulatory legs.

The chelipeds are slender and very nearly equal in length, but the right is very much stouter than the left. In the right cheliped the merus and carpus are subequal in length, together nearly twice as long as the carapax, and both are rough and obscurely spinous, the spines being most conspicuous on the edges of the upper surface of the carpus, which is fully three times as long as broad, flattened above, and angular, but not distinctly carinated along either side. The chela is not far from twice as long as the carpus, nearly three times as long as broad, compressed vertically, evenly rounded, smooth and nearly naked above, but clothed with long, soft hair beneath; the digits are longitudinal, not gaping, and the dactylus is about two-thirds as long as the basal portion of the propodus, and its prehensile edge is armed with a broad tooth near the middle. In the left cheliped the merus and carpus are similar to those of the right, but much more slender and a little longer; the carpus is about six times as long as broad, and the edges of the upper surface are rather more sharply angular than in the right; the chela is shorter than the right, but very slender, smooth, and nearly

naked; the digits are similar, longitudinal, slightly longer than the basal portion of the chela, compressed, slightly curved downward toward the tips, but the prehensile edges straight and very minutely serrate.

The ambulatory legs are very nearly equal in length, and slightly overreach the chelipeds; the merus is about as long as the left chela, and roughened with small spines on the upper and under edges; the propodus is shorter than the merus, compressed, smooth, and ciliated along the edges; the dactylus is a little longer in the second than in the first pair, but in both shorter than the propodus, very strongly compressed, very slightly twisted, about ten times as long as broad, and thickly ciliated along both edges, except for a short distance along the lower edge near the tip.

The *female* is smaller than the male, and has proportionally shorter ambulatory legs, and chelipeds very much shorter and much more alike. The right chela is only about a third longer than the carpus, little more than a third as broad as long, and the digits are slender and nearly as long as the basal portion. The left cheliped is proportionally stouter than in the male, and thus approximates to the right; the chela itself is scarcely more than a third longer than the carpus. The ambulatory legs overreach the chelipeds by nearly or quite the full length of the dactyli, but all the segments have very nearly the same relative proportions as in the male.

The eggs are few in number and very large, being about a millimeter in diameter in alcoholic specimens.

In young males the chelipeds and ambulatory legs are similar to those of the female.

Measurements.

	♂ (Sta. 877).	♂ (Sta. 878.)	♀ (Sta. 878).
	mm.	*mm.*	*mm.*
Length from front of carapax to tip of abdomen	19.0	16.5	16.0
Length of carapax along median line	7.7	6.3	5.6
Length of carapax from front to cervical sutnre	5.3	4.7	4.0
Breadth of carapax in front	6.5	5.3	4.8
Length of eye-stalks	2.9	2.6	2.5
Greatest diameter of eye	2.1	1.8	1.7
Length of peduncle of antennula	6.0	5.5	5.1
Length of ultimate segment of the same	2.7	2.4	2.2
Length of peduncle of antenna beyond front	4.5	4.0	3.4
Length of ultimate segment of peduncle of antenna	2.1	1.9	1.7
Length of right cheliped	32.0	24.8	15.5
Length of carpus	7.0	5.5	4.0
Length of propodus	12.7	10.0	5.4
Breadth of propodus	4.5	3.4	1.9
Length of dactylus	5.6	4.5	2.8
Length of left cheliped	28.0	24.0	15.1
Length of carpus	7.6	6.3	4.0
Length of propodus	10.0	8.0	5.1
Breadth of propodus	2.1	1.7	1.3
Length of dactylus	5.7	4.5	2.8
Length of first ambulatory leg, right side	34.0	28.0	21.0
Length of propodus	8.4	6.8	5.2
Length of dactylus	6.8	5.3	5.0
Length of second ambulatory leg, right side	34.5	28.2	21.5
Length of propodus	8.9	7.2	5.8
Length of dactylus	8.0	7.0	6.0

The carcinœcium is very rarely a naked gastropod shell; in most of the specimens seen it is either built up by a colony of *Epizoanthus Americanus*, like the carcinœcium of *Eupagurus Kröyeri*, from the same stations, or is made up in a somewhat similar way by the single polyp of a species of *Adamsia*, the base secreted by the *Adamsia* being expanded on either side and united below so as to inclose the crab in a broadly conical cavity, with only a slight spiral curvature. The nuclei about which these polypean carcinœcia are formed are of various origins; the majority of the *Adamsia* carcinœcia appear to have been built upon fragments of pteropod shells, in some cases upon bits of worm-tubes, in one case upon the entire shell of a *Cadulus*, the greater part of the shell being left protruding from the base of the polyp. In the carcinœcia formed by *Epizoanthus* the nucleus seems usually to have been absorbed, so that nothing is left distinguishable from the colony of polyps itself. In some cases the *Adamsia* has completely overgrown a small *Epizoanthus* carcinœcium, so that when the *Adamsia* is removed a perfect *Epizoanthus* carcinœcium is found beneath as a nucleus. The carcinœcium of this species, and of *H. gracilis* as well, does not cover the animal to the same extent as is usual in the species of *Eupagurus*, the anterior part of the carapax evidently being constantly exposed, its induration fitting the animal for such exposure. The *Epizoanthus* carcinœcia are, however, very often disproportionally large for the crabs inhabiting them, having grown out either side until they are several times broader than long. In spite of these often enormous carcinœcia, both species of the genus probably swim about by means of the ciliated dactyli of the ambulatory legs, as *Spiropagurus spiriger* has been observed to do by Stimpson (Proc. Acad. Nat. Sci. Philadelphia, 1858, p. 248 (86), 1859).

Stations 865, 870, 871, 872, 873, 874, 876, 877, 878, 880; 65 to 252 fathoms. At many of these stations it occurred in very great abundance.

Hemipagurus gracilis, sp. nov.

This is a smaller and more slender species than the last, and is readily distinguished from it by the smooth carapax, the longer and more slender eye-stalks, the long and acicular ophthalmic scales, and by the narrow dactyli of the ambulatory legs being longer than the corresponding propodi.

Male.—The carapax in front of the cervical suture is flat, smooth, nearly naked, and scarcely at all areolated. The anterior margin is rather more strongly sinuous than in *H. socialis*, and the lateral lobes are slightly angular and each is tipped with a minute spine, as in that species, but the marginal carina between these spines is much less distinct.

The eye-stalks are more than half as long as the carapax in front of the cervical suture, flattened and expanded distally, but only about half as broad as long. The eyes themselves are as in *H. socialis*. The ophthalmic scales are more than half as long as the eye-stalks, and are acicular and regularly acute.

The ultimate segment of the peduncle of the antennula is as long as

the eye-stalk and nearly twice as long as the penultimate segment. The major flagellum is as long as the ultimate segment of the peduncle, the basal portion of about eight segments, the terminal portion three times as long and of about five subequal and very slender segments. The minor flagellum is about half as long as the major, and composed of about six segments. The antennæ are very much as in *H. socialis*.

The chelipeds are nearly equal in length and similar to those of *H. socialis*, but in the right cheliped the inner edge of the upper surface of the carpus is angular, and armed with a regular series of twelve to eighteen small spines, while the outer edge is rounded and unarmed; and the prehensile edge of the dactylus is armed with two irregular and indistinct teeth, corresponding with two irregular emarginations in the edge of the digital portion of the propodus. In the left cheliped the outer edge of the upper surface of the carpus is slightly rounded and scarcely at all spinulous, while the inner edge is armed as in the right cheliped. The left chela differs from that of *H. socialis* in having the digital portion of the propodus considerably stouter than the dactylus, particularly toward the base.

The ambulatory legs are proportionally as long but more slender than in *H. socialis;* in both pairs the dactylus is longer than the propodus, curved slightly near the tip, about sixteen times as long as broad, sparsely ciliated along the upper edge, and very slightly setigerous along the lower.

The *female* differs from the male as in *H. socialis*, but to a very much less extent, the chelipeds and ambulatory legs being only a little shorter than in the male, and the right cheliped only a little less stout and a little more like the left than in the male.

The eggs are few and nearly as large as in *H. socialis*.

Measurements.

	♂ (Sta. 874).	♀ (Sta. 874).
	mm.	*mm.*
Length from front of carapax to tip of abdomen	12.0	11.2
Length of carapax along median line	3.4	3.2
Length of carapax from front to cervical suture	2.2	2.1
Breadth of carapax in front	2.8	2.4
Length of eye-stalks	1.6	1.5
Greatest diameter of eye	1.1	0.9
Length of peduncle of antennula	3.4	3.2
Length of ultimate segment of the same	1.6	1.5
Length of peduncle of antenna beyond front	2.3	1.9
Length of ultimate segment of peduncle of antenna	1.0	0.8
Length of right cheliped	15.2	11.2
Length of carpus	4.0	2.8
Length of propodus	6.0	4.4
Breadth of propodus	2.4	1.8
Length of dactylus	2.0	1.7
Length of left cheliped	13.6	10.0
Length of carpus	3.8	2.6
Length of propodus	5.0	3.6
Breadth of propodus	1.1	1.0
Length of dactylus	2.5	1.9
Length of first ambulatory leg, right side	16.1	12.8
Length of propodus	4.0	3.2
Length of dactylus	5.0	4.0
Length of second ambulatory leg, right side	17.0	14.0
Length of propodus	4.6	3.7
Length of dactylus	5.4	4.5

The carcinœcium in all the specimens examined is a colony of *Epizoanthus*, but this species, like *H. socialis*, probably sometimes inhabits an *Adamsia* carcinœcium.

Stations 865, 870, 871, 874, 877, 878; 65 to 155 fathoms; associated with *H. socialis*, but not at all abundant.

Parapagurus pilosimanus Smith, Trans. Conn. Acad., v, p. 51, 1879.

Stations 880, 893, 894; 252 to 372 fathoms.

Since this species was described, from a single specimen taken in 250 fathoms off Nova Scotia, a few additional specimens have been brought in by fishermen from deep water off Nova Scotia. In all the specimens seen, the carcinœcium is built up by a compound actinoid polyp, as in the specimen first described. Some of the young specimens show very plainly the gastropod shell, which serves as a nucleus about which the polypean carcinœcium is built.

Eupagurus bernhardus Brandt ex Linné.

Station 865; 65 fathoms; two small specimens.

Eupagurus Kröyeri Stimpson.

Stations 869, 870, 877, 878; 126 to 192 fathoms; many specimens, mostly small, and all in carcinœcia formed by colonies of *Epizoanthus Americanus*.

Eupagurus, sp.

Stations 865 to 867, 869 to 874, 876 to 880, 893 to 895; 65 to 365 fathoms.

A species of about the size of *E. Kröyeri*, and quite distinct from the species heretofore known upon our coast, and apparently distinct from all the described European species.

?Munida Caribæa Stimpson, Ann. Lyceum Nat. Hist. New York, vii, p. 244 (116), 1860.

Stations 865, 871 to 874, 877, 878; 65 to 142 fathoms. Very abundant at 871; 115 fathoms.

It is with considerable hesitation that I refer these specimens to Stimpson's species, which was very briefly described, apparently from a single very small specimen, and with no more precise indication of its habitat than is implied in the specific name. Very small specimens of the species before me agree very well, however, with Stimpson's description, except that he says, "eye-peduncles longer and the cornea less dilated than usual", while in the species before me the eye-stalks are just about as long as in *M. Bamffia* and the cornea fully as much expanded horizontally, though considerably more compressed vertically; but this vertical compression is perhaps what Stimpson referred to in speaking of the cornea as "less dilated than usual".

The species in hand resemble *M. tenuimana* G. O. Sars in the length and slenderness of the chelipeds, which are even longer and more slender than in that species, from which, however, it is sufficiently distinct.

The armature of the carapax, chelipeds, and ambulatory legs is more like *M. Bamffia* than *tenuimana*. There are usually six subequal and nearly equidistant spines upon the anterior half of the lateral margin of the carapax, of which one is in front of the cervical suture, three upon the hepatic region, and two upon the anterior part of the branchial region. There are no spines upon the posterior border of the carapax and none upon the abdomen, except two very small ones on the anterior edge of the second somite. The chelipeds are very long and slender, in large specimens being a half or more longer than the entire body, nearly cylindrical, and the merus and carpus sparsely armed with small spines; but the chela, which is longer, but no stouter, than the merus, is without spines.

Four specimens give the following measurements:

	♂	♀	♂	♂
	mm.	*mm.*	*mm*	*mm.*
Length	48.5	48.0	23.0	17.5
Length of carapax, including rostrum	25.0	24.2	12.3	9.2
Length of rostrum	9.1	8.9	4.9	3.4
Breadth of carapax in front of cervical suture	11.1	11.7	5.7	4.4
Greatest breadth, excluding spines	13.7	11.0	6.2	4.8
Breadth near posterior margin	12.3	13.0	6.0	4.5
Length of cheliped	84.0	79.0	36.5	22.8
Length of merus	34.3	32.0	14.8	8.3
Length of carpus	6.0	5.0	3.0	2.0
Length of chela	39.0	36.0	15.9	9.8
Length of dactylus	17.0	17.4	7.2	4.3
Length of first ambulatory leg	50.0	47.7	22.0	14.0
Greatest diameter of eye	4.0	4.0	3.6	2.0

MACRURA.

Arctus depressus, sp. nov.

This species is represented only by a single, small, and probably immature individual, but is apparently distinct from any known species of the genus, and is readily distinguished by the very broad and greatly depressed cephalo-thorax, which in these respects is like *Ibacus*, and by the conspicuous spines each side of the posterior segments of the sternum. The depressed form is perhaps partially a character of immaturity, being an approach to the *Phyllosoma*-stages, and it is possible that the sternal spines disappear in the adult.

The carapax is less than half as thick as broad, and the breadth is much greater than the length along the middle line above, but slightly less than the length of the lateral margin, which is convex in outline, so that the greatest breadth is near the middle of the length. The antero-lateral angles are acute and very prominent, extending far forward of the rest of the front and to a line slightly in advance of the first dorsally exposed segment (the true second peduncular) of the antenna each side. The orbits are very large, almost completely open in front, and occupy fully a third of the width of the whole front. The median carina is low, being, even in the middle of its length, only a little higher than the lateral carinæ, and rises into two low, dentiform prominences, one

at about the middle of the carapax and another a little back of the anterior margin, and in front of the latter the carina is almost wholly obsolete. The lateral carinæ are prominent along the inner sides of the orbits, terminating in front in the elevated and irregularly dentate inner angles of the orbits. Just back of the orbit there is a hiatus in the carina, from which the carina extends uninterruptedly to near the posterior margin, though its crest is minutely and obscurely dentate. The surface of the longitudinal depressed spaces between the median and lateral carinæ are naked and nearly smooth, and so is the narrow and slightly concave space between each lateral carina and the edge of the carapax, except for a line of small tubercles just outside the carina and a few additional ones outside of these, near the postero-lateral angle. The lateral margin is thin and the edge sharp, and divided by a sharp incision at the cervical suture, by an incision slightly less deep a little way back of the cervical suture, and by two or three obscure notches along the branchial region, while the edge between these incisions and notches is irregularly and very minutely dentate.

The eyes are large, with an expanded cornea, and black. The two lobes of the antennulary somite rise in front into small dentiform tubercles, and so do the first and second of the dorsally exposed segments of the antennæ. The second exposed segment of the antenna is about as broad as long, carinated above, acutely angular in front, and the inner and outer edges are each armed with three teeth, of which the anterior in each case is obscure. The terminal segment is short, and the slightly arcuate anterior margin is deeply five-lobed.

The sternum is triangular and very broad, the breadth between the bases of the posterior legs being nearly as great as the length along the median line. The edges are slightly raised above the bases of the legs, and terminate posteriorly, back of and below the base of the fifth leg, in a conspicuous spine, directed backward.

The abdomen, to the tip of the telson, is twice as long as the carapax along the median line above, is at base much narrower than the carapax, and tapers regularly and so rapidly that at the sixth somite it is little more than two-thirds as broad as at base. There is a slight median carina on the second to the fifth somite, and the dorsal surface is naked and sparsely punctate, but otherwise nearly smooth. The pleura of the second, third, fourth, and fifth somites are nearly perpendicular and slightly carinated in the middle; the second is broader than the others and nearly right-angled, but terminates in a spiniform tip, turned backward; the third is angular, but not spiniform at the extremity; and the fourth and fifth are obtuse or rounded. The sixth somite is about as long as, but considerably narrower than, the fifth, and its pleura are small and narrowly triangular. The telson is much longer than broad, tapers very slightly distally; the posterior portion is very thin, delicate, and transparent, and the posterior edge is slightly curved and the angles rounded. The lamellæ of the uropods are as long as and much broader

than the telson, and, except a small portion near the base, are thin and transparent like the terminal part of the telson.

Measurements.

	mm.
Length from front of carapax to tip of telson	18.7
Length from tips of antennæ to tip of telson	23.2
Length of carapax along median line above	6.2
Length of carapax along lateral margin	9.0
Greatest breadth of carapax	8.3
Breadth between anterior angles	7.5
Breadth posteriorly	6.2
Greatest thickness of cephalo-thorax	3.5
Breadth of first somite of abdomen	6.1
Breadth of sixth somite of abdomen	4.0

Station 872; 86 fathoms.

In the outline of the edges of the segments of the antennæ and in the divisions of the carinæ of the carapax this species is much like *A. Americanus* Smith (Amer. Journ. Sci., II, xlvii, p. 119, 1869; *Scyllarus* (*Arctus*) *Gundlachi* von Martins, Archiv für Naturgesch., xxxviii, p. 123, pl. 5, fig. 13, 1872), the young of which it may possibly prove to be, though this seems very improbable considering that the specimen just described is half as long as ordinary specimens of *A. Americanus*, which is known from the Gulf of Mexico and the West Indies.

Nephropsis aculeatus, sp. nov.

Very closely allied to *Nephropsis Stewarti* Wood-Mason (Journ. Asiatic Society of Bengal, xlii, part ii, p. 39, pl. 4, 1873), described from a single female, 98mm long and wanting the chelipeds, dredged in 260 to 300 fathoms in the Bay of Bengal.

Male.—In specimens 30mm to 34mm in length the rostrum is very slightly longer proportionately than represented in the figures of *N. Stewarti*, but in all other respects the carapax shows no differences whatever. The abdomen is as represented in the figure of *N. Stewarti*, except that the pleura of the second to the fifth somite, inclusive, project farther downward and terminate in slender, acuminate, and spiniform tips, and that the pleuron of the sixth somite is sharply right-angled below, and not rounded. The uropods and telson show no differences whatever.

The chelipeds are equal, or very nearly so, about a fourth longer than the carapax, including the rostrum, and are carried with the chelæ held horizontally, as in *Nephrops* and *Homarus*. The merus is about as long as the rostrum, and is armed near its distal end with a slender spine above and a similar one below. The carpus is short, a little longer than broad, slightly broader than the distal part of the merus, and is armed with three small spines—one near the middle of the inner edge, one at its distal end, and another beneath at the articulation with the chela. The chela is scarcely longer than the merus and slightly broader than the carpus, somewhat compressed vertically, rounded above and below, and

without spines, except a few very minute dentiform ones along the inner edge of the propodus; the propodal digit is longitudinal and tapers to a slender incurved tip; the dactylus is a little longer and stouter than the propodal digit, and has a longer and more strongly curved tip, which closes beneath the tip of the propodus; the prehensile edges of both digits are sharp and minutely crenulate. The upper surface and the inner edge of the carpus and the upper surface and both edges of the chela are thickly clothed with very long and soft pubescence, directed distally. The succeeding pairs of legs are very nearly as in *N. Stewarti.* The second pair are about three-fourths as long as the chelipeds, slender and perfectly chelate. The third pair are a little longer than the second and not quite as perfectly chelate. The fourth are a little longer than, and the fifth about as long as, the chelipeds.

Very imperfect *female* specimens, considerably larger than the males above described, have the chelipeds a little larger and stouter proportionally than in the males, and the pleura of the second to the fifth somite of the abdomen very slightly less prolonged, but still acuminate and spiniform, and very different from *N. Stewarti.*

One of the males and an imperfect female give the following:

Measurements.

	♂	♀
	mm.	*mm.*
Length from tip of rostrum to tip of telson	34.0	.....
Length of carapax, including rostrum	16.4	.....
Length of rostrum	7.0	.....
Length of rostrum in front of spines	4.6	.....
Breadth of carapax	5.5	.....
Height of carapax	6.0	.....
Length of chelipeds	20.0	32.0
Length of merus	7.0	11.0
Length of carpus	3.5	5.0
Length of chela	7.1	12.5
Breadth of chela	2.3	4.9
Length of dactylus	4.0	6.2
Length of second pair of legs	15.5	24.0
Length of merus	5.7	9.0
Length of carpus	2.6	4.0
Length of chela	3.8	6.7
Breadth of chela	0.8	1.3
Length of dactylus	1.4	2.2
Length of third pair of legs	17.5	27.0
Length of carpus	3.1	4.8
Length of propodus	5.3	8.0
Breadth of propodus	0.5	0.8
Length of propodal digit	1.1	1.8
Length of dactylus	1.9	2.1
Length of fourth pair of legs	22.0	33.0
Length of propodus	5.2	7.9
Length of dactylus	2.8	4.8
Length of fifth pair of legs	20.5	31.0
Length of propodus	5.0	7.3
Length of dactylus	3.0	4.5
Length of telson	3.9	.....
Breadth of telson	2.6	.....

Station 873; 100 fathoms (3 males). Station 876; 120 fathoms (one very imperfect female from the stomach of *Lopholatilus*). Station 877; 126 fathoms (fragments of two or three specimens).

As Wood-Mason has remarked, the genus *Nephropsis* is closely allied

to *Nephrops*. The structure and arrangement of the branchiæ were apparently not examined by Wood-Mason, but in our species they agree with *Nephrops Norvegicus*, there being nineteen branchiæ upon each side, arranged like the nineteen posterior branchiæ of each side of *Homarus*. The branchia of the second maxilliped is wholly wanting, unless it is represented by a minute, papilla-like process near the base of the epignath. The oral appendages agree perfectly with those of *Nephrops Norvegicus*. The densely pubescent chelipeds, however, are very different from the naked and carinated chelipeds of *Nephrops*, and probably afford an additional generic distinction.

Axius armatus, sp. nov.

Female.—The carapax is strongly compressed, about twice as long as high, smooth and nearly naked. The rostrum is narrow, acuminate, spiniform at the tip, and armed along each edge with four or five slender, acute, and spiniform teeth, directed forward and slightly upward. From the edge of the rostrum a sharp lateral carina runs back on each side more than a third of the way to the cervical suture. The dorsal carina is sharp anteriorly, extends back nearly to the cervical suture, but anteriorly only as far as the posterior marginal teeth of the rostrum, and is armed with two spiniform teeth just back of the base of the rostrum. About half way between the dorsal and lateral carinæ there is a very distinct subdorsal carina, parallel with and extending back nearly as far as the dorsal, and in front turned abruptly inward opposite the posterior dorsal tooth, but not quite reaching the dorsal carina.

The eyes are small and black.

The peduncle of the antennula reaches by the tip of the rostrum the full length of the last segment, and the flagella are subequal in length and about as long as the carapax. The third segment of the peduncle of the antenna is armed with a slender spine on the lower side of the distal end. The distal spine on the second segment, at the base of the acicle, is slender, acute, and more than half as long as the rest of the segment, while the acicle is slender, straight, and as long as the fourth segment, which is slender, and about as long as the second segment together with its distal spine. The fifth, or last, segment is not more than a third as long as the fourth. The flagellum is more than twice as long as the carapax.

The merus of the external maxilliped is armed at the distal extremity of the lower edge with two very long and slender spines.

The larger cheliped is about twice as long as the carapax, and the chela itself, to the tip of the dactylus, is nearly as long as the carapax. The propodus is strongly compressed, about half as broad as the entire length and three-fourths as broad as the length of the basal portion, which is convex on both sides and has the edges sharp and carinated. The digital portion is longitudinal, about three-fourths the entire length, more than half as long as the basal portion, slightly upturned at the tip,

and armed with a stout tooth near the middle of the prehensile edge. The dactylus is as long as the basal portion of the propodus, about three-fourths longer than the propodal digit, strongly curved toward the tip, and the prehensile edge is sharp and minutely crenulate, but not toothed, and closes by the inner side of the tip of the propodus. The smaller cheliped is similar in form to the larger, but is considerably shorter and very much more slender, and the propodal digit is proportionately longer and its prehensile edge thin and minutely multidentate. Both chelæ are sparsely hairy on the digits and very slightly along the margins of the basal portions. The second pair of legs are very slender and a little longer than the carapax; the merus is about as long as the carpus and chela taken together; the carpus is less than half as long as and slightly narrower than the merus and about three times as long as broad; the chela is slightly longer but scarcely broader than the carpus, and the digits are slender, longitudinal, not gaping, and a little shorter than the basal portion. The third and fourth pairs of legs are very nearly alike, and as long as the second, but more slender; the merus is about as long as the carpus and propodus together; the propodus is about a third longer than the carpus; and the dactylus is slender, nearly straight, and about two-fifths as long as the propodus. The fifth, or posterior, legs are considerably shorter and much more slender than the third and fourth pairs, being nearly cylindrical; the merus is about as long as the propodus; the carpus about three-fifths as long; the dactylus is about half as long as the carpus.

The abdomen is much narrower than the carapax and not expanded in the middle, the sides being nearly straight and parallel. The lamellæ of the uropods are about as long as the telson, the outer as long as broad, the inner a little narrower. The telson is about a third longer than the sixth somite of the abdomen, about two-thirds as broad as long; the lateral edges are nearly parallel and each armed with about four small spines; the posterior margin is regularly arcuate. Near the middle of the dorsal surface there is a transverse line of four small spines, and there are one or two more between these and the tip.

An imperfect *male* specimen, wanting the chelipeds and most of the abdomen, has three spines in front on the dorsal carina, and the spines, of the rostrum slightly longer than in the female.

The single female gives the following:

	mm.
Length from tip of rostrum to tip of telson	44.0
Length of carapax to tip of rostrum	16.3
Length of rostrum	3.1
Height of carapax	8.2
Breadth of carapax	7.0
Length of right cheliped	31.0
Length of left cheliped	25.0
Length of right merus	8.3
Length of left merus	7.0
Length of right propodus	12.5

	mm.
Length of left propodus	9.0
Breadth of right propodus	6.0
Breadth of left propodus	3.1
Length of right propodal digit	4.5
Length of left propodal digit	4.0
Length of right dactylus	8.0
Length of left dactylus	5.2
Length of telson	5.5
Breadth of telson	3.8

Stations 873 and 878; 100 and 142 fathoms.

This species is at once distinguished from *A. stirynchus* and *A. serratus* by the narrower and acuminate rostrum, the teeth on the dorsal carina, the form of the chelipeds, and the more slender second, third, and fourth pairs of legs. In *A. stirynchus* and *serratus* the carpus in the second pair of legs is short, expanded distally, and less than half as broad as long, and the chela is nearly or quite half as broad as long.

Axius serratus Stimpson (Proc. Boston Soc. Nat. Hist., iv, p. 222, 1852; Smith, Trans. Conn. Acad., v, p. 55, pl. 10, fig. 4, 1879) was dredged the past season from the "Fish Hawk", in 20 fathoms, sandy bottom, in Narragansett Bay; and large specimens, taken on George's Banks, have been presented to the National Museum by Capt. John Q. Getchell and crew of the schooner "Otis P. Lord", of Gloucester, Mass.

These specimens show that Stimpson's species is distinct from the European *stirynchus*. The *serratus* is at once distinguished by its broad and depressed abdomen, which expands laterally in the middle, and is much broader than the carapax. The fourth segment of the peduncle of the antenna and the acicle are both proportionally much longer in *serratus* than in *stirynchus*, being nearly as long as in the species just described. The upper edge of the propodus in both chelipeds is thin and strongly carinated in *serratus*, but thick and rounded in *stirynchus*, and the smaller cheliped is much narrower and has much longer and more slender digits in *serratus* than in *stirynchus*.

Pontophilus Norvegicus M. Sars.

Stations 869, 870, 880, 881, 893, 894, 895; 155 to 372 fathoms.

The largest females are 74^{mm} long, the largest male 47^{mm}. Several of the specimens belong to the variety with the broad and obtuse rostrum described by Sars.

Pontophilus brevirostris, sp. nov.

Very closely allied to *P. spinosus* and *P. Norvegicus*, but readily distinguished from both these species by the very short rostrum, which is tridentate, with the median tooth scarcely broader and very little longer than the lateral, about reaching to the cornea of the inner side of the eye and not projecting beyond the line of the spiniform outer angles of the orbits. The proportions of the body are more like *spinosus* than *Norvegicus*, but the carination and armature of the carapax are more

like *Norvegicus*, while the sculpture of the distal somites of the abdomen is more like *spinosus*.

The dorsal carina of the carapax is armed with three spines, and usually a smaller fourth one in front of the others and just back of the base of the rostrum; the subdorsal carina is armed with two spines, as in *Norvegicus*, and often with a rudiment of a third behind these; the lateral carina does not extend back of the middle of the carapax, and is armed with a single spine, as in *Norvegicus*. There are no distinct carinæ on the first four somites of the abdomen, but the fifth somite is flattened above and has subdorsal carinæ slightly diverging posteriorly, and below these, each side, another carina, nearly parallel with the subdorsal; and the sixth somite is flattened above and subdorsally carinated, as in *spinosus*, though the carinæ are not quite as conspicuous on either somite as in that species.

The eyes, antennulæ, and antennæ are very nearly as in *P. spinosus*. The external maxillipeds reach a little beyond the tips of the chelipeds, the penultimate segment reaches nearly to the tip of the antennal scale, and the ultimate segment is a little less than twice as long as the penultimate, while in *P. Norvegicus* it is about once and a half as long, and in *P. spinosus* much more than twice as long, as the the penultimate segment. The thoracic legs differ scarcely at all from those of *P. spinosus*.

The lamellæ of the uropods are very nearly as in *P. spinosus*. The inner lamella reaches nearly or quite to the tip of the telson, is lanceolate, and six or seven times as long as broad; the outer lamella is about a tenth shorter than the inner and about four times as long as broad. The telson is once and a fourth to once and two-fifths as long as the sixth somite of the abdomen, is very narrow, slightly acuminate, and has a very narrow and acutely triangular tip, armed with only two very long, slender, and plumose setæ, which arise near together from the under side.

This species appears to be much smaller than either *Norvegicus* or *spinosus*. The following measurements are from two of the larger specimens:

	♂.	♀.
	mm.	*mm.*
Length from tip of rostrum to end of telson	24.5	36.0
Length of carapax along dorsum	6.0	9.5
Length of rostrum in front of the back of the orbit	0.7	0.8
Breadth of carapax at anterior margin	3.7	5.9
Greatest breadth of carapax	3.8	7.1
Length of sixth somite of abdomen	3.9	5.3
Breadth of the same in the middle	1.1	1.9
Length of telson	5.0	7.5
Length of antennal scale	3.0	4.4

Stations 865 to 867, 870 to 874, 877, 878; 65 to 155 fathoms. At most of these stations it was taken in great abundance.

Hippolyte securifrons Norman.

Stations 897 and 880; 225 and 252 fathoms; three large females.

The branchial formula of this species, written essentially after Huxley's method, is:

Somites.	Podobranchiæ.	Arthrobranchiæ.	Pleurobranchiæ.	
VII	0 (ep.)	0	0	=0 (ep.)
VIII	1 (+ep.)	0	0	=1 (+ ep.)
IX	0 (ep.)	0	0	=0 (ep.)
X	0 (ep.)	0	1	=1 (+ ep.)
XI	0 (ep.)	0	1	=1 (+ ep.)
XII	0 (ep.)	0	1	=1 (+ ep.)
XIII	0	0	1	=1
XVI	0	0	1	=1
	1+6 ep.	0	5	6 + 6 ep.

Bythocaris sp.

Stations 865 to 867, 872, 874, 878; 64 to 142 fathoms.

Pandalus propinquus G. O. Sars, Christiania Videnskabs-Selskabs Forhandlinger, 1859, p. 148 (4); *ibid.*, 1871, p. 259 (16).

Stations 878, 879, 880, 893, 894, 875; 142 to 365 fathoms. The largest specimen is a female, over 110^{mm} in length.

This species was dredged in 1879 in the Gulf of Maine, off Cape Cod, station 305, N. lat. 42° 9′ 30″, W. long. 69° 41′, 118 fathoms, soft mud; and station 343, N. lat. 42° 17′, W. long. 69° 51′, 116 fathoms, mud. A male, 74^{mm} long, from station 305, has the chelate second pair of legs reversed, the short one being on the left and the long one on the right! The legs themselves are of the normal size and structure, and the specimen appears to be perfectly normal in all other respects.

As far as I am aware, the species has heretofore been recorded only from deep water off the coast of Norway.

Pandalus leptocerus, sp. nov.

In size and general appearance much like *P. Montagui* (*annulicornis*), but more slender and readily distinguished from it, and from *P. propinquus* and *borealis* as well, by the minutely roughened surface and the presence of exopods upon the external maxillipeds.

The rostrum is from about once and a third to nearly twice as long as the rest of the carapax, and curved very slightly upward, but usually not as much so as in *P. Montagui*. Above, it is armed with eleven to thirteen teeth, of which one is near the tip, as in *P. Montagui*, and usually only two back of the orbit on the carapax proper, while a considerable space back of the terminal spine is unarmed, though this space is usually shorter than in *P. Montagui*. Beneath, there are 6 to 8 teeth, as in *P. Montagui*. The entire surface of the carapax and abdomen is slightly roughened with short and irregular, transverse, punctate ridges, which give rise to very short, bristle-like hairs, while in *P. Montagui*, *propinquus* and *borealis* the surface is naked and very smooth. The

carapax is considerably more slender than in *P. Montagui*, and the posterior tooth of the dorsal carina is farther forward, being much in front of the middle. The abdomen is more slender than in *P. Montagui;* but, except for the greater slenderness, there is scarcely any difference in the form or proportions of the somites, or the form and armature of the telson and uropods. There are slender exopods, about a third as long as the ischia, at the bases of the external maxillipeds, but the endopods themselves are as in *P. Montagui;* the merus reaches to the base of the flagellum of the antenna, and the tip falls considerably short of the tip of the antennal scale.

The first pair of legs are nearly as in *P. Montagui.* The right chelate leg of the second pair is shorter and stouter than in *P. Montagui*, and scarcely reaches the tip of the corresponding leg of the first pair; the ischium is about a fourth the entire length; the merus is only a little shorter than the ischium; the carpus increases in thickness distally, is a little longer than the ischium, not more than about once and a half as long as the merus, and usually composed of only five segments, the proximal half being wholly unsegmented or annulated, then three subequal and very distinct segments, about as broad as long, and these followed by the terminal segment, which is about as long as the three next preceding; the chela is about half as long as the carpus and a little stouter than its distal end.* The left chelate leg is a little shorter and stouter than in *P. Montagui*, but has about the same number of segments in the merus and carpus, and does not differ in other respects. The third, fourth, and fifth pairs of legs differ from those of *P. Montagui* in being a little more slender and in having much longer, much more slender, and nearly cylindrical dactyli, which are wholly unarmed, except a few small spinules beneath near the base.

*The proportions of the segments and the segmentation of the carpus in the unequal second pair of legs in the genus *Pandalus* appear to be usually very constant and to afford very good specific characters, but they occasionally present very remarkable variations. In carefully examining several hundred specimens of this species, only about half a dozen were found which varied from the above description in the segmentation of the left carpus; two or three specimens had an additional but less distinctly indicated segment back of the four distal ones, making six in all. Two specimens had three additional segments inserted in the same way, making eight in all; but in both these specimens the segmentation was more or less irregular, and the additional segments may have resulted from some injury. One large female, quite normal in other respects, has the right carpus multiarticulate throughout and composed of about eighteen segments, nearly as in *P. Montagui;* the whole leg, however, is shorter than in other specimens of the same size, and may have been reproduced, though I cannot see how this would explain its abnormal structure. Detailed measurements of both chelate legs in most of these abnormal specimens are given beyond in the tables of measurements.

One female, 70^{mm} long, stations 290 to 291, 30 to 31 fathoms, off Cape Cod, has the chelate legs reversed, just as in the specimen of *P. propinquus* already referred to.

Measurements.

Number.	Station.	Sex.	Length.	Carapax and rostrum.	Length of rostrum.	Breadth of carapax.	Rostrum, formula.
			mm.	*mm.*	*mm.*	*mm.*	
1	373, off Cape Cod, 42 fathoms	♂	52	22.0	12.7	5.5	$\frac{3+8+1}{6}$
2	878, off Block Island	♂	60	25.4	15.8	6.0	$\frac{2+8+1}{7}$
3	372, off Cape Cod, 70 fathoms	♂	75	36.0	23.1	7.3	$\frac{2+9+1}{7}$
4	878, off Block Island	♀	61	27.8	17.0	6.5	$\frac{2+8+1}{6}$
5	878, off Block Island	♀	65	29.0	17.5	6.2	$\frac{2+10+1}{7}$
6	372, off Cape Cod, 70 fathoms	♀	80	35.0	21.3	8.1	$\frac{2+9+1}{7}$
7	878, off Block Island	♀	82	38.3	24.8	8.0	$\frac{2+10+1}{8}$
8	878, off Block Island	♀	84	39.5	24.5	8.9	$\frac{2+9+1}{6}$
9	372, off Cape Cod, 70 fathoms	♀	90	41.1	26.2	8.9	$\frac{2+9+1}{7}$
10	33, off Cape Ann, 90 fathoms	♀	90	42.0	26.5	9.5	$\frac{2+10+1}{7}$
11	33, off Cape Ann, 90 fathoms	♀	91	42.3	27.2	9.5	$\frac{2+10+1}{7}$
12	33, off Cape Ann, 90 fathoms	♀	98	43.5	27.4	10.2	$\frac{2+9+1}{6}$

Detailed measurements of each of the chelate legs, and the number of segments in the carpus, of nine of the above specimens are given below. The first three columns give the number, sex, and length of each specimen, as in the table above; columns four to nine give the entire length of the leg and the lengths of each of the five distal segments; and the last column gives the number of segments in the carpus. For the left carpus this last number is not perfectly definite, as the segmentation becomes irregular and indistinct toward the proximal end.

No.	Sex.	Length.	Right chelate leg.						
			Length.	Ischium.	Merus.	Carpus.	Propodus.	Dactylus.	No. segs. in carp.
		mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	
1	♂	52	13	3.4	2.7	4.1	2.1	0.9	5
2	♂	60	15	4.0	3.2	4.5	2.6	1.1	5
3	♂	75	22	5.2	4.9	7.0	3.8	1.5	5
6	♀	80	23	5.9	5.1	7.2	4.0	1.6	5
10	♀	90	24	6.6	5.3	7.6	3.9	1.6	5
7	♀	82	20	5.5	4.4	6.5	3.2	1.2	18
4	♂	61	15	4.1	3.2	4.6	2.5	1.0	6
5	♂	65	16	4.0	3.2	5.0	2.5	1.0	8
8	♀	84	22	5.5	1.6	7.0	3.4	1.3	8

No.	Sex.	Length.	Left chelate leg.						
			Length.	Ischium.	Merus.	Carpus.	Propodus.	Dactylus.	No. segs. in carp.
		mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*	
1	♂	52	24	5.5	4.5	10.1	1.1	0.6	53
2	♂	60	27	6.5	5.9	12.3	1.2	0.6	53
3	♂	75	35	9.0	8.0	15.0	1.9	0.9	58
6	♀	80	37	9.0	8.5	16.0	2.0	1.0	64
10	♀	90	41	10.3	8.8	18.2	2.0	1.0	64
7	♀	82	39	10.0	8.4	17.6	1.9	0.9	63
4	♂	61	27	6.7	5.7	12.2	1.1	0.6	54
3	♂	65	27	6.6	5.8	12.1	1.2	0.6	52
8	♀	84	39	9.0	8.8	17.5	1.9	0.8	56

Station 870, 155 fathoms (abundant); 873, 100 fathoms; 878, 142 fathoms (very abundant). It was also taken in abundance this season at many stations in shallow water off Rhode Island.

In the dredgings off Cape Cod, in 1879, this species occurred at a great number of the stations, in 15 to 116 fathoms, and was very often associated with *P. Montagui*, and at 116 fathoms with *P. propinquus*. It was particularly abundant in 25 to 50 fathoms, several quarts of specimens often being taken at one haul of the trawl. In the dredgings previous to 1879 it occurred very much less abundantly, and was carelessly confounded with *P. Montagui*, under which name specimens of *P. leptoceras* may have occasionally been distributed in the sets of specimens made up from the Fish Commission collections and distributed from the National Museum. In the dredgings of 1877–'78, it occurred sparingly, in 22 to 48 fathoms, in Massachusetts Bay; and in 75 to 90 fathoms, in the Gulf of Maine, off Cape Ann, in considerable abundance and of large size; in both localities associated with *P. Montagui*, and in the Gulf of Maine with *P. borealis* also. In Casco Bay, in 1873, a few specimens only were taken. Among great numbers of specimens of *P. Montagui* from the Bay of Fundy I have not succeeded in finding a single specimen of the new species, although it very likely occurs there. At Halifax, Nova Scotia, a few specimens only, most of them very small, were taken, and these were from 18 fathoms. In the region of George's Banks, in 1872, it was taken in 30, 45, 50, 60, and 430 fathoms,

and appears to have been more common than *P. Montagui*, which occurred with the *leptocerus* in 30 and 45 fathoms, and alone in 28 fathoms.*

Pandalus tenuipes, sp. nov.

This species is smaller but has a proportionally thicker body than *P Montagui*, and the surface of the carapax and abdomen are very minutely roughened, somewhat as in the last species, but the punctate ridges are much less conspicuous and much more thickly crowded than in that species.

The carapax, including the rostrum, is about two-fifths of the entire length, and the carapax proper is nearly as long as the rostrum, slightly swollen in the middle, somewhat contracted in front, as seen from above, and with the rostral carina extending back to about the middle, and armed, at about a third of the way from the front, with two to four slender teeth, crowded close together and rapidly decreasing in size posteriorly; but between these teeth and the posterior tooth of the rostrum the carina is wholly unarmed. The rostrum is curved upward a little more than in *P. Montagui*, is not expanded below, and is armed the whole length above with eight to ten teeth, which are usually more widely separated distally, though in some specimens the terminal two or three are crowded together near the tip; beneath there are six to ten small teeth.

The eyes are black and as broad as long, but shorter than in *P. Montagui*. The peduncle of the antennula reaches to near the middle of the antennal scale, and the two distal segments are subequal in length and each about as broad as long. The antennular flagella are subequal in length and much longer than the carapax, including the rostrum; the proximal half of the outer flagellum is very much thickened, the terminal portion very slender, as is the inner flagellum throughout. The antennal scale is approximately four-fifths as long as the rostrum, and of very nearly the same form as in *P. Montagui*. The external maxillipeds are very slender, reach to about the tip of the rostrum, and have well-developed exopods, fully half as long as the ischium; the ischium is a little longer than the rest of the endoped, which is composed, as in *P. Montagui*, of only two distinct segments beyond the ischium, and in this case these two segments are subequal in length.

The first pair of legs are very slender and reach to the tips of the external maxillipeds. The second (chelate) legs are exactly alike, and reach to or considerably by the tips of the antennal scales. The ischium is a little longer than the merus; the carpus a little less than twice as long as the merus, slightly shorter than the antennal scale, and composed of about fifteen segments, of which the proximal are separated by

*In the report on the dredgings in the region of George's Banks (Smith and Harger, Trans. Conn. Acad., iii, pp. 1–57, pls. 1–8, 1874), "*Pandalus annulicornis*" is reported from the following stations: *b*, 30 fathoms; *c*, 28 fathoms; *d*, 50 fathoms; *e*, 60 fathoms; *g*, 430 fathoms; and *q*, 45 fathoms; but on re-examining the specimens I find all those preserved from *b*, *e*, and *g* are *P. leptocerus*, the single specimen from *c* is *P. Montagui*, while from *d* and *q* there are specimens of both species.

indistinct articulations, while the four or five distal ones are separated by conspicuous articulations, of which the ultimate is about twice as long as broad, but the next three or four, each, only about half as long as broad. The chela is slender, only a very little stouter than the distal end of the carpus, nearly a third as long as the carpus, and about half as long as the merus, and the digits are alike, about as long as the basal portion, slightly gaping, and with a very few long, setiform hairs. The third, fourth, and fifth pairs of legs are exceedingly slender, sparsely armed with minute spinules and slender setæ; and the dactyli are very long and slender, slightly and regularly bent, and flattened a little vertically (or in the direction of the plane of the cervature), and wholly unarmed; the fifth pair reach beyond the tip of the rostrum, and the fourth and third pairs are successively a little longer; the dactylus in the fifth pair is a third or a little more than a third as long as the propodus, in the fourth pair a little longer than in the fifth, and in the third pair not far from half as long as the propodus.

The abdomen is evenly rounded and not at all compressed above, and less geniculated at the third segment than in *P. Montagui*. The sixth segment is about once and two-thirds as long as the fifth. The telson is about once and a half as long as the sixth segment, and terminates in an acutely triangular tip, armed each side with two long spines, of which the proximal is very much the longer, and at the extreme tip with a few long, plumose setæ.

Measurements.

Number.	Station.	Sex.	Length.	Carapax and rostrum.	Length of rostrum.	Breadth of carapax.	Rostrum, formula.
			mm.	*mm.*	*mm.*	*mm.*	
1	871, off Block Island	♂	42	19.2	10.0	5.1	$\frac{4+6}{8}$
2	870, off Block Island	♂	50	22.0	11.8	6.2	$\frac{3+7}{9}$
3	878, off Block Island	♀	40	16.5	8.3	5.0	$\frac{3+6}{7}$
4	879, off Block Island	♀	61	25.0	12.8	8.0	$\frac{2+6}{7}$

Some of the legs of these specimens give the following measurements:

Number.	Leg.	Length.	Ischium.	Merus.	Carpus.	Propodus.	Dactylus.
		mm.	*mm.*	*mm.*	*mm.*	*mm.*	*mm.*
1	2d	17.0	4.2	3.8	6.3	2.0	1.0
1	3d	26.0	3.0	10.0	4.7	5.3	3.0
1	5th	24.0	2.0	8.7	5.0	5.5	1.9
2	3d	28.0	3.0	11.6	4.6	5.7	2.5
2	4th	26.7	2.5	11.0	4.6	5.7	2.3
2	5th	25.2	2.5	10.0	5.1	5.0	2.0
3	4th	24.3	2.1	9.1	4.6	5.5	2.3
3	5th	23.5	2.0	8.2	5.4	5.7	1.5
4	2d	25.0	6.5	5.5	9.7	2.7	1.2

Stations 870, 871, 873, 877, 878, 880; 100 to 252 fathoms. Three females from 878, 142 fathoms, were carrying eggs.

The genus *Pandalus*, as at present recognized, apparently contains species representing two or more genera, and the species just described is probably not strictly congeneric with *P. Montagui*, the type species. The equal, chelate legs and the slender, unarmed dactyli of the third, fourth, and fifth pairs of legs separate *P. tenuipes* widely from *Montagui*. The oral appendages afford some characters not indicated in the above description. In *P. tenuipes* the proximal segment of the mandibular palpus is dilated, though not quite as conspicuously as in *P. Montagui;* the posterior lobe of the scaphognath of the second maxilla is very short, broad, obtusely rounded at the extremity, and projects very little back of the base of the endognath, while in *P. Montagui* and the allied species it is very much prolonged and acutely triangular posteriorly; in the second maxilliped the dactylus is about as long as broad and articulated with the oblique distal end of the propodus, while in *P. Montagui* and its allies the dactylus is a narrow plate, articulated by one edge to the distal part of the mesial edge of the propodus.

The branchiæ of *P. tenuipes* are the same in number and arranged in the same way as in *P. Montagui* and *P. borealis;* that is, there are twelve branchiæ plus seven epipods on each side; or, stated in full, the branchial formula is:

Somites.	Podobranchiæ.	Arthrobranchiæ.	Pleurobranchiæ.	
VII	0 (ep.)	0	0	=0 (ep.)
VIII	1 (+ep.)	0	0	=1 (+ep.)
IX	0 (ep.)	2	0	=2 (+ep.)
X	0 (ep.)	1	1	=2 (+ep.)
XI	0 (ep.)	1	1	=2 (+ep.)
XII	0 (ep.)	1	1	=2 (+ep.)
XIII	0 (ep.)	1	1	=2 (+ep.)
XIV	0	0	1	=1
	1+7 ep.	6	5	=12+7 ep.

Penæus politus, sp. nov.

Male.—The carapax and abdomen are naked and smooth and the carapax is armed with well-developed antennal, hepatic, and branchiostegial spines, but the sulci are all shallow and indistinct. The rostrum is short, acute, about two-fifths as long as the rest of the carapax, scarcely overreaches the eyes, rises obliquely from the anterior part of the carapax, and then points straight forward; its dorsal crest is armed with seven or eight teeth, of which the posterior one is just back of the orbit, while the two or three most anterior ones near the tip are small or inconspicuous and nearer together than toward the base; the lower edge is ciliated and minutely multidentate, the teeth being slender, acute, and closely crowded, so that, to the naked eye, the edge appears entire. The dorsal crest extends nearly the whole length of the carapax, but gradually fades out posteriorly, and, at about a third of the way from the base of the rostrum to the posterior border, rises into a low and obscure dentiform prominence.

The eyes are very large, obliquely compressed, and black. The peduncles of the antennulæ reach to the tips of the antennal scales; the lamelliform appendages of the basal segments are small, narrow, and do not cover the eyes above, but lie concealed between the eyestalks; the second segments are slightly longer than the basal, while the third are not quite half as long as the second; the inner flagellum is about as long as the carapax, including the rostrum, and tapers regularly throughout its length; the outer flagellum is slightly shorter than the inner, and suddenly expanded toward the base, but the terminal portion more slender than in the inner flagellum. The antennal scales are about twice as long as the rostrum, rather more than a fourth as wide as long, and taper regularly to the broadly rounded tips. The terminal segment of the peduncle of the antenna is scarcely a fourth as long as the antennal scale, and the flagellum is slender and much longer than the whole body.

The external maxillipeds are slender, and reach a little beyond the middle of the antennal scale, and their exopods to about the middle of the carpi of the endopods. The first pair of legs reach only to the middle of the carpi of the external maxillipeds, the second pair to near the middle of the propodi, and the third and fourth pairs to the tips of the external maxillipeds, and the fifth a little beyond the tips of the fourth pair. The dactyli of the fourth and fifth pairs are slightly compressed, and only about half as long as the propodi.

The first, second, and third abdominal somites are rounded above, but the fourth, fifth, and sixth are compressed and sharply carinated dorsally. The sixth somite is very much compressed, longer than the fourth and fifth taken together, and about twice as long as high. The telson is shorter than the sixth somite, dorsally sulcated with the margins of the sulcus terminating posteriorly in a long spine either side of the tip, which is itself imperfect in the single specimen seen. The outer

lamellæ of the uropods are about as long as the sixth somite, oblong-elliptical, about four times as long as broad, and the terminal spine of the outer margin about a fourth of the way from the tip to the base. The inner lamella is a little shorter, and proportionally very slightly narrower. The bases of the first pair of abdominal legs are connected by a very large and complex sexual appendage, nearly twice as long as the bases themselves.

The only specimen seen is from station 878 (142 fathoms), and gives the following measurements:

	mm.
Length from tip of rostrum to tip of telson	61.0
Length of carapax and rostrum	20.0
Length of rostrum	5.6
Breadth of carapax	6.5
Length of antennal scale	11.0
Length of sixth abdominal somite	10.6
Length of telson	8.2+

Sergestes arcticus Kröyer, Oversigt danske Vidensk. Selsk. Forhandl. Kjöbenhaven, 1855, p. (6); Monograph. Sergestes, Vidensk. Selsk. Skr., v, naturvidensk. mathem. Afh., iv, pp. 240, 276, pl. 3, figs. 7, pl. 5, figs. 16, 1856.

Stations 880, 881, 891, 893, 894; 252 to 500 fathoms; thirty specimens, most of them in good condition, and several about 60^{mm} in length.

Sergestes, sp.

Station 893; 372 fathoms; three specimens, over 60^{mm} in length. The species is different from any described by Kröyer.

SCHIZOPODA.

Thysanopoda Norvegica Sars.

Stations 879, 880; 225 and 252 fathoms.

Lophogaster, sp.

Station 870; 155 fathoms. A species very distinct from *L. typicus* Sars.

Boreomysis arctica G. O. Sars, Christianiafjordens Dybvandsfauna, p. 26, 1869 (extr. Nyt Magazin for Naturvidenskberne); Christiania Videnskabs-Selskabs Forhandlinger, 1871, p. 264 (21).—Metzger, Jahresbericht der Comm. wissensch. Untersuchung der deutschen Meere für 1872, 1873, Nordsee, p. 288, 1875.—*Mysis arctica* Kröyer, Et Bidrag til Kundskab om Krebsdyrfamilien Mysidæ, Naturhistorisk Tidsskrift, III, i, pp. 34, 42, pl. 1, fig. 5, 1861.

Station 891; 500 fathoms.

Pseudomma roseum G. O. Sars, Christiania Videnskabs-Selskabs Forhandlinger, 1869, p. 154 (10); Carcinologiske Bidrag til Norges Fauna, Mysider, part i, p. 54, pl. 4, 1870; Hardangerfjordens Fauna, Christiania Videnskabs-Selskabs Forhandlinger, 1871, p. 263 (20); Archiv for Mathematik og Naturvidenskab, Kristiania, ii, p. 344, 1877.—Metzger, Jahresbericht der Comm. zur wissensch. Untersuchung der deutschen Meere für 1872, 1873, Nordsee, p. 288, 1875.—Whiteaves, Report on further Deep-Sea Dredging Operations in the Gulf of St. Lawrence [in 1873], p. 16, [1874?].—Smith, Trans. Conn. Acad., v, p. 98, 1879.

Station 891; 500 fathoms.

CUMACEA.

Diastylis quadrispinosus G. O. Sars.

Stations 871, 873, 878; 100 to 142 fathoms.

STOMATOPODA.

Lysiosquilla armata, sp. nov.

This species appears to be closely allied to *L. spinosa* Miers, from the Indian Ocean and New Zealand, or at least more closely than to any of the other species contained in Mr. Miers's recent review of the Squillidæ (Ann. Mag. Nat. Hist., V, v, pp. 1–49, pls. 1–3, 1880).

The carapax is smooth and about once and two-thirds as long as the breadth at the anterior margin, which is about two-thirds of the greatest breadth. The rostral plate is about half as broad as the anterior part of the carapax, very slightly longer than broad, the lateral edges not angulated, but strongly convex in outline, and curved regularly round to the short but sharp and acuminate tip. The four exposed thoracic somites and the first abdominal somite increase rapidly in breadth posteriorly, but from the second to the fifth somite the abdomen is of a nearly uniform width, which is about equal to the length of the carapax. The free thoracic somites, like the anterior abdominal, are smooth and unarmed, except that the first somite projects downward either side in a lamellar, transverse, dentiform process below the posterior margin of the carapax. The five anterior abdominal somites are evenly rounded above and smooth, but the posterior edge of the fourth somite is armed either side for about a fourth of its length from the lateral margin with slender, spiniform teeth, directed backward, and the entire posterior margin of the fifth somite is armed in the same way. The sixth somite is about three times as broad as long, only a little narrower than the fifth; the postero-lateral angle each side is armed with a stout, dentiform spine, back of and within which the dorsal surface is uneven and armed with five to seven spines or tubercles, of which the two or three most posterior are slender spines, but the others more or less tuberculiform and inconspicuous; the middle portion of the dorsal surface is smooth, and the posterior margin, except a short space each side, is armed with slender, spiniform teeth, as in the fifth somite.

The telson is nearly as wide as the sixth abdominal somite and about once and two-thirds as wide as long; the middle portion of the dorsal surface rises in a smooth, oval, longitudinal area, projecting behind above the posterior margin, limited each side by a line of short spinules, and its narrow posterior extremity truncated and three-lobed or obtusely tridentate; each side of this smooth area the surface is armed with many spinules or small tubercles, showing a tendency to arrangement in longitudinal lines; the lateral margins are expanded in front of the large lateral spines of the posterior margin and armed with a few spinules; the posterior margin is armed each side with three spines, of which the

two outer are large, dentiform, and have a spinule between them, while the terminal or inner spines are smaller, slender, and movable, and separated from the large lateral spines by a space armed with three or four spinules, while the margin between the movable spines forms an obtuse, re-entering angle, each side of which is armed with a close-set series of seven to ten slender spinules.

The eyes are large, as broad as the rostral plate, and black. The antennal scale is narrowly elliptical, about three times as long as broad, and the margins ciliated. The prehensile edge of the dactylus of the large "raptorial limbs" (second maxillipeds) is armed with ten slender spines, which decrease in length distally. The bases in each of the three posterior pairs of thoracic legs are armed on the outer side with a conspicuous, acute, and somewhat hooked spine, projecting over the articulation of the next segment. The appendages of the antipenultimate segments of the three posterior pairs of thoracic legs are lamellar and broadly elliptical, though those of the anterior pair are a little shorter and those of the posterior pair slightly narrower than the others. The base of the uropods is armed above with a spinulose crest, running from the base to the articulation of the outer ramus, and at the distal end below with two dentiform spines as long as the inner ramus, below the articulation of which there is another but much smaller spine on the base. The proximal segment of the outer ramus is crested above, the distal part of the outer edge is armed with a crowded series of stout, spiniform setæ, and the lamellar terminal segment is elliptical, nearly as long as the base, and has its edges ciliated. The inner ramus is much longer and narrower than the terminal segment of the outer ramus, which in other respects it resembles.

Measurements.

	♂	♀
	mm.	*mm.*
Length	38.0	47.0
Leng h of carapax along median line, excluding rostrum	7.3	10.0
Breadth of carapax at anterior margin	4.2	6.0
Greatest breadth of carapax	6.3	9.0
Length of rostral plate	2.1	2.6
Breadth of rostral plate	2.2	2.8
Greatest breadth of abdomen	8.0	10.2
Length of telson	3.8	5.0
Breadth of telson	6.6	8.5

Station 865, 65 fathoms (one male); 876, 120 fathoms (one somewhat mutilated female, from the stomach of *Lopholatilus*).

AMPHIPODA.

Stegocephalus ampulla Bell.

One specimen from station 895; 238 fathoms.

Epimeria loricata G. O. Sars, Archiv for Mathem. Naturvidenskab, Kristiania, iv, p. 450, 1879.

Stations 869 to 871, 879, 880, 893 to 895; 115 to 372 fathoms. Abundant at 869, 192 fathoms, and 894, 365 fathoms. Sars's specimens were

from 123 to 232 fathoms, north latitude 75° 30′ to 80°, east longitude 17° 50′ to 8° 15′, west of Spitzbergen.

A few, mostly small, specimens of this species were dredged at different points in the Gulf of Maine, in from 32 to 110 fathoms, 1873, 1874, and 1878, and in 88 fathoms (station 43), off Nova Scotia, in 1877. Mr. Whiteaves dredged it also in the Gulf of Saint Lawrence in 1871, 1872, and 1873. Some of these northern specimens were labeled "*Epimeria cornigera?*" by me, and have been so referred to by Mr. Whiteaves, in his reports on dredging expeditions to the Gulf of Saint Lawrence, in the Annals and Magazine of Natural History for November, 1872, and in the American Journal of Science, III, vii, 213, 1874; and by Professor Verrill, in the last named serial, vii, p. 407, 411, 1874, and ix, p. 414, 1875.

Haploops setosa Boeck, Christiania Videnskabs-Selskabs Forhandlinger, 1870, p. 228 (148); Scandinav. Arktiske Amphipoder, p. 541, pl. 30, fig. 7, 1876.—G. O. Sars, Archiv for Mathematik Naturvidenskab, Kristiania, ii, p. 350, 1877.

Station 880; 252 fathoms; one specimen.

I have examined numerous specimens of this species from different parts of the Gulf of Maine, the Bay of Fundy, off Nova Scotia, and from the Gulf of Saint Lawrence (Whiteaves). In the Bay of Fundy and off Nova Scotia the specimens were dredged in from 20 to 100 fathoms.

Ptilocheirus pinguis Stimpson.

Stations 865 to 867, 872; 65 to 86 fathoms.

Ericthonius difformis Milne-Edwards.—*Cerapus rubricornis* Stimpson.—Smith, Trans. Conn. Acad., iv, p. 278, 1880.

Station 861; 192 fathoms; three specimens.

Unciola irrorata Say.—*Glauconome leucopis* Kröyer.—Smith, Trans. Conn. Acad., iv, p. 280, 1880.

Stations 865 to 867, 869 to 872, 876, 778; 65 to 192 fathoms.

Neohela phasma, sp. nov.—*Neohela*, nom. nov., vice *Hela* Boeck, præoc.

This species is apparently very closely allied to *N. monstrosa* Boeck,* but has well-developed eyes, and the propodus in the second pair of gnathopods is different in form, besides other slight differences.

Male.—The head is about as long as and, including the stout lateral spines, fully as broad as the first somite of the peræon excluding its epimera; the anterior edge is slightly carinated and slightly concave in outline above the bases of the antennulæ, leaving a slightly prominent and obtusely angular rostrum and a fully as prominent and more acute angle either side, just back of which the large and prominently convex eyes, salmon-colored in the recently preserved alcoholic specimen, are situated. The antennulæ are much longer than the rest of the animal;

* Forhand. Scandinav. Naturforskeres Kiøbenhaven, 1860, p. 669, 1861; Christiania Videnskabs-Selskabs Forhandlinger, 1870, p. 261 (181); Scandinav. Arktiske Amphipoder, p. 643, pl. 32, fig. 1, 1876.

the first segment of the peduncle is nearly as long as the width of the head; the second segment is much more slender than the first and more than three times as long; the third segment is more slender than the second and considerably longer than the first; there is a well-developed secondary flagellum, as long as the third segment and composed of about nine slender segments; the primary flagellum is very slender and about one and a half times as long as the peduncle. The third segment of the peduncle of the antenna just reaches the distal end of the first segment of the peduncle of the antennula; there is a small, spiniform tubercle on the outside of the first segment, in line with the lateral spine of the head and the spiniform anterior angles of the first and second epimera. The distal portion of each antenna is wanting in the single specimen examined.

The first gnathopods are of nearly the same form as in *N. monstrosa*, as figured by Boeck, but the inferior edge of the propodus is nearly straight, and the spine at the distal end is directed straight out in line with the edge, and not downward as in the figure of *N. monstrosa*. In the second pair of gnathopods the carpus is about twice as long as broad, and has the unarmed prehensile edge much less oblique than represented in the figure of *N. monstrosa*. The first three pairs of peræopods are very nearly as in *N. monstrosa;* the last two pairs are wanting in the specimen.

The pleon is nearly as high but very much narrower than the last somites of the peræon: the first three somites are subequal in size and very similar in form; the fourth is as long but not quite as high as the third; the fifth is not more than two-thirds as long as the fourth; the sixth is only about half as long as the fifth. The telson is partially consolidated with the sixth somite, and somewhat triangular, with an obtuse tip. The uropods are as in *N. monstrosa*.

Measurements.

	mm.
Length from front of head to tip of telson	26.0
Length of head and peræon	17.8
Length of antennula	35.0
Length of first segment of peduncle	2.4
Length of second segment	8.2
Length of third segment	3.2
Length of secondary flagellum	3.2
Length of carpus in first gnathopod	3.1
Breadth of same	1.8
Length of propodus of first gnathopod	2.5
Breadth of same	2.0
Length of dactylus	2.7
Length of carpus of second gnathopod	2.7
Breadth of same	1.4
Length of propodus of second gnathopod	2.5
Breadth of same	1.8
Length of dactylus	2.0

Station 893; 372 fathoms; one specimen.

N. monstrosa, the type of this remarkable genus, and heretofore the only known species, was described from a single specimen, wanting most of the antennulæ and antennæ, dredged in Christiania Fiord, in 20 to 30 fathoms; and G. O. Sars has recently recorded a single mutilated specimen, dredged in 1,215 fathoms, between Norway and Iceland, by the Norwegian expedition of 1876.

ISOPODA.*

Janira alta Harger ex Stimpson.

Stations 865 to 867, 892; 65 to 487 fathoms.

Munnopsis typica M. Sars.

Station 878; 142 fathoms.

Cirolana polita Harger ex Stimpson.

Stations 871, 873, 876; 100 to 120 fathoms.

Gnathia cerina Harger ex Stimpson.

Stations 865 to 867, 892; 65 to 487 fathoms.

Syscenus infelix Harger, Marine Isopoda of New England, Report United States Fish Commission, vi, for 1878, p. 387, 1880.

Stations 893 to 895; 238 to 372 fathoms.

The following tabular synopsis of the known geographical distribution and the bathymetrical range, as far as ascertained by the investigations on our own coast, gives the principal facts in regard to the distribution of the species, and it will also serve as a condensed list of the species enumerated in the foregoing pages. In the first column the species are checked which are known to occur in the Straits of Florida or anywhere in the Caribbean region; in the second, those known in the shallow waters (under 30 fathoms) of the south coast of New England; in the third, those known from any part of the region from Cape Cod to Labrador; in the fourth, those known to occur in Greenland; in the fifth, those known on the coasts of Northern Europe or in the eastern part of the extreme North Atlantic; and in the sixth, those known from the Mediterranean.

* The Isopoda have been placed in Mr. Harger's hands for determination, but he has very kindly identified for me the few species here enumerated, which, however, are only a part of the whole number obtained.

List of the species enumerated in the foregoing paper, with a tabular statement of their geographical and bathymetrical range.

	Straits of Florida, &c.	Southern New England, 1–30 fathoms.	Northern New England, &c.	Greenland.	Northern Europe, &c.	Mediterranean.	Range in depth.
Brachyura:							
Hyas coarctatus		×	×	×	×		0–150
Collodes depressus	×						65–142
Euprognatha rastellifera	×						65–142
Lambrus Verrillii (*nov.*)							65–86
Cancer borealis		×	×				0–225
Geryon quinquedens			×				100–372
Bathynectes longispina	×						85–225
Acanthocarpus Alexandri	×						85–155
Ethusa microphthalma (*nov.*)							85
Anomura:							
Homola barbata						×	86
Latreillia elegans						×	85–86
Lyreidus Bairdii (*nov.*)							100–120
Hemipagurus socialis (*nov.*)							65–155
gracilis (*nov.*)							65–155
Parapagurus pilosimanus							250–372
Eupagurus bernhardus		×	×		×		0–150
Kröyeri			×	×	×		8–430
sp. nov							65–252
Munida Caribæa?	× ?						65–142
Macrura:							
Arctus depressus (*nov.*)							86
Nephropsis aculeata (*nov.*)							100–126
Axius armatus (*nov.*)							100–142
Pontophilus Norvegicus			×		×		101–372
brevirostris (*nov.*)							65–155
Hippolyte securifrons							27–252
Bythocaris, sp. nov					×		65–142
Pandalus propinquus							116–365
leptocerus (*nov.*)			×		×		15–430
tenuipes (*nov.*)		×	×				100–252
Penæus politus (*nov.*)							142
Sergestes arcticus				×			252–500
sp. nov							372
Schizopoda:							
Thysanopoda Norvegica			×	×	×		0–430
Lophogaster, sp. nov							155
Boreomysis arctica				×	×		500
Pseudomma roseum			×		×		45–500
Cumacea:							
Diastylis quadrispinosa		×	×				2–190
Stomatopoda:							
Lysiosquilla armata (*nov.*)							65–120
Amphipoda:							
Stegocephalus ampulla			×	×	×		110–238
Epimeria loricata			×		×		32–372
Haploops setosa			×		×		20–252
Ptilocheirus pinguis		×	×				0–150
Erichthonius difformis		×	×		×	× ?	0–192
Unciola irrorata		×	×	×	×		0–430
Neohela phasma (*nov.*)							372
Isopoda:							
Janira alta			×				0–300
Munnopsis typica			×	×	×		60–220
Cirolana polita			×				0–150
Guathia cerina			×				10–487
Syscenus infelix			×				130–372

A numerical summation of the columns of the above table gives the following:

	Whole number of species.	Straits of Florida, &c.	Southern New England, 1–30 fathoms.	Northern New England, &c.	Greenland.	Northern Europe, &c.	Mediterranean.
Brachyura	9	4	2	3	1	1	.....
Anomura	10	1?	1	3	1	2	2
Macrura	13	.....	1	3	1	3	.....
Schizopoda	4	.....	.....	2	2	3	.....
Cumacea	1	.....	1	1	.....	.....	.....
Stomatopoda	1	.....	.....	.....	.....	.....	.....
Amphipoda	7	.....	3	6	2	5	1?
Isopoda	5	.....	.....	5	1	1	.....
Total	50	5	8	23	8	15	3

In addition to the above facts in regard to the distribution of the species, it should be added that two of the species, *Lyreidus Bairdii* and *Nephropsis aculeata*, belong to genera heretofore known only from the Pacific region, and each represented there by a single species only; while a third species, *Lysiosquilla armata*, has its nearest known ally in a species known only from the same region.

Of the fifty species enumerated, fourteen are described as new and three others are indicated as probably new; forty-three are here first recorded as belonging to the New England fauna south of Cape Cod; twenty-eight are new to the whole fauna from Cape Hatteras to Northern Labrador; and twenty-one are new to America, including Greenland. Of the forty-three species new to the Southern New England fauna, fifteen are now known also from the New England fauna north of Cape Cod; and of the remaining twenty-eight, four were already known from the Straits of Florida, three from Greenland and Northern Europe, and two from the Mediterranean.

NEW HAVEN, CONN., *November* 12, 1880.

LIST OF THE FISHES OF THE PACIFIC COAST OF THE UNITED STATES, WITH A TABLE SHOWING THE DISTRIBUTION OF THE SPECIES.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The writers have been engaged during most of the present year (1880) in making investigations of the fish and fisheries of the Pacific coast of the United States, in the interest of the United States Fish Commission and the United States Census Bureau. Extensive collections have been made at each of the principal fishing ports from New Westminster to San Diego.

In the present paper a catalogue is given of the species now known to inhabit the Pacific Ocean between the mouth of Fraser's River on the north and San Diego on the south. The names of the species not

seen by the writers are placed in italics. A vertical column is given for each of the principal localities, and a cross in any column opposite the name of a species indicates that we have obtained or examined, while in the field, specimens from the locality in question. In the last column, S. indicates a general southern distribution, most usually from Point Concepcion or Monterey to Magdalena Bay or Cape San Lucas; N. indicates a general northern distribution, usually from Monterey or Cape Mendocino to Sitka, or beyond; C. indicates the distinctively Californian fauna, the abundance being usually greatest about Monterey and San Francisco. This fauna is chiefly composed of the two viviparous families *Scorpænidæ* and *Embiotocidæ*.

It will be noticed that the number of species obtained in Monterey Bay and about San Francisco is considerably greater than at any other points. This is partly due to the fact that these regions have more extensive fisheries than others. There is no doubt, however, that more species of fishes really occur from Monterey to Point Reyes than elsewhere on the coast. Monterey Bay is the common meeting ground of the semi-tropical and semi-arctic fish faunæ. There is nowhere an abrupt change along the coast. The three capes, Flattery, Mendocino, and Point Concepcion, are to some extent points of division.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
1. Mola rotunda Cuvier	....	....	....	+	....	+	+	....	S.
2. Diodon maculatus Lac	....	....	....	....	....	....	....	+	S.
3. Tetrodon politus Ayres	....	....	....	....	....	....	....	+	S.
4. Hippocampus ingens Grd	....	....	....	....	....	....	....	+	S.
5. Siphostoma punctipinne (Gill) J. & G	....	....	....	....	....	....	....	....	S.
6. Siphostoma leptorhynchus* (Grd.) Gill	....	....	....	....	....	....	....	+	S.
7. Siphostoma dimidiatum Gill	....	....	....	....	....	+	....	+	S.
8. Siphostoma californiense† (Storer) Gill	+	....	+	+	+	+	....	....	C.
9. Anlorhynchus flavidus Gill	+	....	....	+	....	....	....	....	N.
10. Gasterosteus (aculeatus) serratus Ayres	+	....	+	....	....	....	....	....	N.
11. Gasterosteus microcephalus Grd	+	....	+	+	....	....	+	....	C.
12. Aphoristia atricauda J. & G	....	....	....	....	....	....	....	+	S.
13. Pleuronichthys verticalis J. & G	....	....	+	+	....	....	....	....	C.
14. Pleuronichthys decurrens‡ J. & G	....	....	+	+	....	....	....	....	C.
15. Pleuronichthys cœnosus Grd	+	....	+	+	+	+	+	+	N.
16. Hypsopsetta guttulata (Grd.) Gill	....	....	+	....	+	+	+	+	S.
17. Cynicoglossus pacificus Lock	+	....	+	+	....	....	....	....	N.
18. Glyptocephalus zachirus Lock	....	....	+	+	....	....	....	....	C.
19. Pleuronectes stellatus Pallas	+	+	+	+	+	....	....	....	N.
20. Lepidopsetta bilineata§ (Ayres) Gill	+	....	+	+	....	....	....	....	N.
21. Parophrys ischyrus J. & G	+	....	....	....	....	....	....	....	N.
22. Parophrys isolepis (Lock.) J. & G	+	....	+	....	....	....	....	....	N.
23. Parophrys vetulus Grd	+	....	+	+	....	+	....	....	N.
24. Citharichthys sordidus (Grd.) Gthr	+	....	+	+	+	+	+	+	N.
25. Psettichthys melanostictus Grd	+	....	+	+	....	....	....	....	C.

*Syngnathus arundinaceus Grd.
†Synguathus griseolineatus Ayres.
‡Nom. sp. nov.=Pleuronichthys quadrituberculatus J. & G. Proc. U. S. Nat. Mus. 1880, iii, 50 non *Pleuronectes quadrituberculatus* Pallas.
§Pleuronectes perarcuatus Cope.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
26. Hippoglossoides exilis J. & G	+	....	+	+	....	....	....	....	C.
27. Hippoglossoides elassodon J. & G	+	....	....	....	....	....	....	....	N.
28. Hippoglossoides jordani Lock	+	....	+	+	....	....	....	...	C.
29. Paralichthys maculosus Grd	....	....	+	+	+	+	+	+	S.
30. Xystreurys liolepis J. & G	....	....	....	....	....	+	+	....	S.
31. Hippoglossus vulgaris Flem	+	....	+	....	....	....	....	....	N.
32. Atheresthes stomias J. & G	....	....	+	....	....	....	....	....	N.
33. Merlucius productus (Ayres) Gill	+	....	+	+	....	+	....	....	N.
34. Pollachius chalcogrammus* (Pallas) J. & G	+	....	....	+	....	....	....	....	N.
35. Gadus morrhua† L	+	....	....	....	....	....	....	....	N.
36. Microgadus proximus (Grd.) Gill	+	....	+	+	....	....	....	....	N.
37. Brosmophycis marginatus (Ayres) Gill	....	....	+	....	....	....	....	....	C.
38. Ophidium taylori Grd	....	....	+	+	....	+	....	....	C.
39. Scytalina cerdale J. & G	+	....	....	....	....	....	....	....	N.
40. Lycodopsis pauciden (Lock.) Gill	....	....	+	....	....	....	....	....	C.
41. Lycodopsis pacificus Collett	+	....	+	....	....	....	....	....	N.
42. Anarrhichthys ocellatus Ayres	+	....	+	+	....	....	....	....	N.
43. Lumpenus anguillaris (Pallas) Gill	+	....	....	....	....	....	....	....	N.
44. Xiphister rupestris J. & G	+	....	....	+	....	....	....	....	N.
45. Xiphister mucosus‡ (Grd.) Jor	+	....	+	+	....	....	....	....	N.
46. Xiphister chirus J. & G	+	....	....	+	....	....	....	..	N.
47. Cebedichthys violaceus Grd	....	....	+	+	+	....	....	....	C.
48. Anoplarchus alectrolophus§ (Pallas) J. & G	+	....	+	+	....	....	....	....	N.
49. Apodichthys flavidus Grd	+	....	+	+	....	....	....	....	N.
50. Apodichthys fucorum J. & G	+	....	+	+	....	....	....	....	C.
51. Murænoides ornatus (Grd.) Gill	+	....	....	....	....	....	....	....	N.
52. Murænoides lætus (Cope) Gill	+	....	+	....	....	....	....	...	N.
53. Cremnobates integripinnis Rosa Smith	....	....	....	....	....	..	...	+	S.
54. Gibbonsia elegans Cooper	....	....	..	+	....	+	...	+	S.
55. Heterostichus rostratus Grd	....	....	....	+	+	+	+	+	S.
56. Neoclinus blanchardi Grd	....	....	....	+	+	+	....	....	S.
57. Neoclinus satiricus Grd	....	....	....	+	....	....	....	....	S.
58. Hypleurochilus gentilis (Grd.) Gill	....	....	....	....	....	+	....	+	S.
59. Porichthys porosissimus (Cuv. & Val.) Gthr	+	....	+	+	+	+	+	+	C.
60. Gobiesox reticulatus Grd	+	....	+	+	....	....	....	....	N.
61. Eumicrotremus orbis (Gthr.) Gill	....	....	....	....	....	....	....	....	N.
62. Neoliparis mucosus (Ayres) Steind	....	....	+	+	....	....	....	....	N.
63. *Liparis cyclopus* Gthr	....	....	....	....	....	....	....	....	N.
64. Liparis pulchellus Ayres	....	....	+	+	....	....	....	....	N.
65. *Aspidophoroides inermis* Gthr	....	....	....	....	....	....	....	....	N.
66. Brachyopsis verrucosus Lock	....	....	+	....	....	....	....	....	C.
67. Brachyopsis xyosternus J. & G	....	....	+	+	....	....	....	....	C.
68. Podothecus acipenserinus (Pallas) Gill	+	....	....	....	....	....	....	....	N.
69. Podothecus vulsus J. & G	....	....	+	....	....	....	....	....	C.
70. Podothecus trispinosus (Lock.) J. & G	....	....	+	....	....	+	....	....	C.
71. *Bothragonus swani* (Steind.) Gill	....	....	....	....	....	....	....	....	N.
72. Prionotus stephanophrys Lock	....	....	+	....	....	....	....	....	S.
73. Ascelichthys rhodorus J. & G	+	....	....	....	....	....	....	....	N.
74. Psychrolutes paradoxus Gthr	....	....	....	....	....	....	....	....	N.
75. Cottus polyacanthocephalus Pallas	+	....	....	....	....	....	....	....	N.
76. Artedius lateralis Grd	+	....	+	+	....	....	....	....	N.
77. Artedius notospilotus Grd	+	....	+	....	+	+	....	....	C.
78. Artedius quadriseriatus Lock	....	....	+	....	....	....	....	....	C.
79. Artedius pugettensis Steind	+	....	+	....	....	....	....	....	C.
80. Hemilepidotus spinosus Ayres	....	....	+	+	....	....	....	....	C.
81. Hemilepidotus gibbsi Gill	+	....	+	....	....	..	....	....	N.
82. Aspicottus bison Grd	+	....	+	....	....	....	....	....	N.
83. Scorpænichthys marmoratus Grd	+	....	+	+	+	+	....	+	C.

* Gadus periscopus Cope.
† Gadus auratus Cope; *Gadus morrhua* L. (*fide* Bean.)=*G. macrocephalus* Tiles.
‡ Xiphidium cruoreum Cope.
§ Opidium atropurpureum Kittlitz = Anoplarchus crista-galli Gthr.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
84. Leptocottus armatus Grd	+	...	+	+	+	+	+	+	C.
85. Liocottus hirundo Girard	...	...	...	...	...	+	...	...	S.
86. Oligocottus globiceps Grd	+	...	+	+	...	...	...	...	N.
87. Oligocottus maculosus Grd	+	...	+	+	+	...	...	...	N.
88. Oligocottus analis Grd	...	...	...	+	...	...	+	+	S.
89. Blepsias cirrhosus (Pallas) Gthr	+	...	+	...	...	...	...	...	N.
90. Nautichthys oculofasciatus Grd	+	...	+	...	...	...	...	...	N.
91. Scorpæna guttata Grd	...	...	...	...	...	+	+	+	S.
92. Sebastichthys nigrocinctus (Ayres) Gill	+	...	+	+	...	...	...	...	N.
93. Sebastichthys serriceps J. & G	...	...	+	+	...	+	+	+	S.
94. Sebastichthys nebulosus (Ayres) Gill	+	...	+	+	...	...	...	...	N.
95. Sebastichthys chrysomelas J. & G	...	...	+	+	...	+	+	...	C.
96. Sebastichthys carnatus J. & G	...	...	+	+	+	+	+	...	C.
97. Sebastichtys maliger J. & G	+	...	+	+	...	...	...	...	N.
98. Sebastichthys caurinus (Rich.) J. & G	+	...	...	...	...	...	...	...	N.
var. vexillaris J. & G	...	...	+	+	...	+	+	+	C.
99. Sebastichthys rastrelliger J. & G	...	...	+	+	+	+	+	...	S.
100. Sebastichthys auriculatus (Grd.) Gill	+	...	+	+	+	+	...	...	C.
101. Sebastichthys rubrivinctus J. & G	...	...	...	+	...	+	...	...	S.
102. Sebastichthys chlorostictus J. & G	...	...	+	+	...	...	...	...	C.
103. Sebastichthys rhodochloris J. & G	...	...	+	+	...	...	...	...	C.
104. Sebastichthys rosaceus (Grd.) Lock	...	...	+	+	...	+	...	...	C.
105. Sebastichthys constellatus J. & G	...	...	+	+	...	+	...	...	C.
106. Sebastichthys ruber (Ayres) Lock	+	...	+	+	...	+	...	...	N.
107. Sebastichthys miniatus J. & G	...	...	+	+	...	+	+	...	C.
108. Sebastichthys pinniger (Gill) Lock	+	...	+	+	...	...	...	...	N.
109. Sebastichthys atrovirens J. & G	...	...	+	+	+	+	+	+	S.
110. Sebastichthys elongatus (Ayres) Gill	...	...	+	+	...	...	...	...	C.
111. Sebastichthys proriger J. & G	...	...	+	+	...	...	...	...	C.
112. Sebastichthys ovalis (Ayres) Lock	...	...	...	+	...	+	...	...	C.
113. Sebastichthys entomelas J. & G	...	...	+	+	...	...	...	...	C.
114. Sebastichthys mystinus* J. & G	+	...	+	+	...	+	+	+	C.
115. Sebastichthys melanops (Grd.) J. & G	+	...	+	+	...	...	...	...	N.
116. Sebastichthys flavidus (Ayres) Lock	...	...	+	+	...	...	+	+	C.
117. Sebastodes paucispinis (Ayres) Gill	...	...	+	+	+	+	+	...	C.
118. Hexagrammus asper† Steller	+	...	...	...	...	...	...	...	N.
119. Hexagrammus superciliosus§ (Pallas) J. & G	+	...	+	+	...	...	...	...	N.
120. Hexagrammus decagrammus‖ (Pallas) J. & G	+	...	+	+	+	...	...	...	N.
121. *Hexagrammus nebulosus* (Grd.) J. & G	...	...	...	...	...	...	...	...	N.
122. Ophiodon elongatus Grd	+	...	+	+	+	+	...	...	N.
123. Zaniolepis latipinnis Grd	...	...	+	...	...	...	...	...	N.
124. Oxylebius pictus Gill	+	...	+	+	...	...	...	...	N.
125. Myriolepis zonifer Lock	...	...	...	+	...	...	...	...	C.
126. Anoplopoma fimbria (Pallas) Gill	+	...	+	+	...	...	...	...	N.
127. *Gobius glaucofrænum* (Gill) J. & G	...	...	...	...	...	...	...	...	N.
128. Lepidogobius gracilis (Grd.) Gill	+	...	+	...	...	...	...	...	C.
129. Lepidogobius newberryi (Grd.) Gill	...	...	...	...	...	...	...	...	C.
130. Gillichthys mirabilis Cooper	+	...	+	...	...	+	+	+	S.
131. Crystallogobius eos Rosa Smith Mss	...	...	...	...	...	...	...	+	S.
132. Trichodon stelleri Cuv. & Val	...	...	...	...	...	...	...	...	N.
133. Caulolatilus anomalus (Cooper) Gill	...	...	...	+	...	+	+	+	S.
134. Bathymaster signatus Cope	+	...	...	...	...	...	...	...	N.
135. Icichthys lockingtoni J. & G	...	...	+	...	...	...	...	...	N.
136. Icosteus ænigmaticus Lock	...	...	+	...	...	...	...	...	N.
137. Trachypterus¶ ?altivelis Kner	...	...	...	...	...	...	...	...	N.
138. Hypsypops rubicundus (Grd.) Gill	...	...	...	...	...	+	+	+	S.
139. Chromis punctipinnis Cooper	...	...	...	...	...	+	+	+	S.
140. Pseudojulis modestus (Grd.) Gthr	...	...	...	+	...	+	+	...	S.
141. Platyglossus semicinctus (Ayres) Gthr	...	...	...	...	...	...	+	...	S.
142. Pimelometopon pulcher (Ayres) Gill	...	...	...	+	...	+	+	+	S.

*Nom. sp. nov.=Sebastodes melanops Ayres, non *Sebastes melanops* Grd.
† Sebastosomus simulans Gill.
‡ Chirus trigrammus Cope.
§ Chirus pictus Grd.; Chirus balias Cope.
‖ Chirus guttatus Grd. (♀); Chirus constellatus Grd. (♂); Chirus maculoseriatus Lock. (♀).
¶ Taken at Santa Cruz by Dr, C. L. Anderson, and at Cape Flattery by James G. Swan.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
143. Abeona minima (Gibbons) Gill	....	....	+	+	+	+	....	+	C.
144. Abeona aurora J. & G	....	....	+	+	....	....	....	....	C.
145. Cymatogaster aggregatus Gibbons	+	....	+	+	+	+	+	+	C.
146. Brachyistius frenatus Gill	+	....	+	+	....	+	+	....	C.
147. Brachyistius rosaceus J. & G	....	....	+	....	....	..	....	..	C.
148. Holconotus analis (A. Agassiz) J. & G	....	....	....	+	+	..	....	....	C.
149. Holconotus argenteus (Gibbons) J. & G	....	....	+	+	+	+	+	+	C.
150. Holconotus agassizi (Gill) J. & G	....	....	+	+	+	+	....	....	C.
151. Holconotus rhodoterus Ag	....	....	+	+	....	+	....	....	C.
152. Amphistichus argenteus Ag	....	....	+	+	+	+	+	+	C.
153. Hypsurus caryi (L. Agass.) A. Agass	....	....	+	+	+	+	....	....	C.
154. Ditrema* jacksoni (Agass.) Günther	+	....	+	+	+	+	+	+	C.
155. Ditrema laterale (Agass.) Günther	+	....	+	+	+	+	....	....	N.
156. Ditrema atripes J. & G	....	....	....	+	....	....	....	....	C.
157. Ditrema furcatum (Grd.) Gthr	....	....	+	+	+	+	+	+	C.
158. Damalichthys argyrosomus (Grd.) J. & G	+	....	+	+	+	+	+	....	N.
159. Rhacochilus toxotes Agass	....	....	+	+	+	+	+	....	C.
160. Parephippus faber† (Bloch) Gill	....	....	....	....	....	....	....	....	S.
161. Genyonemus lineatus (Ayres) Gill	....	....	+	+	+	+	+	.	C.
162. Corvina saturna (Grd.) Gthr	....	....	....	....	....	+	+	+	S.
163. Roncador stearnsi (Steind.) J. & G	....	....	....	....	....	+	+	+	S.
164. Umbrina xanti‡ Gill	....	....	....	....	....	+	+	+	S.
165. Menticirrus undulatus§ (Grd.) Gill	....	....	....	....	....	+	+	+	S.
166. Cynoscion nobilis (Ayres)‖ J. & G	....	..	+	+	....	+	+	+	S.
167. Cynoscion parvipinnis¶ Ayres	....	....	....	....	....	....	+	+	S.
168. Seriphus politus Ayres	....	....	+	+	+	+	+	+	S.
169. Girella nigricans (Ayres) Gill	....	....	....	+	....	+	+	+	S.
170. Scorpis californiensis Steind	....	....	....	....	....	+	+	+	S.
171. Xenichthys californiensis Steind	....	....	....	....	....	....	....	....	S.
172. Pristipoma davidsoni Steind	....	....	....	....	....	....	+	+	S.
173. Stereolepis gigas Ayres	....	....	....	+	....	+	....	+	S.
174. Serranus clathratus (Grd.) Steind	....	....	....	+	....	+	+	+	S.
175. Serranus nebulifer (Grd.) Steind	....	....	....	+	....	....	+	+	S.
176. Serranus maculofasciatus Steind	....	....	....	....	....	....	+	+	S.
177. Stromateus simillimus (Ayres) Gill	+	....	+	+	+	+	....	+	C.
178. Trachurus saurus Raf	....	....	....	+	....	+	+	....	S.
179. Caranx caballus Gthr	....	....	....	....	....	....	....	....	S.
180. Seriola lalandi** Cuv. & Val	....	....	....	....	....	+	+	+	S.
181. Orcynus alalonga†† (Gmel.) Risso	....	....	....	+	....	+	+	....	S.
182. Sarda chilensis‡‡ (C. & V.) J. & G	....	....	....	+	....	+	+	+	S.
183. Scomberomorus concolor§§ (Lock.) J. & G	....	....	....	+	....	....	....	....	S.
184. Scomber pneumatophorus‖‖ De la Roche	....	....	....	+	....	....	....	....	S.
185. Xiphias gladius L	....	....	....	....	....	....	+	....	S.
186. Remora jacobæa (Lowe) Gill	....	....	+	..	....	....	..	..	S.
187. Echeneis naucrates L	....	....	+	....	....	....	....	....	S.
188. Ammodytes (tobianus) personatus Grd	+	....	....	+	..	....	....	....	N.
189. Sphyræna argentea Grd	....	....	+	+	....	+	+	+	S.
190. Atherinopsis californiensis (Grd.) Gill	....	....	+	+	+	+	+	+	C.
191. Atherinops affinis (Ayres) Steind	....	....	+	+	+	+	+	+	C.
192. Leuresthes tenuis (Ayres) J. & G	....	....	....	..	....	..	....	+	S.

* We are informed by Dr. Günther that the pharyngeals in *Ditrema temmincki* are of the normal type as in *Embiotoca*. *Ditrema* is therefore identical with *Phanerodon* Grd., and no character of importance distinguishes "*Phanerodon*" from *Embiotoca*. *Embiotoca argyrosoma* Grd, is identical with *Damalichthys vacca*.

† Ephippus zonatus Grd.

‡ Umbrina undulata Steind., non Grd.

§ Umbrina elongata Gthr.

‖ Otolithus californiensis Steind.

¶ Otolithus magdalenæ Steind.

** Seriola mazatlana Steind.

†† Orcynus pacificus Cooper.

‡‡ Pelamys lineolata Grd.

§§ Chriomitra concolor Lock.; Chriomitra Lock.=Cybium C. & V.=Scomberomorus Lac.

‖‖ Scomber diego Ayres.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
193. Mugil mexicanus Steind.	....	....	....	+	....	+	+	+	S.
194. Tylosurus exilis (Grd.) J. & G	....	....	....	....	....	+	+	+	S.
195. Scombersox brevirostris Peters	....	....	....	+	....	....	....	....	C.
196. Hemirhamphus rosæ J. & G	....	....	....	....	....	....	+	+	S.
197. Exocœtus californicus Cooper	....	....	....	....	....	+	+	+	S.
198. Cyprinodon californiensis Grd.	....	....	....	....	....	....	....	....	S.
199. Fundulus parvipinnis Grd.	....	....	....	....	....	+	+	+	S.
200. Myctophum procellarum Bean Mss	....	....	....	....	....	....	....	....	N.
201. Myctophum crenulare J. & G	....	....	....	....	....	+	....	....	S.
202. Synodus lucioceps (Ayres) Gill	....	....	+	+	....	+	....	....	S.
203. Paralepis coruscans J. & G	+	....	....	....	....	....	....	....	N.
204. Sudis ringens J. & G	....	....	....	....	....	+	....	....	S.
205. Alepidosaurus borealis Gill.	+	....	....	....	....	....	....	....	N.
206. Osmerus thaleichthys Ayres	+	....	+	+	+	....	....	....	N.
207. Osmerus attenuatus Lock	....	....	+	....	....	....	....	....	C.
208. Hypomesus olidus (Pallas) Gill	+	....	+	....	....	....	....	....	N.
209. Thaleichthys pacificus (Rich.) Grd	+	+	....	....	....	....	....	....	N.
210. Salvelinus malma* (Walb.) J. & G	+	+	....	....	....	....	....	....	N.
211. Salmo purpuratus Pallas	+	+	+	+	....	....	....	....	N.
212. Salmo irideus Gibbons	....	....	....	+	....	....	....	....	C.
213. Salmo gairdneri Rich	+	+	+	+	....	....	....	....	N.
214. Oncorhynchus kennerlyi (Suckl.) Jor	+	+	....	....	....	....	....	....	N.
215. Oncorhynchus gorbuscha† (Walb.) Gill & Jor.	+	+	+	....	....	....	....	....	N.
216. Oncorhynchus keta‡ (Walb.) Gill & Jor.	+	+	+	....	....	....	....	....	N.
217. Oncorhynchus kisutch§ (Walb.) J. & G.	+	+	+	....	....	....	....	....	N.
218. Oncorhynchus tshawytcha (Walb.) J. & G	+	+	+	+	....	....	....	....	N.
219. Oncorhynchus nerka‖ (Walb.) Gill & Jor	+	+	....	....	....	....	....	....	N.
220. Stolephorus ringens (Jenyns) J. & G	+	+	+	+	+	+	+	+	S.
221. Stolephorus delicatissimus (Grd.) J. & G	....	....	....	....	....	....	....	+	S.
222. Stolephorus compressus (Grd.) J. & G	....	....	....	....	....	....	+	+	S.
223. Clupea sagax Jenyns	....	....	+	+	+	+	+	+	S.
224. Clupea mirabilis Grd	+	....	+	+	+	+	+	+	N.
225. Albula vulpes (L.) Goode	....	....	....	+	....	....	....	+	S.
226. Nemichthys avocetta J. & G	+	....	....	....	....	....	....	....	N.
227. *Myrichthys tigrinus* Grd	....	....	....	....	....	....	....	....	N.
228. Ophichthys triserialis (Kaup) Gthr	....	....	....	....	....	....	....	....	S.
229. Muræna mordax Ayres	....	....	....	....	....	....	+	+	S.
230. Acipenser transmontanus¶ Rich.	+	+	+	....	....	....	....	....	N.
231. Acipenser medirostris** Ayres	....	+	+	....	....	....	....	....	N.
232. Chimæra colliæi Bennett	+	....	+	+	....	....	....	....	N.
233. Manta birostris†† (Walb.) J. & G.	....	....	....	....	....	....	....	....	S.
234. Myliobatis californicus Gill	....	....	+	+	+	+	+	+	S.
235. *Aëtobatis laticeps* Gill	....	....	....	....	....	....	....	....	S.
236. Pteroplatea marmorata Cooper	....	....	....	....	....	+	+	+	S.
237. Dasybatus dipterurus J. & G	....	....	....	....	....	....	....	+	S.
238. Urolophus halleri Cooper	....	....	....	....	....	+	+	+	S.
239. Raia binoculata Grd. ‡‡	+	....	+	+	....	....	....	....	N.
240. Raia rhina J. & G.	+	....	+	+	....	....	....	....	N.
241. Raia inornata J. & G. Mss	....	....	+	+	....	....	....	....	C.
var. inermis J. & G. Mss.	....	....	....	....	....	+	....	....	C.
242. Raia stellulata J. & G	....	....	....	+	....	....	....	....	C.

*Salmo spectabilis Grd.; Salmo bairdi, etc., Suckley; Salmo callarias Pallas.
† Salmo scouleri Rich., non Suckl.
‡ Salmo sanguinolentus Pallas; Salmo tsuppitch Rich.; Salmo scouleri Suckl.
§ Salmo lycaodon Pallas, non Gthr.; Salmo punctidens Rich.
‖ Salmo lagocephalus Pallas; Salmo canis Suckl.
¶ Acipenser brachyrhynchus et acutirostris Ayres.
** Acipenser acutirostris Gthr.
†† Raia birostris Walb.; Manta americana Bancroft; Ceratoptera vampyrus Auct.
‡‡ Raia binoculata Grd. = yg. of *Raia cooperi* Grd.

Name.	Puget Sound.	Columbia River.	San Francisco.	Monterey Bay.	San Luis Obispo.	Santa Barbara.	San Pedro.	San Diego.	Greatest abundance.
243. Zapteryx exasperatus J. & G	....	....	....	....	....	....	....	+	S.
244. Rhinobatus triseriatus J. & G	....	....	+	....	....	+	+	+	S.
245. Rhinobatus productus Ayres	....	....	+	....	+	+	+	+	S.
246. Torpedo californica Ayres	....	....	+	+	....	....	....	....	C.
247. Squatina angelus Dum	....	....	+	+	....	+	+	+	S.
248. Somniosus microcephalus (Bloch) Gill	+	....	....	....	....	....	....	....	N.
249. Squalus acanthias L	+	....	+	+	....	+	....	....	N.
250. Heterodontus francisci (Grd.) Gill	....	....	....	....	....	+	+	+	S.
251. Notorhynchus maculatus Ayres	....	....	+	+	....	....	....	....	C.
252. Hexanchus corinus J. & G	+	....	....	+	....	....	....	....	C.
253. Catulus ventriosus* (Garman) J. & G	....	....	....	+	....	+	+	....	S.
254. Mustelus hinnulus (Blainv.) J. & G	....	....	+	+	....	+	+	+	S.
255. Rhinotriacis henlei Gill	....	....	+	+	....	....	....	....	C.
256. Triacis semifasciatus Grd	....	....	+	+	....	+	+	+	C.
257. Galeorhinus galeus (L.) Blainv	....	....	+	+	....	+	+	+	S.
258. Galeocerdo tigrinus M. & H	....	....	....	....	....	....	....	+	S.
259. Carcharinus glaucus (L.) Blainv	+	....	+	....	....	....	....	....	C.
260. Eulamia lamia (Risso) Gill	....	....	....	....	....	....	....	+	S.
261. Sphyrna zygæna (L.) Raf	....	....	....	....	....	....	....	....	S.
262. Cetorhinus maximus (L.) Blainv	....	....	....	+	....	....	....	....	C.
263. Carcharodon carcharias† (L.) J. & G	....	....	....	+	....	....	....	....	S.
264. Isurus oxyrhynchus Raf	....	....	....	....	....	....	+	....	S.
265. Lamna cornubica (Gmel.) Flem	....	....	....	+	....	....	....	....	C.
266. Alopias vulpes (Gmel.) Bon	....	....	....	+	....	....	....	....	C.
267. Entosphenus tridentatus (Rich.) Gill	....	+	....	+	....	....	....	....	N.
268. Ammocœtes plumbeus (Ayres) J. & G	+	....	+	....	....	....	....	....	N.
269. Polistotrema dombeyi‡ (Muller) Gill	....	....	+	+	....	....	....	....	S.
270. Branchiostoma lanceolatum (Pallas) Gray	....	....	....	....	....	....	....	....	S.
Totals	90	14	145	148	43	99	80	83	

Species most abundant northward (Alaskan fauna)	96
Species most abundant centrally (Californian fauna)	76
Species most abundant southward (Lower Californian fauna)	98
Total	270
Species found also in Atlantic Ocean	28
Species not obtained by the Commission	15
Species not recorded by previous writers	66

* Cephaloscyllium laticeps J. & G., probably not of Duméril.
† Carcharodon rondeleti M. & H.
‡ Bdellostoma polytrema Grd.; Bdellostoma stouti Lock.

INDIANA STATE UNIVERSITY,
Bloomington, November 30, 1880.

ON THE GENERIC RELATIONS OF BELONE EXILIS GIRARD.

By DAVID S. JORDAN and CHARLES H. GILBERT.

The "needle-fish" (*Belone exilis* Girard), of the California coast, differs from the type of the genus *Belone* in the development of the gill-rakers. In *Belone vulgaris* the gill-rakers are well developed, long, and slender, and a patch of teeth is present on the vomer. In *Belone exilis* the gill-rakers are entirely wanting, and there are no vomerine teeth. The gill-rakers are also wanting in the Atlantic species, *Belone longirostris* (Mitch.), *Belone latimana* Poey, *Belone melanochira* Poey, *Belone notata* Poey, and *Belone hians* (Cuv. & Val.), and probably also in *Belone cantraini*, which is the type of the genus *Tylosurus* Cocco. The generic name *Tylosurus* may therefore be provisionally adopted for the species of *Belone* without gill-rakers. The caudal keel on which the genus *Tylosurus* was based, and which is developed in *T. exilis* as in *T. cantraini*, has apparently no systematic importance.

BLOOMINGTON, IND., *December* 2, 1880.

NOTES ON A COLLECTION OF FISHES FROM UTAH LAKE.

By DAVID S. JORDAN and CHARLES H. GILBERT.

A short visit to Provo, Utah, on Utah Lake, enabled one of the writers to make a small collection of the fishes of that locality. This collection has been since supplemented by an excellent series of the different species, presented to the United States National Museum by Peter Madsen and sons, fishermen at Provo. Four of the thirteen species obtained seem to be new to science.

1. Cottopsis semiscaber Cope.—*Bull-head.*

Two specimens. Professor Cope says of his types: "Skin prickly above the lateral line, smooth below it posteriorly." Our specimens are villous above and below, as in *Cottopsis asper*, from which *C. semiscaber* differs chiefly in the less number of rays in the vertical fins.

The genus *Cottopsis* is distinguished from *Centridermichthys* mainly by the absence of a slit behind the fourth gill, which, as I am informed by Dr. Günther, is present in *Centridermichthys fasciatus*. *Centridermichthys uncinatus*, of the North Atlantic, agrees with *Cottopsis* in this respect, and should probably be referred to it. The American genera of Cot-

toids may be divided into two series, on the presence or absence of this slit, as follows:

Without slit.	With slit.
Ascelichthys.	Blepsias.
Psychrolutes.*	Nautichthys.
Cottunculus.	Blennicottus.
Uranidea.	Oligocottus.
Cottopsis (including Tauridea and Potamocottus).	Leptocottus.
Cottus.†	Scorpænichthys.
Artedius.	Liocottus.
Hemitripterus.	Triglopsis (including Oncocottus).
	Gymnacanthus.
	Aspicottus.
	Icelus.
	Triglops.
	Hemilepidotus.
	Melletes.

2. **Coregonus williamsoni** Grd.—*Mountain Herring.*

Very abundant.

3. **Salmo purpuratus** Pallas.—*Lake Trout; Brook Trout.*

(*Salmo clarki* Rich.)

Very abundant in Utah Lake; a food-fish of much value.

Specimens obtained do not differ in any visible respect from others taken in salt water in Puget Sound. This is apparently the parent stock from which *S. spilurus*, *S. irideus*, and *S. gairdneri* Rich., (*S. truncatus* Suckley) have scarcely yet become completely differentiated. *S. henshawi* Gill & Jor. is a marked local variety of *S. purpuratus.*

4. **Squalius tænia** (Cope) J. & G.—*Leather-side Minnow.*

Very abundant. We find it impossible to separate the genera *Squalius*, *Telestes*, *Tigoma*, *Siboma*, *Cheonda*, and *Clinostomus*, and we adopt for the whole group the name of *Squalius*. The genus *Dobula* was established by Rafinesque in the Ichthyologia Ohiensis (1820, p. 45). Although no type is stated, it was probably based on the *Cyprinus dobula* L., afterwards the type of *Squalius* Bonaparte.

5. **Squalius montanus** (Cope) J. & G.

Also abundant.

6. **Squalius cruoreus**, sp. nov.

Allied to *Squalius ardesiacus* Cope, but with larger scales and shorter head.

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* We are unable to perceive any distinction between the *Psychrolutidæ* and the *Cottidæ*. *Psychrolutes* has a rudimentary spinous dorsal, hidden in the loose skin.

† In *Cottus grœnlandicus*, *polyacanthocephalus*, and *scorpius* a small pore is present behind the last gill. In other species (*octodecimspinosus œneus*, *scorpioides*), the slit appears to be wholly obliterated. In a specimen of *C. polyacanthocephalus* of about two feet in length there is visible a minute pore representing the usual last slit.

Form of the species termed "*Clinostomus*", but less compressed. Body moderately elongate, somewhat compressed, symmetrical, the back considerably arched; caudal peduncle rather stout. Head subconical, laterally compressed, broad and rounded above; mouth short, oblique, jaws about equal. Premaxillary in front on the level of the lower edge of the pupil; maxillary reaching to opposite the front of the eye. Eye large, about as long as snout, 4½ in head. Isthmus narrow; scales firm, not closely imbricated; the belly with imbedded scales. Lateral line complete, running low, but not greatly decurved. Dorsal fin inserted a little behind the ventrals, scarcely nearer base of caudal than snout. Caudal fin evenly forked. Pectorals shortish, not reaching nearly to the ventrals; the ventrals reaching to the vent. Head contained 4 times in length to base of caudal; greatest depth equal to length of head Fin-rays: Dorsal 9; anal 8. Scales 11–55–6. Teeth 2, 5–4, 2, without evident masticatory surface. This latter character is, however, so variable in the Cyprinoids of this type as to be scarcely even of specific value. Back and fins dusky blnish; sides of body and head dark, with fine punctulations; a red spot at base of each ventral and of anal.

Numerous specimens, the longest 6 inches in length. This species is related to *S. ardesiacus* (Cope), but it has a deeper body and larger scales, the pectorals are shorter and length of the head proportionately less.

7. **Squalius copei**, sp. nov.

(*Hybopsis egregius* Cope, Ann. Rept. U. S. Geol. Surv. Terr. 1870, 438; Cope & Yarrow, Wheeler's Expl. W. 100th Mer. v, 662, 1877; not *Tigoma egregia* Girard.)

Numerous specimens of this species were obtained at Evanston, Wyo., of boys fishing with hook and line in tributaries of Bear River. It has not been observed in Utah Lake. As the original types of *Tigoma egregia*, examined by us, have 66 scales only in the lateral line, the species called *Tigoma egregia* by Professor Cope is distinct from it, and may receive the above specific name.

8. **Squalius atrarius** (Girard) J. & G.

This "chub" is very abundant in Utah Lake. It is exceedingly destructive to the young trout, well meriting the epithet of "devilish chub" applied to it by Mr. Madsen.

9. **Squalius rhomaleus**, sp. nov.

Allied to *Squalius niger* (Cope), but with the large scales of *Squalius squamatus* (Gill).

Body robust, elevated anteriorly, somewhat compressed or flat-sided, although the back is very broad. Head broad, considerably concave in profile as seen from the side, as in the groups called *Platygobio* and *Gila;* the interocular space flattish, scarcely raised above the level of the upper edge of the eye. Snout rather broad, somewhat elevated at tip; the premaxillary on the level of the pupil; the form of the head resembling that of *Chasmistes*. Mouth very oblique, its cleft at an angle of about 45°; the mandible much projecting. Maxillary extending to the

front of the eye. Eye small, anteriorly placed, its diameter $1\frac{3}{4}$ in snout, 7 times in the length of the head. Isthmus very narrow, the gill-openings extending forward below. Teeth 2, 5–4, 2; one of the teeth in the larger series with a broad, flattish, grinding surface, the others convex; the teeth comparatively short and stout. Scales large for the genus, subequal over the body, rather smaller on the belly, their texture firm, their exposed surfaces very broad and hexagonal. Dorsal fin inserted directly over the ventrals, behind the middle of the body. Caudal fin evenly forked, on a stout, rather long caudal peduncle, the rudimentary rays at its base not more than usually developed. Pectorals not long, extending three-fifths the distance to the ventrals; the ventrals about to the vent; the lower fins all short. Fin-rays: Dorsal 9; anal 8. Scales 10–55–5. Length of head contained $3\frac{1}{2}$ times in the total length to the base of caudal; the greatest depth of the body about the same.

Color blackish, fins all dusky. The ground shade is somewhat silvery, but the color is rendered very dark by the large number of small black specks.

The typical specimens, two in number, are about a foot in length. This is therefore one of the largest members of the genus.

10. Apocope vulnerata Cope.

Numerous specimens, some of them 5 inches in length. The large specimens have the lateral line developed anteriorly only. Pectoral fins short, not reaching nearly to ventrals. Lat. l. about 70.

11. Chasmistes liorus Jordan.—*June Sucker.*

A considerable number of fine specimens of this interesting species are in the collection, all of them about 18 inches in length. Color olivaceous above, with dusky mottlings formed of dark points; belly white; fins chiefly pale, shaded at the tips with dusky. Anal and lower lobe of caudal tuberculate in the males. Body slender, heavy at the shoulders, somewhat compressed, the caudal peduncle stoutish; depth of body at the shoulders half more than its thickness. Head not conic, low at the nape, and strongly concave in profile above, from the great prominence of the premaxillary spines, which form a conspicuous nose, elevated above the eye, and with its top even with the interorbital space, which is very broad and nearly flat. Preorbital large; suborbital moderate. Mouth large and very oblique, anteriorly on the level of the suborbital bones; the mandible strong, placed at an angle of 45°, its base below the nostrils, its length equal to that of the snout, which is about three-sevenths that of the head. Upper lip somewhat protractile, narrow, vertical, its edge smooth; lower lip narrow, the two lobes well separated, very faintly plicate, the plicæ slightly uneven. No cartilaginous sheath to the jaws. Interorbital space nearly equal to length of snout. Eye small, exactly median, 7 in head. Isthmus as broad as eye. Pharyngeal teeth essentially as in *Catostomus*. Scales much reduced in size and crowded anteriorly, those on the breast imbedded in the skin. Scales

7–61–9; 28 series in front of the dorsal. Insertion of dorsal nearly midway between snout and base of caudal, the fin elevated in front, the anterior ray twice the height of the posterior, and about equal to the base of the fin; the free margin of the fin nearly straight. Caudal fin deeply forked, the lower lobe the longer. Lower fins all small. Dorsal rays 11; anal 7.

12. Catostomus fecundus Cope & Yarrow.—*Utah Sucker.*

This species occurs in Utah Lake in numbers which are simply enormous, justifying Mr. Madsen's assertion that the lake is the "greatest sucker pond in the universe". It is very destructive to the trout. It ascends the rivers in the spring to spawn at the same time as the latter species, on the eggs of which it feeds. In the interest of the food supply of Salt Lake City an organized attempt at the reduction or extirpation of this species may become necessary. The old trout feed largely on the young of this species, but the "suckers eat the trout first". No full description of *Catostomus fecundus* has been yet published. It will be seen from the following account that it is well separated from all its congeners, and that in many respects it approaches *Chasmistes liorus.* It is, in fact, probably the parent stock of the genus *Chasmistes.*

Body moderately stout, a little elevated, not much compressed, tapering into a long and slender caudal peduncle. Head subconic, the profile regularly decurved from the nape to the base of the premaxillary spines, which abruptly protrude, forming a distinct "nose", as in *Chasmistes liorus.* Preorbital long. Premaxillary a little below the level of the preorbital. Mandible large, oblique, placed at an angle of 30° when the mouth is closed; its length about one-third that of the head. Upper lip protractile, full, pendant, with about four rows of coarse papillæ. Lower lip moderately developed, divided nearly into two parts by a broad emargination, each lobe with about six rows of coarse papillæ. Mouth not large. Interorbital space strongly convex, its width nearly equal to length of snout. Eye a little behind the middle of the head, its diameter contained 7 times in the length of the head. Isthmus broader than eye. Scales 8–60–8, reduced in size forward; breast scaly.

Insertion of dorsal about midway between snout and base of caudal; the first ray nearly twice the height of the last, its length greater than that of the base of the fin. Caudal fin moderately forked, the lower lobe longest and widest. Pectorals long, reaching more than half way to ventrals, the latter not to vent. Anal high. Fin-rays: Dorsal 11; anal 7; ventrals 9. Length of head contained 4 times in total length to base of caudal; greatest depth 4½ times. Color blackish above, silvery below, the fins slightly dusky tinged, the dark colors formed of black points.

This species seems to reach a smaller size than the other lake suckers.

13. Catostomus ardens, sp. nov.

(? *Catostomus guzmaniensis* Cope & Yarrow; not of Girard.)

A large, thick-lipped species, allied to *C. macrochilus*, &c.

Body rather elongate, subfusiform, little compressed, the back broad and somewhat elevated. Head conical, broad and convex above, the front regularly sloping from the nape to the snout. Mouth entirely inferior, the mandible quite horizontal, the premaxillaries scarcely raised above the level of the base of the mandible. Upper lip very wide, full, pendant, with about eight rows of coarse, irregular papillæ, of which the second and third rows from the inside are much larger than the others; upper lip continuous with the lower at the angle of the mouth, the lower lip cut to the base in the middle by a deep, abrupt incision Front of eye midway in head. Eye very small, 7 in head, $3\frac{1}{2}$ in the convex interorbital space. Isthmus broad, half broader than the eye. Fontanelle large, as in the other species noticed in this paper. Scales crowded anteriorly, 9–65–9. Breast with evident imbedded scales. Dorsal fin inserted a little behind the middle of the body, long and low, its anterior rays but three-fourths the length of the base of the fin, $1\frac{1}{2}$ the length of the last rays; the free edge of the fin straight. Caudal fin short and broad, about equally forked, its upper lobe two-thirds the length of the head. Pectorals short and broad, their length three-fourths that of the head. Ventrals short, not quite reaching vent. Anal very high, reaching caudal. Dorsal rays 13; anal 7. Length of head $3\frac{3}{5}$ in body to base of caudal; greatest depth $4\frac{1}{2}$. Teeth essentially as in the others.

Color blackish above, blotched with darker, the whole back and sides obscurely spotted; belly white; a narrow, bright, rosy, lateral band on the anterior part of the body, overlying the blackish; fins mostly dusky mottled; top and sides of head rendered dusky by the presence of many dark specks.

This species is described from a large adult male nearly 18 inches in length, besides which we have a single young specimen.

There is another specimen in the collection, a large male fish 18 inches long, which agrees entirely with the type of *C. ardens*, with the following exceptions: The lower lip is wider, with less conspicuous, coarse, irregular papillæ, in 8 to 10 rows; the upper lip with two rows of large papillæ and several series of small ones. The caudal fin is much larger, the upper lobe three-fourths the length of the head, the lower broader than the upper; the pectoral fin is very long, but little shorter than head; and the ventrals reach the vent. The dorsal has 12 rays, and is long and low, as in *C. ardens*. The scales on the breast are almost obsolete. The isthmus shows a structure very different from that of any other Catostomoid fish known. The gill membranes are partly free posteriorly, their free margins forming a broad fold across the narrow isthmus, as in the genus *Cottus*. This structure appears normal, and is not the result of injury. If it be permanent, this form should probably constitute a distinct genus; if not, it may not be sepa-

rable as a species from *Catostomus ardens*. Meanwhile we abstain from giving a new name until more specimens can be obtained to settle the question.

INDIANA STATE UNIVERSITY, *December* 4, 1880.

DESCRIPTION OF A NEW SPECIES OF "ROCK-FISH" (SEBASTICHTHYS CHRYSOMELAS), FROM THE COAST OF CALIFORNIA.

By DAVID S. JORDAN and CHARLES H. GILBERT.

Sebastichthys chrysomelas, sp. nov.

(*Sebastichthys nebulosus* Jordan & Gilbert, Proc. U. S. Nat. Mus. iii, 1880, 73, and elsewhere; not *Sebastes nebulosus* Ayres.)

In previous papers on the California rock-fish we have provisionally identified one of the common species as the *Sebastes nebulosus* of Ayres. Ayres himself, however, considered his own *nebulosus* as without question the *Sebastes fasciatus* of Girard, which is the *Sebastichthys fasciolaris* of Lockington. The two species agree closely in general characters, but differ in the development of the spines on the head, and especially in color, the "*fasciolaris*" having the yellow markings in the form of small spots or specklings, which are confluent along the sides, forming a sort of band, the other species having the yellow areas all large. The original description of *Sebastes nebulosus* Ayres (Proc. Cal. Acad. Nat. Sci. i, 5, 1854) applies in the main to both species; but the account of the coloration applies to *S. fasciolaris* Lockington, and not to our "*S. nebulosus*".

Ayres says:

"In color this fish is finely mottled with dusky yellow and dark brown; on the fins the latter hue predominates, and the lighter mottlings have rather a bluish aspect."

We propose, therefore, to consider *fasciolaris* a synonym of *nebulosus*, and to give to the species previously called *nebulosus* by us the new name *chrysomelas*, in allusion to its yellow and black coloration.

DESCRIPTION.—Body short and stout, not much compressed; highest at the origin of the first dorsal, thence tapering rapidly to the tail. Head short, bluntish, the profile very steep. Mouth rather small, nearly horizontal, entirely below the axis of the body. Lower jaw rather shorter than the upper in the closed mouth; no prominent symphyseal knob. Premaxillaries anteriorly on the level of the lower edge of the orbit; maxillary reaching the vertical from the posterior margin of the pupil.

Preorbital wide, its neck about half the diameter of the eye, its margin sinuate, usually with a spine.

Ridges on top of head very prominent, high and strong, ending in strong spines, which diverge backward. They are a little stronger than in *S. carnatus*, but lower than in *S. nebulosus*. The following pairs are present: Nasal, preocular, supraocular, tympanic, and occipital, five in all. Preopercular spines short and thick, the uppermost usually the

longest. Opercular spines usual. A small spine on the interopercle and one on the subopercle at the junction of the two bones. Supra-scapular spines present. Gill-rakers short, rather thick, compressed and somewhat clavate, the longest about two-ninths the diameter of the orbit. Scales moderate, rough, the accessory ones few; about 56 transverse series. Lower jaw, maxillary, nasal region, and space in front of eye naked.

Dorsal spines high and strong, the third to sixth spines subequal and highest, rather higher than the highest soft rays. Dorsal fin deeply emarginate. Second anal spine much stronger than third, the two about equal in length. Pectorals with very broad base, reaching beyond the tips of the ventrals, which reach nearly to the vent. The lower pectoral rays thickened. Caudal slightly rounded.

D. XII, I, 13; A. III, 6.

Coloration black and yellow; the latter shade is usually a clear, warm, brownish yellow, with some specks of deeper orange. It varies from a dusky orange to olivaceous yellow, the latter color more often seen on the belly. The dark shades are black or dark brown, with slight olive tinge. The colors are usually purest in specimens taken in deep water.

The dark color predominates on the back; the membrane between the third and fourth dorsal spines and an area at the base of these spines is always pale; a yellow blotch extends thence downward and backward, joining the light color of the belly. Another light area passes from near the angle of the opercle around the pectorals, uniting below them. Three other blotches occur along the back, one under the eighth dorsal spine, one under the last spine, and one under the last soft ray; from each of these irregular pale areas extend down the sides. The fins have the color of the region to which they belong. Head above with dusky cross-shades and faint bands radiating from the eye.

This species reaches a length of about 15 inches, and is found in large numbers on the coast of California, from the island of San Nicolas, which marks the southern limit of the abundance of the "rock-fish", to Cape Mendocino. It is common in the markets of San Francisco, although not one of the most abundant species. Its affinity with *S. carnatus* has been elsewhere noticed (Proc. U. S. Nat. Mus. iii, 1880, 74).

A table of measurements will be found on page 75 of vol. iii.

The species described by us as *Sebastichthys vexillaris* in vol. iii, p. 292, is represented in Puget Sound and the Gulf of Georgia by a variety or subspecies with lower dorsal spines and much darker and duller coloration, the dark shades being of a reddish brown. The latter form is apparently identical with *Sebastes caurinus* Richardson, Ichth. Voy. Sulphur, i, 1844, 77, pl. 41, fig. 1, described from Sitka.

The species may therefore take the name of *Sebastichthys caurinus*, and the California form that of subspecies *vexillaris*.

INDIANA STATE UNIVERSITY,
Bloomington, Ind., November 6, 1880.

FISHES FROM THE DEEP WATER ON THE SOUTH COAST OF NEW ENGLAND OBTAINED BY THE UNITED STATES FISH COMMISSION IN THE SUMMER OF 1880.

By G. BROWN GOODE.

The following paper enumerates 51 species of fishes known to occur outside of the hundred-fathom curve along the southern coast of New England. Nearly all were obtained by the Fish Commission steamer "Fish Hawk" on its three trips to the "Lopholatilus Ground" in September. Several of the species were described a few weeks ago in another paper.

MALTHEIDÆ.

1. Halieutæa senticosa, new species.

A single small specimen (No. 26088) was obtained, September 13, from station 879, at a depth of 225 fathoms, and on October 2, from station 895, 238 fathoms, four specimens (No. 26175), ranging in length from 60mm to 140mm.

The occurrence on the Atlantic coast of the United States of a species of the genus *Halieutæa*, hitherto known only from China, is exceedingly interesting. A related genus, *Halieutichthys*, Poey, is represented in the West Indian fauna by the species *Halieutichthys aculeatus*.*

DESCRIPTION.—Disk orbicular, nearly as wide as long; its length less than half that of the body; its lateral outlines prolonged on each side in a strong spine, armed at the tip with a group of irregularly arranged acicular spinelets. Body covered above with numerous stout, conical spines with stellular bases. These are largest upon the postdiscal portion of the body, where they are approximately arranged in about four irregular longitudinal rows upon each side of the dorsal fin. Closely set rows of these stout spines mark the outer margin of the disk, and there is also a cluster of five to seven upon each carpal peduncle. Outside of these marginal spines, upon each side, is an irregular marginal row of five depressed, knife-like spines, each tipped with a crown of three acicular spinelets. On the anterior margin of the disk the two rows of spines coalesce and form a bristling row of closely set spines, some pointing dorsally, some laterally, some ventrally. There are two kinds of spines upon the dorsal surface, in addition to the large ones already described: some large, somewhat remote from each other, conical, stellular; others, much more numerous and filling the interspaces, prickle-like, stellular. Belly armed with numerous closely set spines of a similar kind. Snout somewhat projecting, armed with three many-

Halieutichthys aculeatus (Mitchill) Goode.

Lophius aculeatus, MITCHILL, Amer. Monthly Magazine, ii, 1818, p. 325 (specimen from Straits of Bahama).

Halieutichthys aculeatus, GOODE, Proc. U. S. Nat. Mus. ii, 1879, p. 109 (calling attention to Mitchill's description).—GOODE & BEAN, *ibid.* p. 333 (specimen from Key West).

Halieutichthys reticulatus, POEY, Proc. Acad. Nat. Sci. Phila. 1863, p. 91 (specimen from Cuba).

tipped spines. A spine-armed ridge in front of the eyes, over the top of the snout. In this four spines are conspicuous, one in front of each eye, and between these a larger pair, in front of the supraorbital ridges. From these last-mentioned spines extend spine-armed ridges along the upper margins of each orbit. Under the snout is a cavity containing a barbel, pedicelled, with thick, club-shaped, trilobate tip. On each side of this cavity are the nasal openings.

The width of the mouth is equal to the distance between the centers of the pupils of the eyes, this being much less than in *Halieutæa stellata*, in which the mouth is proportionally twice as large. The shape of the disk is less circular than in the Asiatic species, being intermediate between this form and *Halieutichthys*. Other points by which *H. stellata* may be distinguished are the absence of the strong lateral spines of the disk; the slighter specialization of the carpal peduncles; the greater proportionate size of the disk, which occupies two-thirds of the entire length of the fish; the less immediately axillary position of the gill-openings; the less spiny armature of the body, the spines upon the margin being smaller and less crowded; and the entire absence of spines upon the ventral surface.

D. 6; A. 4; C. 8; P. 13–15; V. 5. Color reddish gray, whitish below.

Measurements.

Current number of specimen	26175.	
Locality	Station 895.	
	Millimeters.	100ths of length.
Extreme length	140	
Length to base of middle caudal rays	118	100
Body:		
Greatest width of disk		50
Length of disk (snout to lateral spine)		47
Length of disk (snout to angle of pectoral)		47
Least height of tail		5
Length of body (outside of disk)		40
Head:		
Greatest length (to branchial opening)		39
Width of interorbital area		8
Length of snout		4
Width of mouth		16
Length of maxillary		9
Length of mandible		10
Diameter of orbit		8
Dorsal:		
Distance from snout		60
Length of base		8
Greatest height		14
Length of rostral barbel		2
Anal:		
Distance from snout		65
Length of base		5
Height at longest ray		14
Caudal:		
Length of middle rays		13
Pectoral:		
Distance of elbow from snout		52
Length		24
Ventral:		
Distance of free portion from snout		35
Length		12
Dorsal		6
Anal		4
Caudal		8
Pectoral		13–15
Ventral		5

LOPHIIDÆ.

2. Lophius piscatorius, Linn.

A specimen, No. 26170, 26^{cm} long, containing immature ova, was taken at station 894, at a depth of 365 fathoms; also a large specimen with immature ova, No. 26098, from station 876, 120 fathoms; and a smaller one, perhaps two years old, No. 26070, from station 878, 142½ fathoms.

3. Mancalias uranoscopus (Murray) Gill.

Ceratias uranoscopus, Murray, in Wyville Thompson, The Atlantic, 1878, ii, p. 67, fig. 20 (Am. ed.).

Mancalias uranoscopus, Gill, Proc. U. S. Nat. Mus. i, 1878 (Oct. 17), p. 228.

A single specimen, No. 26159, 185^{mm} long, was taken October 2 at station No. 893, at a depth of 372 fathoms. It is of much interest, only one specimen having hitherto been found. This was dredged July 23, 1873, by H. M. S. Challenger, southeast of Madeira (lat. 22° 18′ N., long. 22° 2′ W.), at a depth of 2,300 fathoms (temperature 1° 65′ C.). Mr. Murray's description, which is sufficiently accurate except that our specimen has four instead of three rays in the second dorsal, runs as follows: The specimen is 90^{mm} in length from the snout to the end of the tail, compressed laterally, and of a uniform black color. The anterior spine of the first dorsal fin is produced into a long filament, ending in a pear-shaped bulb, terminating in a very distinct, semi-transparent, whitish spot. This spine has its origin on the posterior portion of the head, and when laid back it reaches nearly to the tip of the tail. The second part of the first dorsal is placed far back on the body, and consists of two short, fleshy tubercles, which lie in a depression in front of the second dorsal fin. The second dorsal has three rays; the anal is opposite the second dorsal and has four rays; the caudal has eight rays, the four central rays being much larger than the others, and bifid. The pectorals are small and have ten very delicate rays. The gill-opening is a slit situated below the pectoral fin. The upper jaw is formed by the intermaxillaries, and is armed, together with the lower jaw, with a series of teeth of moderate size, which can be depressed inward as in *Lophius*. The skin is thickly covered with minute, embedded, conical spines. The eyes are very small and are placed high up on the middle of the head. The presence of a fish of this group at so great a depth is of special interest. From its structure, and from the analogy of its nearest allies, there seems to be no reasonable doubt that it lives on the bottom. It is the habit of many of the family to lie hidden in the mud, with the long dorsal filament and its terminal soft expansion exposed. It has been imagined that the expansion is used as a bait to allure its prey, but it seems more likely that it is a sense-organ intended to give notice of their approach.

ANTENNARIIDÆ.

4. Chaunax pictus. Lowe.

Chaunax pictus, Lowe, Trans. Zool. Soc. Lond. iii, 1846, p. 339, pl. li.—Günther, Cat. Fish. Brit. Mus. iii, 1861, p. 200.—Gill, Proc. Acad. Nat. Sci. Phila. 1863, p. 90 (generic diagnosis in synopsis of family); Bull. U. S. Nat. Mus. i, 1878, p. 222.

A single small specimen of a species of *Chaunax*, 37mm long, was obtained September 4, at station 869, at a depth of 192 fathoms.

While there is a general agreement between the specimen described from Madeira by Lowe under the name *Chaunax pictus** and the immature individual of the same genus before me, there are certain characters, such as the slightly smaller number of fin-rays in dorsal and caudal, and the difference in the shape of these fins in the latter, which renders the question of their identity somewhat doubtful. I am unwilling, however, to establish a new specific name on this immature specimen, particularly since the shape of the fins is likely to be modified with age, and the difference in the radial formula is hardly of specific importance. The specimen is therefore provisionally referred to Lowe's species. A larger specimen from our coast is much to be wished for. Lowe's was 406mm (16 inches) long, and "was taken with an ordinary bait and line at the Picos, a rocky shoal about a league from the shore of Camera de Lobos, a village five or six miles to the westward of Funchal, on the 12th of March, 1846"; depth of water not stated. The color of this specimen was bright orange above, rosy at the sides, and with fins and tips vermilion; on the belly rosy white, with fins vermilion.

The color of our specimen, No. 26021, is brownish gray. The rostral tentacle is nearly as long as the diameter of the eye.

Radial formula: D. I, 10; A. 5; C. 7; V. [3]; P. 10.

Measurements.

	Millimeters.	100ths of length.
Extreme length	37	.....
Length to base of middle caudal rays	27	100
Body:		
Greatest height	.....	18
Greatest width	.....	12
Least height of tail	.....	4
Head:		
Greatest length (to branchial aperture)	.....	74
Greatest width	.....	33
Width of interorbital area	.....	15
Length of snout	.....	11
Length of maxillary	.....	20
Length of mandible	.....	18
Diameter of orbit	.....	5
Dorsal tentacle	.....	4
Dorsal fin:		
Distance from snout	.....	70
Anal:		
Distance from snout	.....	74

* 1846.—Lowe, Rev. R. T. On a New Genus of the Family *Lophidæ* (Les Pectorales, Pediculées, Cuv.), discovered in Madeira. < Trans. Zool. Soc. London, iii, pp. 339 344, pl. li. Read Sept. 22, 1846.

Measurements—Continued.

	Millimeters.	100ths of length.
Caudal:		
Length of middle rays		28
Pectoral:		
Distance from snout		64
Length		[10]
Ventral:		
Distance from snout		44
Length		[10]
Dorsal		I, 10
Anal		5
Candal		7
Pectoral		10
Ventral		[3]

PLEURONECTIDÆ.

5. Hippoglossus vulgaris, Fleming.

Pleuronectes hippoglossus, LINN. Syst. Nat. ed. x, i, p. 269

Hippoglossus vulgaris, FLEMING, Brit. Animals, p. 199.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, p. 403.

Hippoglossus americanus, GILL, Proc. Acad. Nat. Sci. Phila. 1864, p. 220.

The New London halibut-smacks obtain many halibut on the south part of George's Banks and the neighboring shoals. An individual was taken, years ago, on the outer side of Fisher's Island, Connecticut. The halibut may, in all probability, be found to be abundant on the edge of the continental slope south of Cape Cod, since here have been recently obtained nearly all the species most constantly associated on the northern halibut grounds on the outer edges of La Have, Brown's, Sable Island, and other banks off the coast of Nova Scotia and Newfoundland.

6. Hippoglossoides platessoides (Fabricius) Gill.

Pleuronectes platessoides, FABRICIUS, Fauna Groenlandica, 1780, p. 164 (excellent description).—"Vidensk. Selsk. Naturv. och Mathem. Afhandl. i, p. 50, pl. ii, fig. 2."

Citharus platessoides, REINHARDT, *ibid.* vii, 1838, p. 130.—KRÖYER, in Gaimard, Voyages en Scandinavie, etc. pls. xxi (excellent figure).

Drepano(p)setta platessoides, GILL, Cat. Fish. E. Coast N. America, 1861, p. 50.

Hippoglossoides platessoides, GILL, Proc. Acad. Nat. Sci. Phila. 1864, p. 217.—GOODE & BEAN, Cat. Fish. Essex Inst. 1879, p. 7.

Platessa dentata (not *Pleuronectes dentatus*, Mitchill), STORER, Rep. Fish. Mass. 1839, p. 143; Hist. Fish. Mass. 1867, p. 197, pl. xxx, fig. 3.

Hippoglossoides dentatus, GILL, Cat. Fish. E. Coast N. A. 1861, p. 50.—GÜNTHER, Cat. Fish. Brit. Mus. iv, 1862, p. 406.

Pomatopsetta dentata, GILL, Proc. Acad. Nat. Sci. 1864, p. 217 (with def. of *Pomatopsetta*, p. 216).

Hippoglossoides limandoides, GOODE & BEAN, Amer. Journ. Sci. & Arts, xvii, 1876, p. 39.

Not unusual in deep water off Southern Massachusetts and Rhode Island, approaching the coasts in winter, but not taken in these trips of the Fish Commission steamer.

7. Paralichthys oblongus, (Mitchill) Jordan.

Pleuronectes oblonga, Mitchill, Trans. Lit. & Phil. Soc. N. Y. i, 1814, p. 391.

Platessa oblonga, Storer, Syn. Fish. N. A. p. 225.—DeKay, Zool. N. Y. Fish. 1842, p. 299, pl. xlviii, fig. 156.

Chænopsetta oblonga, Gill, Cat. Fish. E. Coast N. A. 1861, p. 50 (name of genus proposed; no definition); Proc. Acad. Nat. Sci. Phila. 1864, p. 218 218 (genus defined p. 216).

Pseudorhombus oblongus, Günther, Cat. Fish. Brit. Mus. iv, 1864, p. 426.—Goode & Bean, Cat, Fish. Essex Co. & Mass. Bay, 1879, p. 7.

Paralichthys oblongus, Jordan, MSS.

Platessa quadrocellata, Storer, Proc. Bost. Soc. Nat. Hist. ii, 1847, p. 242; Hist. Fish. Mass. 1867, p. 203, pl. xxxi, fig. 3.

Platessa quadrocularis, Gill, Cat. Fish. E. Coast N. A. 1861, p. 51.

Specimens were obtained at the following trawling stations: No. 26078, from station 873, 100 fathoms.

8. Monolene sessilicauda, Goode.

Monolene sessilicauda, Goode, Proc. U. S. Nat. Mus. iii, 1880, p. 338.

Specimens were obtained from the following stations:

	Fathoms.
No. 26004, stations 870, 871	150–115
No. 26099, station 876	120
No. 26109, station 877	126

9. Citharichthys arctifrons, Goode.

Citharichthys arctifrons, Goode, Proc. U. S. Nat. Mus. iii, 1880, p. 341.

Specimens were obtained from the following stations:

	Fathoms.
Nos. 25908, 26130, station 871	115
Nos. 26100, 26101, station 872	86
No. 26117, station 876	120
No. 26118, station 876	120
No. 26124, station 878	142½
No. 26129, station 874	85
" station 870	155

10. Citharichthys unicornis, Goode.

Citharichthys unicornis, Goode, Proc. U. S. Nat. Mus. iii, 1880, p. 342.

Specimens were obtained as follows:

	Fathoms.
No. 26003, station 870	155
No. 26003, station 871	155

11. Limanda ferruginea (Storer) Goode & Bean.

Platessa ferruginea, Storer, Hist. Fish. Mass. 1867, p. 198, pl. xxx, fig. 4.

Myzopsetta ferruginea, Gill, Cat. Fish. E. Coast N. A. 1861, p. 51 (genus not defined); Proc. Acad. Nat. Sci. Phila. 1864, p. 217 (genus defined), *et alibi.*

Pleuronectes ferrugineus, Günther, Cat. Fish. Brit. Mus. iv, 1862, p. 447.

Limanda ferruginea, Goode & Bean, List Fish. Essex Co. & Mass. Bay, 1879, p. 6.

Platessa rostrata, H. R. Storer, Boston Journ. Nat. Hist. v, 1857, p. 268, pl. viii, fig. 2.

Myzopsetta rostrata, Gill, l. c.

Numerous specimens were taken in 1874, 1875, and 1880 south of Cape Cod, in deep, cold water. The most southern locality is the *Pecten* Ground off Watch Hill.

12. Limanda Beanii, new species.

Two specimens, No. 26102, were obtained—one from station 875, at a depth of 126 fathoms; one from station 876, 120 fathoms—which are provisionally referred to the genus *Limanda*, Gottsche, as understood by American ichthyologists. The species surely belongs to *Pleuronectes*, as limited by Günther, the weight of whose opinion regarding the difficulties of making generic divisions in this group is fully appreciated. The extreme brevity of the snout and the elongate-elliptical form of the body render its shape very unlike that of *Limanda ferruginea* of our own coast and *Limanda platessoides* of the Eastern Atlantic. In its general appearance, except that the ventrals are not both lateral, it resembles considerably the species mentioned above.

DESCRIPTION.—The body is elliptical in form, with angular outlines. Its height is three-eighths (38) of its total length, and slightly more than twice the length of the head, and about three times the greatest height of the anal fin. Its height at the ventrals (25) is one-fourth of its length and less than distance from snout to origin of anal. Its least height, at base of tail (12), is half its height at ventrals. It is thin, its greatest width (7) not exceeding the diameter of the orbit.

The scales are subcircular, small, strongly pectinate on the colored side, cycloid on the blind side, where they are also larger, there being about fifty (as nearly as can be counted in the specimens before me) in the lateral line, behind the curve, while on the colored side there are probably sixty. The lateral line on the colored side makes a very abrupt, conspicuous, angular, high curve over the pectoral fin. The chord of this arc is nearly as long as the head of the fish, its height half as great. The scales in the lateral line are highly specialized, particularly along the curve, which appears to contain about twenty-seven of them, while posterior to this, in the straight portion, there are about sixty. The specialized scales of the lateral line extend far out upon the caudal fin. On the blind side the lateral line is little conspicuous, the scales very slightly specialized, and it becomes obsolete in the region where, upon the colored side, the curve is located. The scales extend far out upon the caudal fin, but are not present upon the other fins.

The head is very short, its length (18) contained about five times and one-half in the total. The snout is very short (2), one-fiftieth of the total, and the mouth is small, its cleft subvertical, and the maxillary extending very slightly behind the anterior margin of the orbit. The teeth are inconspicuous, apparently in two rows, stronger and more numerous on the blind side, barely discernable in upper jaw, absent elsewhere in the mouth.

The eyes are large, prominent; their diameters (7) greater than the length of the maxillary (6) and equal to that of the mandible (6). They are very closely set, the interorbital space marked by a knife-like edge of bone. The upper eye, in its outline trenching upon the dorsal outline of the head, is almost directly above its mate. Together they occupy

nearly three-fourths of the width of the head at the perpendicular passing through their centers.

The dorsal fin begins over the posterior part of the pupil of the upper eye. Its rays are long, widely separated, and with their tips protruding beyond the membrane, giving to this, as also to the anal, a ragged, irregular appearance. Its greatest height (8) is equal to half the length of the head. The anal is inserted under the axil of the pectoral, and its height is about the same as that of the dorsal.

The length of the caudal (20) is equal to one-fifth of that of the body, without including caudal. It is broad, fan-shaped, acutely convex in outline. The distance of the ventral from the snout (28) is about one-third the length of the base of the dorsal. The arrangement of these fins upon the ventral keel is much as in *Limanda ferruginea*, the right fin being almost upon the median line. The pectorals are normal.

The color is grayish brown, mottled with darker patches. There is a conspicuous black blotch upon the outer rays of the caudal on either side.

Radial formula: D. 64; A. 63; C. 18; P. 7; V. 6; lateral line about 88.

This species is dedicated to my associate Dr. Tarleton H. Bean, of the United States National Museum.

Measurements.

Current number of specimen	26102.	
Locality	Stations 875–6.	
	Milli-meters.	100ths of length.
Extreme length	135	.....
Length to base of middle caudal rays	111	100
Body:		
Greatest height	.....	38
Greatest width	.....	7
Height at ventrals	.....	25
Least height of tail	.....	12
Head:		
Greatest length	.....	18
Width of interorbital area	.....	5
Length of snout	.....	2
Postorbital portion of head	.....	9
Length of maxillary	.....	6
Length of mandible	.....	7
Diameter of orbit	.....	7
Dorsal:		
Distance from snout	.....	9
Length of base	.....	83
Greatest height	.....	8
Anal:		
Distance from snout	.....	28
Length of base	.....	70
Caudal:		
Length of middle rays	.....	20
Pectoral:		
Distance from snout	.....	17
Length	.....	9
Ventral:		
Distance from snout	.....	17
Length	.....	9
Dorsal	.....	64
Anal	.....	63
Caudal	.....	18
Pectoral	.....	7
Ventral	.....	6 R.
Number of scales in lateral line (*ca.*)	88 (27 in curve).	

13. Glyptocephalus cynoglossus (Linn.) Gill.

Pleuronectes cynoglossus, Linnæus, Syst. Nat. ed. x, i, 1758, p. 269.

Glyptocephalus cynoglossus, Gill, Proc. Acad. Nat. Sci. Phila. 1873, p. 161.—Goode & Bean, Proc. U. S. Nat. Mus. i, 1878, p. 21 (with extensive synonymy).

Numerous specimens of various sizes, from the young of two centimeters to the adult of fifty centimeters, were taken in the following localities:

14. Thyris pellucidus, Goode.

Thyris pellucidus, Goode, Proc. U. S. Nat. Mus. iii, 1880, p. 344.

Specimens were obtained from the following localities:

	Fathoms.
No. 26005, station 871	115
No. 26006, station 872	86

MACRURIDÆ.

15. Macrurus Fabricii, Sundeval.

Macrurus Fabricii, Sundeval, "Vet. Akad. Handl. 1840, p. 6".—Goode & Bean, Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 7.

Macrurus rupestris, Günther, Cat. Fish. Brit. Mus. iv, 1862, p. 390.

There can be little doubt that this species occurs south of Cape Cod, though no living specimens have yet been obtained. The first specimen found on the coast of the United States was picked up at sea, floating, somewhere off Gravesend, N. Y.

16. Macrurus Bairdii, Goode & Bean.

Macrurus Bairdii, Goode & Bean, Amer. Journ. Sci. & Arts, xiv, 1877, pp. 471–473 (Massachusetts Bay); Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 7.

Specimens were obtained from the following localities:

	Fathoms.
No. 26062, stations 879–880	225–252
Nos. 26163, 26166, 26187, 26194, station 893	372
Nos. 26168, 26194, 26217, 26218, station 894	365
Nos. 26191, 26195, 26210, station 895	238
No. 26193, station 892	487
Nos. 26212, 26217, 26218, station 891	487

17. Macrurus carminatus, Goode.

Macrurus carminatus, Goode, Proc. U. S. Nat. Mus. iii, 1880, p. 346.

Specimens were obtained from the following localities:

	Fathoms.
No. 26001, station 871	115

GADIDÆ.

18. Gadus morrhua, Linnæus.

The cod occurs in deep water on this portion of the coast.

19. Phycis chuss.

Several specimens apparently of this species were obtained outside of the hundred-fathom curve.

20. Phycis Chesteri, Goode & Bean.

Phycis Chesteri, Goode & Bean, Proc. U. S. Nat. Mus. i, 1878, p. 256; Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 8.

Numerous specimens, old and young, were found at stations 878, 142 fathoms; 879, 225 fathoms; 880, 252 fathoms; 881, 325 fathoms; 892, 487 fathoms; 895, 238 fathoms.

This species and *Macrurus Bairdii* appear to be the most abundant fishes of this district, occurring in immense numbers and breeding copiously.

21. Phycis regius (Walbaum) Jordan & Gilbert.

Blennius regius, Walbaum, Artedi, 1792, p. 186.
Urophycis regius, Gill, Proc. Acad. Nat. Sci. Phila. 1863, p. 240.
Phycis regius, Jordan & Gilbert, Proc. U. S. Nat. Mus. i, 1878, p. 371.—Goode & Bean, Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 8.—Bean, Proc. U. S. Nat. Mus. iii, 1880, p. 70.
Enchelyopus regalis, Schneider, Bloch. Syst. Ichth. i (cloth), 1801, p. 33.
Phycis regalis, Kaup, Archiv für Naturg. 1858, p. 89.—Gill, Cat. Fish. E. Coast N. A. 1861, p. 49.—Günther, Cat. Fish. Brit. Mus. iv, 1862, p. 354.
"*Gadus blennioides*, Mitchill, Medical Register, 1814."
Gadus punctatus, Mitchill, *ibid.*
Phycis punctatus, DeKay, Zool. N. Y. Fish. 1842, p. 292, pl. xlvi, fig. 149.

A specimen was obtained at station 870, in 155 fathoms of water. The distribution of this species is very puzzling. It has been found at Halifax, Nova Scotia, and south to the Cape Fear River, but seems nowhere abundant except about Long Island.

22. Haloporphyrus viola Goode & Bean.

Haloporphyrus viola, Goode & Bean, Proc. U. S. Nat. Mus. i, 1878, p. 257; Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 8.

Specimens were taken October 2, at station 893, in 372 fathoms of water. The species has never before been found except on the outer edges of the Nova Scotia banks.

23. Enchelyopus cimbrius (Linn.) Jordan.

Gadus cimbrius, Linnæus, Syst. Nat. ed. x, i.
Onos cimbrius, Goode & Bean, Proc. U. S. Nat. Mus. i, 1878, p. 349 (with full synonymy); Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 8.
Enchelyopus cimbrius, Jordan, MSS.

Several specimens were obtained outside the hundred-fathom curve.

24. Merlucius bilinearis (Mitchill) Gill.

Numerous specimens of old and young were taken September 4, September 13, and October 2, in almost every haul of the trawl-nets, at whatever depth. The adults appeared to be in the middle of the spawning season, the eggs being separated in the ovaries and flowing easily in specimens taken at the depth of 250 and 487 fathoms. This phenomenon is of the greatest interest and importance, since it may serve to illustrate how other species, common near the shores, such as the menhaden (*Brevoortia tyrannus*) and the bluefish (*Pomatomus saltatrix*), retreat to deep water to spawn.

25. Hypsicometes gobioides, Goode.

Hypsicometes gobioides, GOODE, Proc. U. S. Nat. Mus. iii, 1880, p. 348.

A single specimen of this puzzling little stranger was obtained at station 871, in 115 fathoms of water.

STICHÆIDÆ.

26. Eumesogrammus subbifurcatus (Storer) Gill.

A single specimen of this arctic species was obtained off the mouths of Newport Harbor.

LYCODIDÆ.

27. Lycodes Verrillii, Goode & Bean.

Lycodes Verrillii, GOODE & BEAN, Amer. Journ. Sci. & Arts, xvi, 1877, p. 474; Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 9.

Specimens were obtained at the following localities: Stations 870, 155 fathoms; 879, 225 fathoms; 880, 252½ fathoms; 881, 325 fathoms; 893, 372 fathoms; 895, 238 fathoms; often in considerable abundance.

28. Lycodes paxillus, Goode & Bean.

Lycodes paxillus, GOODE & BEAN, Proc. U. S. Nat. Mus. ii, 1879, p. 44; Cat. Fish. Essex Co. & Mass. Bay, 1879, p. 9.

Two specimens, No. 26181, came from stations 891 and 894, 487 and 365 fathoms. The unique specimen previously known was obtained by Captain Collins in the gully between La Have and Sable Island Banks. The enormous development of the buccal muscles appears to be a character acquired in old age, as also the special peculiarities of dentition mentioned in the description.

ANARRHICADIDÆ.

29. Anarrhichas lupus, Linnæus.

A single small specimen, about 30^{mm} in length, was obtained at station 866, in 65 fathoms. At the time of writing the present notice this is not available for examination, but it is believed to be the young of *Anarrhichas lupus*, never before recorded south of Cape Cod.

LIPARIDIDÆ.

30. Liparis sp.

Specimens of a *Liparis* closely resembling *L. ranula*, Goode & Bean, were obtained at station 879, and are preserved for future discussion.

COTTIDÆ.

31. Amitra liparina, new genus and new species (*Cottidæ*).

Two specimens of the fish here described were obtained, October 2, at station 891, in 487 fathoms; one, No. 26184, 164^{mm} long; also a smaller one, 55^{mm}. Their structure was so peculiar that I have long hesitated to describe them. They are evidently Liparoid fishes, without ventral fins or ventral disk. Professor Jordan and Dr. Bean have examined

them with me, and the decision has been reached that they should be placed in a new genus of the family *Cottidæ*. Professor Jordan considers this genus as forming one of the most abnormal types of *Cottidæ*, approached through *Cottunculus* and *Psychrolutes*, and also closely allied to *Liparidæ*.

AMITRA, new genus.

Cottoid fishes, with small head, elongate, attenuate, body covered with thick, lax, slimy skin. Ventral fins absent. Opercular stray present. Pseudobranchiæ present. Gills 3½, without slit behind last (?). Gill-openings closed below, restricted to small slits under the very small operculum. Operculum very small, strap-shaped. Lower jaw included within the upper. Teeth weak, paved. First five rays of the dorsal non-articulate, the others grading gradually into the flexible rings.

32. Amitra liparina, new species.

DESCRIPTION.—Body elongate, compressed posteriorly, very thin at the tail, covered with a gelatinous, lax, transparent skin, which is separated from the body and the fins by a filmy, mucous intertissue. Greatest height of body (18) contained five and one-half times in its length, without caudal.

Head thick, convex between eyes, its greatest width (11) nearly three-fourths its length (15), which is contained six and two-third times in the length of the body. Snout convex, protruding. Mouth under the snout and far back from its tip. Eyes lateral, in diameter (3) about half the width of the interorbital area (5). Nostril in front of eye. Pores along the upper lip. When the head is viewed from directly in front the opening of the mouth seems to be convex upward.

The dorsal fin begins over the end of the pectoral, and the rays and outline of this, as well as of the anal, are hardly visible through the thick, lax skin. The rays are thick, but very flexible. The anal begins under the eighth to tenth dorsal ray. The dorsal and anal rays lie closely connected with those of the caudal, which are somewhat larger, and extend in a pencil-like point.

The pectoral is broad, its lower base almost under the posterior margin of the orbit. It is composed of twenty-three rays, the six lowest of which are prolonged beyond the lower rays contiguous. The jugular disk cannot be found.

Radial formula: D. 67; A. 54; C. 6; P. 23.

Color: Yellowish white, dusky toward the tail and blackish upon the anterior part of the head. Abdominal cavity showing black through the skin.

Two other specimens of this or a related species were obtained (No. 26179) from station 894, in 365 fathoms of water, but they are in poor condition and cannot at present be made out.

Measurements.

Current number of specimen	26184.	
Locality	Station 487.	
	Millimeters.	100ths of length.
Extreme length	164	
Length to base of middle caudal rays	150	100
Body:		
Greatest height		18
Greatest width		9
Head:		
Greatest length		15
Greatest width		11
Width of interorbital area		5
Length of snout		4
Diameter of orbit		3
Dorsal:		
Distance from snout		30
Greatest height		6
Anal:		
Distance from snout		37
Height at longest ray		5
Caudal:		
Length of middle rays		9
Pectoral:		
Distance from snout (below)		8
Length		10
Dorsal		67
Anal		54
Caudal		6
Pectoral		23

33. Cottunculus microps, Collett.

Cottunculus microps, Collett, Tillhægsh. til. Vidensk.-Selsk. Forh. Christiania, 1864, p. 20, pl. i, figs. 1–3; Norges Fiske, 1875, p. 20, pl. i, figs. 1–3; Fiske Nordhaus-Expeditionens, 1878, p. 20; Meddelelser om Norges-Fiske Aarena, 1875–'78, 1879, p. 11.

Specimens from the following localities have been obtained:

	Fathoms.
No. 26087 (1), station 880	252½
No. 26167 (3), station 892	372
station 894	365
station 895	238
No. 26176 (3), station 895	238
No. 26140 (1), station 880	252½

The largest measures 265^{mm}, the smallest 25^{mm}. This species, never before found except on the Norwegian coast, was described from a specimen measuring 15^{mm}, dredged by Prof. G. O. Sars at Hasvig, near Hammerfest, in 200 fathoms, August, 1874; another, 50^{mm} long, near Trondhjemsfjord, in 1878, by Mr. Storm, at a depth of 180 fathoms; again, at a depth of 191 fathoms, 18 miles northwest from Hammerfest (72° 27′ N., 20° 51′ W.), in temperature 3° 5′ C., and at a depth of 459 fathoms; 15 miles westward of Northwestern Spitzbergen (79° 59′ N., 5° 40′ W.), with temperature of 1° C.

34. Cottunculus torvus, new species, undescribed.

A smooth-skinned species of *Cottunculus* was also obtained. This is reserved for future discussion.

AGONIDÆ.

35. Peristedium miniatum, Goode.

Peristedium miniatum, GOODE, Proc. U. S. Nat. Mus. iii, 1880, p. 349.

Specimens were obtained from the following localities:

	Fathoms.
No. 26023, station 869	192
No. 26030, station 871	115
No. 26083, station 876	120

As has already been stated, adults and young were found, the former full of nearly ripe eggs.

36. Asphidophoroides monopterygius (Bloch) Valenciennes.

In 1874 a head of an individual of this species was dredged up on the "Pecten Ground" off Watch Hill, R. I. This is the sole instance of its capture south of Cape Cod, though there can be little doubt that it is of frequent occurrence in the districts recently explored by the Commission.

37. Sebastes marinus, Linnæus.

Numerous small individuals of this species were taken in nearly every haul of the trawl-net down to the depth of 155 fathoms.

38. Setarches parmatus, new species.

A single specimen, No. 28084, was obtained at locality 876, in 120 120 fathoms. The young fish, 52^{mm} long, was taken in company with numerous young specimens of *Sebastes marinus*, from which it differs in many very striking respects.

It appears to belong to the type described by Johnson under the name *Setarches*.*

It is, however, much stouter and higher than the other known species of this genus, *Setarches Güntheri*, from which, too, it differs in having 10 instead of 11 spines in the first dorsal, and 6 instead of 5 rays in the ventrals. The height of the body (38) is three-eighths of its standard length. The length of the head (45) is nine-twentieths of the same. The diameter of the eye (12) is contained less than four times in the length of the head (45). The scales are small, cycloid, each with several concentric furrows.

The specimen is so young, and mutilated withal, that it seems scarcely desirable to prepare an elaborate specific diagnosis. I append, however, a table of measurements, from which the other proportions of the body may readily be deduced, hoping soon to secure materials for a better description. *Setarches parmatus* may readily be distinguished from *Sebastes marinus* by its more generous proportions, as well as by the generic characters already mentioned. The height of the body is three-eighths of

* Proc. Zool. Soc. London, 1862, p. 177; *Setarches Güntheri*, n. s. Madeira, p. 177, pl. xxiii.

its length instead of one-fourth; its width is one-fourth instead of three-twentieths; the length of the head nine-twentieths instead of three-eighths. The width of the interorbital area is half the length of the upper jaw instead of one-fourth, and is nearly equal to instead of one-half of the diameter of the orbit. The vertical fins are inserted farther back, the paired fins farther forward, and the fins are, without exception, longer. The tail appears to be truncate instead of emarginate, as in *S. marinus*. The preopercular spines are very prominent. The spinous dorsal contains ten spines.

Measurements.

Species: *Setarches parmatus.*

Current number of specimen	26084	
Locality	Station 876.	
	Milimeters.	100ths of length.
Extreme length	52	
Length to base of middle caudal rays	43	100
Body:		
Greatest height		38
Greatest width		23
Least height of tail		9
Head:		
Greatest length		45
Width of interorbital area		10
Length of snout		10
Length of operculum		13
Length of upper jaw		23
Diameter of orbit		12
Dorsal:		
Distance from snout		42
Length of base		34
Greatest height at fourth spine		23
Height at first spine		10
Height at second spine		18
Height at third spine		22
(*Soft*) length of base		Mutilated.
Anal:		
Distance from snout		80
Length of base		12
Height at first spine		7
Height at second spine		14
Height at third spine		14
Height at longest ray		15
Caudal:		
Length of middle rays		24
Pectoral:		
Distance from snout		44
Length		44
Ventral:		
Distance from snout		44
Length		25
Dorsal		X, 6+
Anal		III, 6

XIPHIIDÆ.

39. Xiphias gladius, Linn.

A fishing smack from Noank, Conn., was engaged by Professor Baird to set a trawl on the edge of the oceanic slope, in the hope of obtaining more specimens of *Lopholatilus*. Their only capture was a sword-fish thirteen feet long and weighing over 600 pounds. This was brought up from the bottom on the trawl-line. There is room for much question whether it was taken at the bottom or fastened itself to the

hooks as the line was being lowered, and was carried by its weight to the bottom. This curious freak of the sword fish, so often observed of late, deserves careful study.

LATILIDÆ.

40. Lopholatilus chamæleonticeps, Goode & Bean.

Lopholatilus chamæleonticeps, GOODE & BEAN, Proc. U. S. Nat. Mus. ii, 1879, p. 205.

In July, 1879, numerous specimens of this remarkable fish were taken by Gloucester fishing vessels, at a depth of 84 fathoms, 80 miles south by east from Noman's Land. The first trip of the "Fish Hawk" to deep water from Newport was September 4, and the nets were hauled as nearly as possible on the same grounds where *Lopholatilus* had previously been taken.

The second trip, ten days later, was to a region about forty miles farther west, and on this occasion six or more large individuals of this species were brought up on a hand line ("ladder-line") set from an open boat sent out from the steamer. None were at any time taken in the trawl-nets, though there is every reason to believe from the success of the fishing vessels previously, and from the number taken on the hand-line by the men in the small boat, that they are exceedingly abundant in this locality and probably for hundreds of miles in either direction, or at any rate to the south.

The *Lopholatilus* may yet prove to be a fish of economic importance. Its suitability for food was tested at the ward-room table of the "Fish Hawk", and it was pronounced equal to cod-fish, though somewhat finer grained in flesh.

The following notes upon color and internal structure were taken from a fresh specimen. The colors are very beautiful, and in general appearance when taken from the water it is one of the loveliest fishes I have ever seen, no exception being made in favor of the brilliant parrot-fishes or angel-fishes of the West Indian coral groves.

Color.—Black bluish, with a green tinge, iridescent, changing through purplish blue and bluish gray to rosy white below, and milky white toward the medium line of the belly. Head rosy, iridescent, with red tints most abundant on the forehead, blue under the eyes cheeks fawn-colored. Throat and under side of the head pearly white; with an occasional tint of lemon-yellow; this is most pronounced in front of the ventrals and on the anterior portion of ventral fins. Back with numerous maculations of bright lemon or golden. Anal purplish, with blue and rose tints, iridescent. Margin of anal rich purplish blue, iridescent like the most beautiful mother of pearl. This color prevading more or less the whole fin, which has large yellow maculations. The lower border is rose-colored like the belly, and the base of the fin also partakes of this general hue. Dashes of milk-white on the base of the anal between the rays.

Dorsal gray. In front of the seventh dorsal the upper third posterior to the upper two-thirds dark brown. Spots of yellow, large, elongate, on or near the rays. Adipose fin whitish brown or yellow; a large group of bright yellow, confluent spots at the base.

Pectorals sepia colored with rosy and purplish iridescence.

Viscera.—Stomach small, siphonal, barely more than a loop in the very large intestine. Alimentary canal short, stomach and intestine when stretched out at full length extending from the diaphragm to the caudal. A loop in the intestine immediately posterior to the stomach. Liver with two lobes, nearly equal in length, light chestnut-brown. Gall-bladder large, pendant, pear-shaped, with long duct. Swim-bladder simple, with thick muscular walls, strongly attached to roof of abdominal cavity by numerous root-like appendages, resembling somewhat those of *Pogonias*. Spleen two-thirds as long as gall-bladder.

CHAULIODONTIDÆ.

41. Chauliodus Sloanii, Schneider.

Chauliodus Sloanii, Schneider, Bloch. Syst. Ichth. 1801, p. 430, tab. lxxxv (as *C. setinotus*).

Chauliodus Sloanii, Günther, Cat. Fish. Brit. Mus. v, 1864. p. 392.

A single individual, No. 26165, 105^{mm} long, was taken from station 892, in 487 fathoms. The only other specimen recorded is that from the stomach of a codfish from George's Banks, preserved in the museum of the Essex Institute.

Radial formula of No. 26165: D. 6; A. 12.

SCOPELIDÆ.

42. Myctophum, sp.

A species, apparently undescribed, was obtained in several of the deep hauls. It is reserved for comparison with numerous other specimens of the group, as yet unelaborated, obtained by the Commission from the deep waters of the Atlantic.

MICROSTOMIDÆ.

Hyphalonedrus chalybeius, new genus and new species.

Numerous specimens (No. 26092) of a form closely related to *Argentina* were taken, September 13, at stations 876 and 878, 120 and 142 fathoms. They are considered to represent a new generic type.*

HYPHALONEDRUS, new genus.

A genus of Microstomatid fishes. Body rounded, terete. Cleft of mouth extending under the anterior third (at least) of the orbit. Eye large. Teeth in the jaws small, sharp, on the edges of the bony lips. Tongue entirely smooth. Tip of lower jaw projecting. Dorsal fin short, inserted midway in space between insertions of pectorals and ventrals.

*Etymology: ὑφάλος = under the sea + ἑνέδρος = a dweller.

Gill-arches 4. Pseudobranchiæ present. Scales moderate, pronouncedly pectinate.

The genus *Silus* Gill* was founded upon a misconception. The scales of *Argentina silus* (Cuv.) Nilss., are "dentigerous," it is true, but not ctenoid. They are true cycloid scales, with dentigerous surfaces. The diagnosis of *Silus* Gill would include the form above described, but, as has been remarked, it was founded upon a misunderstanding, and there can be no question as to what his intention may have been.

43. **Hyphalonedrus chalybeius**, new species.

DESCRIPTION.—Body plump, terete, its height (16) contained six times and one-fourth in its length, its width (13) seven and three-fourths. The height at ventrals (16) is equal to that of the origin of dorsal, the dorsal being inserted at the highest portion of the body, its middle over the origin of the ventrals. The least height of the tail is half that of the body. The scales are moderately strong, and sharply pectinated at the edge, and arranged in regular transverse rows, overlapping in such a manner as to resemble oblique plates upon the sides. The lateral line is prominent, straight, containing about 52 scales. Between the lateral line and the origin of the dorsal are 6½ scales, the origin of the ventral 6. The greatest length of the head to the end of the flexible flap of the operculum (27) slightly exceeds one-fourth of the body-length, and is itself slightly more than four times the length of the snout (6). The longitudinal diameter of the orbit (8) is four times that of the interorbital space (2). The maxillary, broad and flattened posteriorly, is in length (10) one-tenth of the body, and extends back to a perpendicular from the anterior margin of the pupil. The articulation of the mandible is in advance of the posterior tip of the maxillary, its length (11) slightly greater, and it protrudes beyond the snout, when the mouth is open, a distance greater than the width of the interorbital area. When the mouth is closed its tip still projects noticeably.

The dorsal fin is located almost midway between the snout and the adipose dorsal. Its height is almost equal (19) to that of the ventral (18). The adipose dorsal is over the middle of the anal, its length half the diameter of the orbit.

The distance of the anal from the snout (76) is about three-fourths of the body-length. Its length of base (6) is equal to the length of the snout; its height (10) to that of the middle caudal rays. The caudal is furcate. The pectoral is long, subfalcate, inserted close to the branchial cleft, its tip extending to the fourteenth or fifteenth scale of the lateral line, its length (22) twice that of the mandible.

The ventral is located two-fifths of the way from the snout to the base of the caudal, and directly under the middle of the dorsal.

Radial formula: D. 11 + 1 (adipose); A. 8; C. 16; P. 17 or 18; V. 9 or 10; L. lat. about 52.

Color grayish mottled with brown, scales metallic silvery.

*Proc. Acad. Nat. Sci. Phila. 1862, p. 15.

Measurements.

Current number of specimen	26092	
Locality	Station 876-8	
	Millimeters.	100ths of length.
Extreme length	112	
Length to base of middle caudal rays	97	100
Body:		
Greatest height		16
Greatest width		13
Height at ventrals		16
Least height of tail		8
Head:		
Greatest length		27
Width of interorbital area		2
Length of snout		6
Length of maxillary		10
Length of mandible		11
Diameter of orbit		8
Dorsal:		
Distance from snout		34
Length of base		12
Greatest height		19
Length of adipose fin		4
Anal:		
Distance from snout		76
Length of base		6
Height at longest ray		10
Caudal:		
Length of middle rays		10
Length of external rays		17
Pectoral:		
Distance from snout		16
Length		22
Ventral:		
Distance from snout		40
Length		18
Dorsal		11
Anal		8
Caudal		5, 7+9, 7
Ventral		9 or 10
Number of scales in lateral line (*ca.*)		52
Number of transverse rows above lateral line		6½
Number of transverse rows below lateral line to ventral		6

NEMICHTHYIDÆ.

44. Nemichthys scolopaceus, Richardson.

A single specimen, No. 26106, was taken in 252 fathoms of water at station 880. It came up clinging with its long jaws to the outside of the trawl-net.

SYNAPHOBRANCHIDÆ.

45. Synaphobranchus pinnatus (Gronow) Günther.

Specimens were obtained from the following localities: Station 880, 252 fathoms; 881, 325 fathoms; 891, 487 fathoms; 894, 365 fathoms. In the last-mentioned locality a specimen was taken carrying nearly mature eggs.

SIMENCHELYIDÆ.

46. Simenchelys parasiticus, Gill.

Simenchelys parasiticus, Gill, in Goode & Bean, Fish. Essex Co. & Mass. Bay, 1879, p. 27.

A single specimen, No. 26172, was taken at a depth of 487 fathoms at station 892.

RAIDÆ.

47. Raia, unknown species.

The young of a species of skate, with body covered closely with minute sharp spines, was taken in many localities. Mr. Garman has the specimens for identification.

48. Raia, unknown species.

The young of another species, with an extremely long tail, was taken from large, square, short-tendriled eggs at various depths. Mr. Garman has also these.

49. Raia lævis, Mitchill.

Two large skates apparently of this species were taken October 2 in deep water. A cast of one of them was made.

SPINACIDÆ.

50. Centrophorus? unknown species.

Mr. Garman has for identification two specimens taken at station 893, at a depth of 372 fathoms.

MYXINIDÆ.

51. Myxine glutinosa, Linnæus.

Specimens were obtained from the following localities: Stations 869, 192 fathoms; 870, 155 fathoms; 878, 142 fathoms.

DESCRIPTION OF A NEW SPECIES OF CARANX (CARANX BEANI), FROM BEAUFORT, NORTH CAROLINA.

By DAVID S. JORDAN.

Caranx beani, sp. nov.

Allied to *Caranx cibi* Poey, but much less elongate.

Color bluish above, silvery, with golden luster below; upper edge of caudal peduncle a little dusky; spinous dorsal blackish; axil dusky; no dusky spot on opercle, pectoral fin, or elsewhere.

Form rather broadly elliptic-ovate, the dorsal and ventral outlines about equally and nearly regularly curved, the depth greatest at the origin of the anal and soft dorsal, the axis of the body not far from the middle of its depth. Profile from the snout to the base of the dorsal forming a very regular curve. The greatest depth $2\frac{2}{3}$ in total length, $2\frac{1}{3}$ in length to the base of the caudal. Head little compressed, scarcely carinate above, the interorbital space more than half broader than the eye, which is small, shorter than snout, scarcely broader than the preorbital, 4 in head. Length of head $3\frac{1}{3}$ to base of caudal, 4 in total length. Mouth comparatively small, oblique, the lower jaw very slightly projecting when the mouth is closed. Maxillary small, scarcely extending to the anterior border of the orbit. Premaxillaries anteriorly on the

level of the lower edge of the pupil. Teeth small, villiform, in a narrow band in each jaw; those in the outer series slightly enlarged; the band in the upper jaw considerably broader than that in the lower; no canine teeth; bands of villiform teeth on vomer, palatine, and tongue. Adipose eyelid little developed. Cheeks and opercles scaly. Gill-rakers long, longer than the pupil. Breast closely scaled, its scales a little smaller than those on the sides. Upward curve of lateral line not very strong. Armature of tail feeble, only those plates on the caudal peduncle itself having distinct spines; about 26 plates may be counted before they merge into the ordinary scales.

Spinous dorsal low and feeble, the highest spine scarcely as long as the snout, the last spine nearly free, short and thickish; a small procumbent spine before the dorsal; soft parts of dorsal, anal, and caudal densely covered with small scales; soft dorsal and anal low, their highest rays scarcely longer than the snout; free anal spines, separate from the fin but connected with each other, scarcely longer than the pupil; caudal fin short, not widely forked, the lobes equal, the upper lobe $\frac{3}{4}$ length of head, the distance vertically between their tips slightly less than the length of the head; ventral fins very short, scarcely longer than snout, reaching about half way to anal; pectoral fins falcate, reaching about to the fourth soft ray of anal, their insertion on the level of the maxillary, their outer surface largely scaly; length of pectorals $\frac{2}{3}$ the greatest depth, about equal to length of head.

Fin rays: D. VIII–I, 26; A. II–I, 23.

Two specimens of this species were obtained by Mr. Charles H. Gilbert and myself at Beaufort, N. C., in the summer of 1877. They were taken with a small seine in the harbor, close to the shore.

It agrees in dentition and many other respects with *Caranx cibi* Poey, but the latter species is much slenderer, the depth of the body being about equal to the length of the pectorals or the length of the head. I place it provisionally in the genus *Caranx*, the value of the various proposed subdivisions of the latter group not being evident.

The example from which the preceding description was taken has been presented to the United States National Museum, where it is numbered 27372.

I present a table of comparative measurements of the type *Caranx beani* and of one of Poey's types of *C. cibi*.

Table of measurements.

Species	Caranx bean.		Caranx cibi.	
Locality	Beaufort, N. C.		Cuba.	
	Inches and 100ths.	100ths of length.	Inches and 100ths.	100ths of length.
Extreme length	6.85		11.00	
Length to end of caudal armature	5.48	100	9.00	100
Body:				
Greatest height		43		33
Greatest width		15		14
Height at ventrals		38		30
Least height of tail		7		4
Length of caudal peduncle		8		10
Head:				
Greatest length		30		30
Distance from snout to nape		27		
Greatest width		15		
Width of interorbital area		11½		10
Length of snout		10½		10
Length of the operculum		8		8
Length of maxillary		14		11½
Length of mandible		16		15
Diameter of orbit		9		7
Dorsal (*spinous*):				
Distance from snout		43		40
Length of base		17		
Greatest height		9		10
(*Soft*) length of base		38		34½
Height at longest ray		13		12⅝
Anal:				
Distance from snout		63		
Length of base		38		31
Height at first free spine		4		2½
Height at longest ray		11		
Caudal:				
Length of middle rays		8		
Length of external rays		27		26
Pectoral:				
Length		30		34
Ventral:				
Length		13		11
Dorsal		VIII-I, 26		VIII-I, 25
Anal		II-I, 22		II-I, 22
Number of plates in lateral line		25		29

INDIANA STATE UNIVERSITY,
Bloomington, Ind., November 10, 1880.

ON A COLLECTION OF FISHES FROM EASTERN MISSISSIPPI.*

By O. P. HAY.

The collection of fishes which it is the object of the present paper to describe was made almost wholly by the author, while on a trip along the eastern side of the State of Mississippi, during the latter part of March and the early part of April of the present year, 1880. The route taken was along the Mobile and Ohio Railroad, and extended from Corinth, near the northern line of the State, to Shubuta, a town about one hundred miles north of Mobile. Stops were made along this line of travel of from a few hours to four or five days. The conditions for col-

*A full series of these has been presented to the National Museum.

lecting were usually very unfavorable, on account of high water and the superabundance of logs and snags. Nevertheless, I succeeded in collecting altogether 53 species. Three additional species, and additional specimens of several species that I had already secured, have since been sent me by Mr. William A. Warner, of Enterprise.

Of the 56 species named in the succeeding pages, I describe 15 as new—7 of them in the family of *Etheostomatidæ*, and 8 in *Cyprinidæ*. Little has yet been done in the way of determining the fish fauna of this and some of the other Southern States, where so rich a field is offered to the naturalist.

At Corinth a few draws were made with the seine in a little stream that runs near the railway depot. This stream is a branch of the Tuscumbia, which eventually empties into the Mississippi through the Big Hatchee.

At Artesia, in Lowndes County, my collecting was done in Catawba Creek and its branches and ponds. This creek flows into the Tibbyhah, itself an affluent of the Tombigbee. South of this point, I next fished at Macon, in Noxubee County, on the Noxubee River. The river itself was too high to enter, and I had to content myself with working the ponds and Horsehunter Creek, which at this point flows into the Noxubee.

At Narkeeta, in Kemper County, I saw a few "Sunfishes" taken from the Sucarnochee River, a tributary of the Tombigbee.

At Enterprise, in Clarke County, my collecting was done in the Chickasawha River and its branches, near the town. I have in my collection from that place 33 species. One species was caught with a hook from the same stream at Shubuta, in the south part of the same county. Further south this river joins the Leaf, to form the Pascagoula, which flows into the Gulf.

I have not in this paper attempted to discuss the geographical distribution of the species obtained, as this I consider useless until a much more complete survey of the State has been made. This I hope to be able to do at some future time. At the end of this paper I subjoin a list of the species obtained at each of the localities that I have named.

Types of the new species described have been furnished the National Museum, as well as duplicates of most of the others. Duplicates of some of the new species have also been placed in Professor Jordan's collection. The remainder of the collection is the property of Butler University, at Indianapolis, Indiana.

I take pleasure in acknowledging my indebtedness to Prof. D. S. Jordan for various suggestions made in reference to the species herein named, as well as for general aid obtained from his numerous papers on the fresh-water fishes of our country.

Family ETHEOSTOMATIDÆ.

Genus AMMOCRYPTA, Jordan.

1. **Ammocrypta gelida**, Hay, sp. nov. (No. 27,425, U. S. Nat. Mus.)

General form of the body that of *P. pellucidus* (Bd.) Ag.; terete, slender, and in life almost transparent. Head pointed. Mouth terminal, larger than in *P. pellucidus*, the maxillary bone extending back to a vertical from the anterior of the orbit.

Jaws armed with large, curved teeth. Eyes high up, 4 in the head, less than the length of the snout.

Cheeks and opercles naked. Opercular spine absent, the bone terminating behind in a thin and obtuse process.

Body almost naked; about three rows of pectinated scales along the lateral line, 65 scales in each row.

The rays of the median fins as follows: D. X, 11; A. I, 10 or 9. Dorsals separated. Length of spinous dorsal eight-ninths that of the head, and four-fifths as high as long. Soft dorsal three-fourths the length of the head, and two-thirds as high as long. Anal, in length, slightly less than soft dorsal, and a little less in height than in length.

Head in the length to base of caudal 4; depth in length $7\frac{1}{2}$.

Color of the body in spirits white; in life translucent, with a golden yellow band along each side. Head above dusky, from being thickly sprinkled with black points. A few such points are scattered over the whole dorsal surface. Spinous dorsal with a black spot about half way up in front. Soft dorsal, anal, and caudal slightly dusky. No spots along the sides or dorsal region.

Length to base of caudal $1\frac{4}{5}$ inches.

Found in the Chickasawha River at Enterprise. It seems to prefer a sandy bottom.

The description of this species seems to agree pretty well with that of *Ammocrypta beanii*, published by Professor Jordan in Bulletin No. 10 of the United States National Museum. Judging from his description, however, my species is slenderer and has a head comparatively shorter. *A. beanii* has depth in length 6, head $3\frac{3}{4}$. The fin formula is also different, being in his species D. X, 10; A. I, 9. The coloration of the spinous dorsal is different. Nor do I observe that the soft dorsal and anal fins of my species are notably higher than they are in specimens of *P. pellucidus*.

To the generic characters given by Professor Jordan in his description of *A. beanii* I will add that of the complete absence of an opercular spine. This spine is wanting in no other Etheostomoid fishes known to me, although it is feebly developed in *Microperca punctulata*.

GENUS PERCINA, Hald.

2. Percina caprodes (Raf.) Grd. (No. 27,424, U. S. Nat. Mus.)

Percina caprodes, JORDAN, Annals N. Y. Lyc. Nat. Hist. 1877, 312 (Synonomy)

A single specimen of the "Hog-fish", taken from the Chickasawha, has been sent me by Mr. W. A. Warner.

GENUS HADROPTERUS, Agassiz.

3. Hadropterus spillmani, Hay, sp. nov. (No. 27,432.)

Body elongated, compressed. Head in the length about 4 times. Depth in the length, exclusive of the caudal fin, 5 times. Eye equal to snout, and one-fourth the length of the head.

Lateral line with from 56 to 60 scales, 6 rows above and 9 below. A row of enlarged, non-deciduous, ctenoid plates along the middle of the belly. Cheeks and opercles scaled. The whole chest covered with small plates or scales.

The fin-rays as follows: D. XII, 12; A. II, 9. Spinous dorsal about nine-tenths as long as the head, and one-half as high as long; soft dorsal three-fifths as long as the head, and five-sixths as high as long; anal equal in length to the soft dorsal, and about as high as long. Ventrals and pectorals reaching back about to the same point, two-thirds the distance from the base of the ventrals to the vent. Caudal fin truncated. Spinous and soft dorsals well separated.

The snout is rather pointed; upper jaw not protractile; mouth moderate, the maxillary reaching back to a vertical from the anterior of the orbit. Teeth on jaws, vomer, and palatines. Mouth slightly oblique.

The general color is dark above, reddish yellow below. The sides are crossed by about a dozen brown bands, which are broadest along the lateral line, where coalescing they form a dark horizontal band. This band becomes narrower and better defined on the head, and is continued along the upper edge of the opercle and cheek, through the eye, to the tip of the snout. A narrow dark line runs downward and forward from the lower edge of the orbit. There are three well-defined spots at the base of the caudal fin.

The vertical fins are blotched more or less with dusky colors; the ventrals are bluish black, while the pectorals are lighter.

The cheeks and the occipital region are pale in color; the snout and interorbital space are bluish black.

Length, exclusive of caudal fin, 3 inches.

This species is allied to *H. nigrofasciatus*, a description of which is given by Professor Jordan in the Ann. N. Y. Lyc. Nat. Hist. 1877, 310. Judging from a comparison of my specimens with his description, I think that they evidently belong to a distinct species.

Several specimens of this handsome fish were caught with small hooks in a branch flowing into the Chickasawha at Enterprise. I dedicate it to my friend Rev. William Spillman, M. D., of Enterprise, who

has spent a long life in scientific labors in the South, and who has thereby done much to increase our knowledge of the geology and natural history of his own and neighboring States.

Genus BOLEOSOMA, DeKay.

4. Boleosoma maculatum, Agassiz. (No. 27, 443.)

B. brevipinne, Cope, Proc. Amer. Phil. Soc. 1870, 268.

A single specimen of a *Boleosoma* was obtained in Horsehunter Creek at Macon. An examination indicates that it is *B. maculatum*, although it does not agree wholly with descriptions of that species. It is much paler than specimens of that species obtained in the streams about Indianapolis. There are no dark bars on the back, and the spots usually found along the lateral line are not as conspicuous as common. The fin formula is D. VIII, 12; A. I, 8. Lateral line 50.

I do not believe that the separation of *B. olmstedi* and *B. maculatum* as distinct species can be maintained. The characters most relied on in distinguishing them are the difference in length of the soft dorsal, the difference in the number of scales along the lateral line, and the smoothness or scaliness of the cheeks. I have examined specimens in the State collection at Normal, Ill., labeled *B. maculatum*, that appear to combine these characters in all sorts of ways. Some have scaled cheeks, 55 vertical rows of scales, and dorsal fin-rays X, 12. Another specimen noted has scaled cheeks, 48 rows of scales, and dorsal rays VIII, 11. Another has bare cheeks, 53 scales, dorsal IX, 12. Another, bare cheeks, 46 scales, dorsal rays IX, 13. Specimens there labeled *B. olmstedi* seem to be in no way different.*

As to color, I have specimens from Western Illinois that are almost black, especially the head, the vertical and the ventral fins. These are males in their breeding dress, but they appear to be unusually dark.

Genus NANOSTOMA, Putnam.

5. Nanostoma zonale (Cope) Jordan. (No. 27,417.)

Pœcilichthys zonalis, Cope, Journ. Acad. Nat. Sci. Phila. 1869, 212.

Nanostoma zonale, Jordan, Bull. U. S. Nat. Mus. No. 10, 6, 1877.

Two specimens of this beautiful species were seined in a shallow and sandy creek flowing into the Chickasawha River at Enterprise. They differ in no way from described specimens, except that none of the transverse bands anterior to the anal fin pass around the lower part of the body. Even in this respect they are like a specimen mentioned by Cope from the Miami River, in Indiana. The belly, throat, and spaces between the bars below the lateral line are, in spirits, pure white.

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*Since the above lines were penned I have received the October number of the American Naturalist, from which I learn that Prof. S. A. Forbes, of the Illinois State Laboratory of Natural History, in his interesting article on "The Food of the Darters", regards the two so-called species as identical. Professor Jordan also informs me that he now considers the two forms as merely "subspecies".

6. **Nanostoma elegans**, Hay, sp. nov. (No. 27,445.)

Body stout and somewhat compressed. Head short and deep, with swollen cheeks. The snout is turned abruptly downward. The mouth is subterminal, horizontal, and small, the maxillary not reaching back to the vertical from the anterior of the orbit. Upper jaw not protractile. Eye in the head 4 times.

Head in the length to caudal (as in all measurements in this paper) 4 times; depth in length 5. Depth of caudal peduncle twice in its length; this equal to three tenths of the length of the body.

Rows of scales 5–42–6. Lateral line complete, nearly straight.

The formula of the vertical fins is D. X, 12; A. II, 8. The spinous dorsal slightly longer than the head, and half as high as long. Soft dorsal five-sixths as long as the head, and two-thirds as high as long. Anal three-fourths the length of the head, and as high as long, the posterior rays being the longest.

The pectoral fins are very wide and long, reaching beyond the tips of the ventrals and to the vent. Caudal fin emarginate.

Cheeks, opercles, and back of the neck scaly; the chest and the region just behind the ventrals naked. Gill-membrane broadly connected across the breast.

The general color of the body, after lying in spirits, is purple. Along the back are six large square blotches of black, and along the sides about eight broad transverse bars of the same color, but fainter; these least distinct forward. Along the lateral line, alternating with the transverse bars, are a number of spots, which, in the case of my largest specimen, are of a more intense color than the bars. These spots connect the bars, and with them form a dark lateral band.

Besides these markings, many of the scales, both within and outside the dark bars, principally above the lateral line, but also below, have at their base a jet-black dot. These dots are so arranged as to form somewhat regular longitudinal lines. At the extremity of the caudal peduncle there is a small black spot just above the last transverse bar, and another below it. There are a few black spots behind the eye; a dark bar running from the eye downward, and another from the eye forward to the snout.

Ventral and anal fins indigo-blue. Some of the same color on the pectorals. In life there is a bar of deep orange or red running along the base of both dorsals. The tips of the ventral rays in some specimens, males perhaps, are swollen.

Length of longest specimen 2⅛ inches.

Taken in a shallow, rocky, and sandy branch of the Chickasawha River at Enterprise.

The small, subinferior mouth, little compressed body, and widely connected gill-membrane ally this species to *Nanostoma*. The dorsal fins are separated as in *Nothonotus*.

Genus PŒCILICHTHYS, Agassiz.

7. Pœcilichthys artesiæ, Hay, sp. nov. (No. 27,434.)

In this species the body is more elongated than usual, and considerably compressed. The head is large and contained in the length to caudal fin 3¾ times; depth in length 5 times. Caudal peduncle contained in the length of the body 4½; its depth one-half its length.

Mouth large, the maxillary reaching to a vertical from the pupil, terminal, nearly horizontal; the lower jaw slightly shorter than the upper. Gill-membrane rather broadly connected across the breast.

The eye equal to the snout, and contained in the head 4½ times. The cheeks are wholly covered with small scales, resembling in this respect *P. asprigenis*, Forbes, from Central Illinois. The opercles are covered with large scales. The scales on the region between the occiput and the dorsal fin are very small.

There are along the sides about 56 vertical rows of scales, 8 horizontal rows above the lateral line and 11 below. The lateral line extends slightly behind the posterior end of the soft dorsal, being absent on about 10 or 12 scales. Just above the base of the pectoral fin, on each side, there is an enlarged black scale.

The two dorsals are contiguous, the membrane of the first reaching the second. The fin-rays are, D. XI, 13; A. II, 7. The length of the first dorsal, measured from the first to the last spine, equal to the length of the head; its height less than half its length. The soft dorsal seven-ninths the length of the head; its height about four-fifths its length. The anal is in length a little more than one-half the length of the head; its height also one-half the head.

The pectoral and ventral fins reach backward to the same point. The pectorals are much smaller than in *P. cæruleus* (Stor.) Ag., reaching back only three-fifths the distance from their origin to the vent, while in that species they extend backward four-fifths this distance.

Color.—Sides yellowish olive, with indications of transverse and oblique bars of dark, and sprinkled with many small blotches of carmine. Pectorals and ventrals dull blue. Dorsals with a broad band of carmine running along the middle, bordered on each side with orange. The tips of the dorsals dull blue, as is also the base of the soft dorsal. Base of the spinous dorsal with several blotches of carmine. Anal mostly crimson, tipped with blue. Caudal first blue, then orange, then carmine, followed by orange, and tipped with blue. The iris is yellow.

Length of the only specimen obtained 2⅝ inches.

From a small branch flowing into the Catawba, itself tributary to the Tombigbee.

A brilliant little fish, attracting by its bright colors the eye at a distance of many feet.

The palatine teeth of this species form a broad band, whereas in *P. cæruleus* they are few in number and in a single row.

8. **Pœcilichthys saxatilis**, Hay, sp. nov. (No. 27,433.)

In my collection there is a single specimen of another *Pœcilichthys* that appears to be undescribed. It measures but $1\frac{3}{8}$ inches in length. The lateral line is incomplete, but extends as far back as the posterior rays of the soft dorsal, being found on 35 scales and not arched over the pectorals. There are about 50 vertical rows of scales and 11 horizontal rows, 5 above the lateral line and 6 below.

The opercula have a few large scales, but the cheeks are naked. The breast and throat are bare.

The dorsal and anal fin-rays are as follows: D. XI, 10; A. II, 7. The spinous dorsal equals the head in its length, and is one-half as high as long.

The soft dorsal is two-thirds as long as the head, and as high as long. The dorsals are separated by a space equal to one-half the head. The anal, in height and length, is equal to nearly one-half the length of the head.

The head is contained 4 times in the length of the body, the depth 5 times, and the caudal peduncle $3\frac{1}{2}$ times. The head is narrow and pointed; the profile descends in a gradual curve. The mouth is horizontal, terminal, and large, the maxillary extending back to a vertical from the anterior edge of the pupil. The eye is equal to the snout, and is contained in the head 4 times. Upper jaw non-protractile.

In color the specimen in my possession rather resembles a *Boleosoma* or a *Bolichthys* than a typical *Pœcilichthys*. Above, the ground color is yellowish olive, below pale. On the dorsal region are about six square brown spots. Along the sides there are about eight somewhat W-shaped spots of the same color, between which and the dorsal blotches are many specks of brown arranged in zigzag lines. A black streak before the eye and another below it. Opercle mostly black. An enlarged black humeral scale on each side. All the fins, except the anal, more or less barred with dusky.

Found at Enterprise in a rocky and sandy stream flowing into the Chickasawha.

Genus VAILLANTIA, Jordan.

9. **Vaillantia chlorosoma**, Hay, sp. nov. (No. 27,428.)

Body slender, compressed, and the dorsal region much arched. At the vent the body is suddenly contracted into the long and slender caudal peduncle, which (measured from the posterior anal ray to base of caudal fin) is contained in the whole length of the body $3\frac{1}{3}$ to $3\frac{1}{2}$ times, and has a depth one-third its length. The head is small, pointed, and contained in the length from $4\frac{1}{2}$ to $4\frac{3}{4}$ times. Eye in the head 4. Upper jaw protractile. Mouth horizontal, moderate, subinferior, the upper jaw overlapping the lower. The depth of the body in its length from 5 to $5\frac{1}{2}$ times

There are from 50 to 60 vertical rows of scales, and about 12 horizontal rows between the soft dorsal and anal. The lateral line is found on

from 4 to 20 or more of the scales. Cheeks and opercles scaled. Region in front of pectoral and ventral fins sometimes scaled and sometimes naked.

The fin-rays are, D. IX, 11 (10); A. I, 7 or 8. The dorsals are separated by a distance equal to one-half the length of the head, or more. The spinous dorsal is five-sevenths as long as the head, and four-fifths as high as long. The soft dorsal has about the same dimensions. The anal is equal to one-half the head in length and height.

In color this species is of a pale greenish yellow, with many blotches and zigzag markings of brown. There is a row of about ten of these blotches on each side, most distinct on the caudal peduncles. Also there are about eight square brown spots along the dorsal region. Top of the head, a spot on the operculum, and another below the eye, dark; a line of the same color, but more distinct, from the eye to the snout.

Length of the largest specimen $1\frac{7}{8}$ inches.

This species appears to be widely distributed, as I obtained it at Corinth in a small stream that flows into the Tuscumbia, at Artesia in Sandy Creek, and at Macon in Horsehunter Creek.

The characters of this species appear to agree in many respects with those of *Boleosoma gracile*, Girard, described in the Proc. Acad. Nat. Sci. Phila. 1859, 103. Girard's specimens were from Southwest Texas. In *B. gracile*, however, the spinous dorsal is described as being longer and lower than the soft dorsal, and the anal as being much deeper than long, which statements do not well apply to *Boleichthys chlorosoma*. I am also informed by Professor Jordan that the jaw of *B. gracile* is non-protractile.

The species that I have above described belongs to Professor Jordan's genus *Vaillantia* (Bull. U. S. Nat. Mus. No. 12, 89), the type of which is *Boleosoma camurum*, Forbes. From that species it differs, among other things, in having the two dorsals widely separated. In *B. camurum* they are contiguous.

Genus MICROPERCA, Putnam.

10. Microperca prœliaris, Hay, sp. nov. (No. 27,418.)

The species about to be described may possibly belong to the genus *Boleichthys*. I have but a single specimen, which has a total length of $1\frac{1}{2}$ inches. It was obtained at Corinth, and was at first supposed to be a specimen of *V. chlorosoma*.

The body is rather short and stout, the depth being contained in the length a little more than 4 times. Behind the vent the body becomes contracted into the caudal peduncle, which is compressed and contained in the length of the body 3 times. Its median depth is one-third its length.

The head is contained in the length 4 times. The snout conical and pointed. The jaws are equal, the upper not protractile; the mouth

terminal, slightly oblique, and rather small. The maxillary reaches back to a vertical from the anterior of the orbit. The eye is small, 4 in head, and greater than the snout. Cheeks and opercles covered with large scales. Opercular spine well developed.

The scales of the body are large, there being only 36 vertical and 11 horizontal rows, the latter counted between the dorsal and anterior of anal. The lateral line is found on but two scales anteriorly. Fin-rays, D. VIII, 11; A. I, 6. Anal II, 6, in a specimen of the same species from Alabama in the U. S. Nat. Mus. (*fide* Jordan). The two dorsals are well separated. Spinous dorsal two-thirds the length of the head, its height a little more than one-half the head. Soft dorsal with about the same dimensions. Anal spine slender and of moderate length. Length of anal 3 times in the head; its height twice its length. Pectorals and ventrals reaching nearly to the vent.

Color greenish olive, with many specks of brown. These brown specks somewhat in rows above the place for the lateral line. About ten oblong spots of brown along the sides, most distinct above the anal fin. Below, white. The usual black streaks below and in front of the eye. Dorsal fins somewhat barred.

The general appearance of this little fish is that of a *Boleichthys*, but the very short lateral line, large scales, equal jaws, &c., seem to ally it most closely to *Microperca*. From the latter it differs in having but a single anal spine and the beginnings of a lateral line. Since, however, this "lateral line" is found on the opercle of *M. punctulata*, it would not be surprising if it should be sometimes, even in that species, found on one or two of the anterior scales.

Family CENTRARCHIDÆ.

Genus MICROPTERUS, Lacépède.

11. Micropterus pallidus (Raf.) Gill & Jor. (No. 27,450.)

Huro nigricans, DeKay, Fauna N. Y. Fishes, 1842, 15.
Micropterus nigricans, Cope, Proc. Acad. Nat. Sci. Phila. 1865, 83.
Dioplites nuccensis, Girard, U. S. Pac. R. R. Surv. vol. x, 4.
Micropterus pallidus, Jordan, Annals N. Y. Lyc. Nat. Hist. 1877, 314.

This species is abundant everywhere, and is esteemed as one of the best food-fishes. It is called "Trout", instead of "Bass", as at the North.

The young are conspicuously marked by a dark, sometimes interrupted, lateral band. This is sometimes found also in the adults. There is often a small patch of feeble teeth on the tongue of both this species and *M. salmoides*.

Specimens were obtained in the Catawba at Artesia, and in the Chickasawha at Enterprise.

Genus AMBLOPLITES, Raf.

12. Ambloplites rupestris (Raf.) Gill. (No. 27,451.)

Centrarchus pectacanthus, DeKay, Fauna N. Y. Fishes, 1842, 30.
Ambloplites æneus, Girard, Pac. R. R. Surv. vol. x, 8, pl. i.

A fine specimen of this species was taken in the Chickasawha at Enterprise. Another has since been sent me by Mr. Warner.

Genus CHÆNOBRYTTUS, Gill.

13. Chænobryttus gulosus (C. & V.) Gill. (No. 27,459.)

Calliurus melanops, Girard, Pac. R. R. Surv. vol. x, 11, pl. iii.
Chænobryttus gulosus, Cope, Proc. Acad. Nat. Sci. Phila. 1865, 84.—Jordan, Annals N. Y. Lyc. Nat. Hist. 1877, 361.

A single specimen of this was obtained at Enterprise. It has many of the characteristics assigned by Professor Jordan to *Ch. viridis*. This latter species is attributed by him to the region from Virginia to Florida.

In the specimen which I caught the coloration is quite dark, being a reddish brown. Most of the scales have a dark spot in the center. This spot, on a few of the scales along the sides, is quite conspicuous. The fins are dark in color, the soft dorsal, especially behind, being marked with spots. The base of the anal is also obsoletely spotted. Tips of soft dorsal and anal in life bright red. Lower jaw and snout livid blue. The specimen agrees well with Girard's *Calliurus melanops*. I think it not unlikely that *Ch. gulosus* and *viridis* will turn out to be varieties of the same species.

Genus APOMOTIS, Rafinesque.

14. Apomotis cyanellus (Raf.) Jordan. (No. 27,449.)

Calliurus formosus, Girard, Pac. R. R. Surv. vol. x, 14, pl. v, figs. 1–4.
Apomotis cyanellus, Jordan, Bull. U. S. Geol. Surv. vol. iv, No. 2, 398.

I obtained specimens of this widely distributed species from Catawba Creek at Artesia, and from the Noxubee at Macon.

Genus LEPOMIS, Rafinesque.

15. Lepomis pallidus (Mitchill) Gill & Jordan. (No. 27,457.)

Pomotis incisor, DeKay, Fauna N. Y. Fishes, 1842, 33.
Pomotis speciosus, Girard, Pac. R. R. Surv. vol. x, 23, pl. viii, figs. 5–8.
Lepiopomus pallidus, Jordan, Bull. U. S. Geol. Surv. vol. iv, No. 2, 397.
Lepiopomis incisor, Goode & Bean, Proc. U. S. Nat. Mus. 1879, 139.

Numerous specimens of the above species were obtained in Catawba Creek at Artesia, Noxubee River at Macon, and in the Chickasawha at Enterprise.

16. Lepomis obscurus (Ag.) Jordan. (No. 27,458.)

Pomotis obscurus, Agassiz, Amer. Journ. Sci. and Arts, 1854, 302.
Lepiopomis obscurus, Jordan, Annals N. Y. Lyc. Nat. Hist. 1877, 317.

A fine example of this species, 6 inches long, was obtained with the hook from Sucarnochee Creek at Narkeeta, a station on the Mobile and Ohio Railroad.

This species is distinct from *L. pallidus*, although closely related to it. The color is much darker. Each scale has in its center a dark spot, longest up and down. The opercular flap is longer and more abruptly formed than in *L. pallidus*. The opercular flap, measuring from where the scales cease, is equal to the diameter of the eye, while in *L. pallidus* it is equal to only two-thirds the eye's diameter. The pectoral and ventral fins reach fully to the first anal spine.

17. Lepomis fallax (B. & G.) Hay. (No. 27,456.)

Pomotis fallax and *convexifrons*, B. & G. Proc. Acad. Nat. Sci. Phila. 1854, 24.
Pomotis fallax, GIRARD, Pac. R. R. Surv. vol. x, 27, pl. ix, fig. 5.

While at Enterprise I obtained some small specimens of a Sunfish which belongs to Professor Jordan's genus *Xenotis*. I saw several adult specimens, but could procure none from their captors, who took professional pride in their long "strings". My attention was especially attracted to this fish by its immense opercular flap. Since returning home, Mr. William A. Warner, of Enterprise, has kindly sent me additional material, and, among other things, a specimen of this fish, having a total length of 6 inches. After a careful study of this species my conclusion is that it is the *Pomotis fallax* of Baird and Girard, described from Northern Texas. The agreement with the description and figures given in the Pacific Railroad Survey Report is very close indeed. Fig. 5, pl. ix, gives a very good although somewhat reduced representation of my largest specimen.

Xenotis solis, Gill & Jor. (Bull. U. S. Nat. Mus. No. 10, 22), not *Pomotis solis*, C. & V. (see Proc. U. S. Nat. Mus. 1879, 225), is a more elongate species, the greatest depth being contained 2⅓ times in the length instead of 2, as in my specimens. The eye of that species is contained in the flap 1½ times instead of 2, as in this. The flap of that is contained 2½ times in the rest of the head instead of 2 times, as in this. In that there are "about 5 rows [of scales] above and 11 below" the lateral line; in this there is one more both above and below.

From *P. brevicеps*, B. & G., it appears to differ in having a larger eye, a more anterior dorsal fin, and longer ventral fins; from *X. megalotis*, in that the body is not so heavy anteriorly.

I cannot give a description of the colors in life, except that they are brilliant. In spirits the body above is yellowish brown, the scales being dark-edged; fins dusky, narrow blue stripes on the cheeks; flap jet-black, with a pale edge.

Professor Jordan informs me that he now regards *L. fallax* as simply a variety of *L. megalotis*. I have not had the opportunity to examine enough material to enable me to satisfy myself of the correctness of this conclusion. He also discards the genus *Xenotes*.

Genus CENTRARCHUS, Cuvier.

18, Centrarchus irideus (Lac.) C. & V.

C. irideus, Jordan, Bull. U. S. Nat. Mus. No. 10, 31.

At Narkeeta, on the Mobile and Ohio Railroad, I saw a specimen of *Centrarchus* taken from the Sucarnochee River, but was not able to procure it. From an examination made at the time I regard it as being *C. irideus*. It appeared, however, to have some of the characters of *C. macropterus;* there being, for instance, 8 anal spines instead of 7, the usual number.*

Genus POMOXYS, Rafinesque.

19. Pomoxys nigromaculatus (Le S.) Girard. (No. 27,461.)

Centrarchus hexacanthus, DeKay, Fauna N. Y. Fishes, vol. iv, 1842, 31.
Pomoxis nigromaculatus, Girard, Pac. R. R. Surv. vol. x, 6.

Numerous specimens of this were taken from Horsehunter Creek at Macon. Both this and the next are much sought after as food and to stock fish-ponds.

20. Pomoxys annularis, Rafinesque. (No. 27,460.)

Pomoxis annularis and *nitidus*, Girard, Pac. R. R. Surv. vol. x, 6.

Same locality as above.

Family ELASSOMATIDÆ.

Genus ELASSOMA, Jordan.

21. Elassoma zonatum, Jordan. (No. 27,452.)

Elassoma zonatum, Jordan, Bull. U. S. Nat. Mus. No. 10, 50; Bull. Ill. Lab. Nat. Hist. No. 2, 47.

Two specimens of this interesting species were secured in a pond along the Noxubee River at Macon. The largest was $1\frac{5}{8}$ inches in length, somewhat larger than the specimens hitherto found. After careful search I have been unable to find any evidences of the existence of vomerine teeth in this species. The fin-formula is, D. I; V, 10; A. III, 5 or 6. The scales are very small and difficult to count. As nearly as I could make out, there are 42 vertical rows and 18 or 20 horizontal rows between anal and dorsal. The pseudobranchiæ are obsolete.

* Since this paper has gone to press, Professor Jordan writes me that he is now satisfied that *C. macropterus* and *C. irideus* are identical, and that as the term *macropterus* has the priority, it must be accepted as the name of the species. He had already, in his "Catalogue of the Fishes of Illinois," published in Bull. No. 2, Ill. Lab. Nat. Hist., expressed the opinion that they might have to be merged into one.

Family APHREDODERIDÆ.

Genus APHREDODERUS, Le Sueur.

22. Aphredoderus sayanus (Gilliams) DeKay.

Aphredoderus sayanus, DeKay, Fauna N. Y. Fishes, 35.
Aphododerus isolepsis (Nels.) Jordan, Bull. Ill. Lab. Nat. Hist. No. 2, 48.
Aphrodedirus cookianus, Jordan, Proc. Acad. Nat. Sci. Phila. 1877, 60.

A single small specimen was obtained at Macon. All the names cited above belong to varieties of the same species. DeKay mentions that this species occurs at New Orleans.

Family CYPRINODONTIDÆ.

Genus ZYGONECTES, Agassiz.

23. Zygonectes notatus (Raf.) Jordan. (No. 27,444.)

Zygonectes notatus, Jordan, Bull. U. S. Nat. Mus. No. 9, 47.

Many fine specimens of this species were taken. I have them from Corinth, Artesia, Macon, and Enterprise. This and the succeeding species are seen almost everywhere, especially in quiet waters, swimming near the surface. One of my specimens from Enterprise is 3 inches long to the caudal, or a total of 3½ inches.

The color is translucent yellowish green above, silvery white below, with a broad, dentate, lateral band of black. There are four or five longitudinal rows of black dots above the lateral band, especially conspicuous in specimens from Enterprise. The fins are golden, the dorsal and caudal dotted with black.

24. Zygonectes melanops (Cope) Jordan. (No. 27,427.)

Haplochilus melanops, Cope, Proc. Amer. Phil. Soc. 1870, 457.
Zygonectes melanops, Jordan, Bull. Ill. Lab. Nat. Hist. No. 2, 52.

Many of these little fishes were seined in the ponds and rivulets along Catawba Creek in the vicinity of Artesia, and in Horsehunter Creek near Macon. They correspond closely with Professor Cope's description cited above. This species appears to have a very wide distribution. It was originally described by Professor Cope from the Neuse River, in North Carolina. It was next discovered in Southern Illinois by Prof. S. A. Forbes, the accomplished superintendent of the Illinois State Laboratory of Natural History. I have now the pleasure of announcing its occurrence at points much farther south.

Family HYODONTIDÆ.

Genus HYODON, Le Sueur.

25. Hyodon selenops, Jordan & Bean. (No. 27,455.)

Hyodon selenops, Jordan, Bull. U. S. Nat. Mus. No. 10, 67.

This beautiful species appears to be abundant in the Chickasawha River. At Enterprise, where I saw a number taken from the water

with hooks, they are called "Hickory Shad". They are not esteemed very highly as a means for gratifying the palate. This species is reported from the Tennessee and Cumberland Rivers.

Family CLUPEIDÆ.

Genus CLUPEA, Artedi.

26. Clupea chrysochloris (Raf.) Jor. (No. 27,453.)

Pomolobus chrysochloris, Rafinesque.

A single specimen of this species has been sent me by Mr. William A. Warner, of Enterprise.

Genus DOROSOMA, Rafinesque.

27. Dorosoma cepedianum (Le S.) Gill. (No. 27,454.)

Dorosoma cepediana, Jordan, Proc. Acad. Nat. Sci. Phila. 1877, 69; subsp. *heterurum*, Bull. U. S. Nat. Mus. No. 10, 65.

Several specimens of this species were caught while seining a deep pond along the Noxubee River near Macon. I do not find that the characters assigned by Professor Jordan to the variety *heterurum* exist in my specimens, unless it be that of the long filamentous ray of the dorsal fin. Even this distinction does not always hold good. I find no particular differences between my largest specimen, 8½ inches long, and a specimen of the same size from the Potomac.

Family CYPRINIDÆ.

Genus HYBORHYNCHUS, Agassiz.

28. Hyborhynchus notatus (Raf.) Ag. (No. 27,441.)

Hyborhynchus notatus, Cope, Trans. Amer. Phil. Soc. 1869, 392.

A single specimen obtained at Corinth; many in the waters about Artesia and Macon. In their coloration some of the specimens that I obtained are different from any that I have seen from other localities and from any descriptions that have fallen under my eye. These peculiarities of color are observed only in the largest individuals, those 2½ inches in length. Some of these are quite brown, this color being produced by each scale having a black border. The head is blue-black, of varying degrees of intensity, being in some cases almost jet-black. There is a deep black band occupying the whole upper half of the dorsal fin. The greater part of the caudal fin is also black, the base and tip only being light. There is sometimes a black spot near the tip of the posterior rays of the anal fin. In many of these dark-colored specimens the dark lateral band usually seen in this species is either obsolete or indistinct. These highly colored individuals are, no doubt, males in their wedding suits of black. The other party does not dress so gorgeously.

Genus HYBOGNATHUS, Agassiz.

29. Hybognathus argyritis, Girard. (No. 27,431.)

Hybognathus argyritis, Girard, Pac. R. R. Surv. vol. x, 235; Proc. Acad. Nat. Sci. Phila. 1856, 182.

Specimens of this species were seined in Horsehunter Creek at Macon, and in the Chickasawha River at Enterprise. Some of these have a total length of 4½ inches.

Genus ALBURNOPS, Girard.

30. Alburnops taurocephalus, Hay, sp. nov. (No. 27,439.)

This very interesting species resembles much *Hyborhynchus notatus*, and therefore recalls strongly Professor Cope's description of *Hybopsis tuditanus*, from Northern Indiana. (See Trans. Amer. Phil. Soc. 1869, 381.) It is a true *Hybopsis*, or *Alburnops*, as indicated by the short alimentary canal and the close union of the spinous dorsal ray to the first soft dorsal. The teeth are 4–4, hooked, compressed, and provided with a masticatory surface.

The body is stout, somewhat compressed, broad and flat above, with a deep and angulated caudal peduncle. The latter is contained in the body about 3⅔ times. Its depth is one-half its length. The head is broad and flat above, and at the temporal region forms an angle with the cheeks. The breadth of the head behind the eyes is equal to the distance from the muzzle to the back of the orbit, and nearly two-thirds the length of the head. The muzzle is broad and obtuse; but not so truncate as that of *Hyborhynchus notatus*, since the profile rounds gradually into the snout.

The mouth is rather small, horizontal, and terminal; the jaws about equal, the upper heavy. The maxillary hardly reaches a perpendicular from the anterior margin of the orbit. Eye large, 3½ in the head. Head in the length, exclusive of the caudal, 4½ times. Depth about equal to the length of the head.

Dorsal I, 8; A. I, 7. The dorsal begins above the ventrals, is longer than high, and has on the anterior rays, rather below the middle, a black spot. This fin commences nearer the snout than the caudal. The anal is small.

The scales along the lateral line are rather large and silvery; the formula is 8–43–4. The scales in front of the dorsal fin are small, especially on the nape.

In color this species is pale yellow, with a dusky tinge given it by numerous black punctulations on each scale. The sides are silvery, as are also the cheeks and opercles. There is an obsolete dusky band along the lateral line, terminating at the base of the caudal in a small but distinct black spot. The top of the head and snout brown.

Length of the largest specimen 3 inches, exclusive of caudal.

From the Chickasawha at Enterprise. Caught for bait for larger fishes, and called "Bull Heads".

While this species must resemble *H. tuditanus*, it evidently is distinct from it. The dorsal fin of that species is said to be markedly nearer to the caudal than to the end of the muzzle, while the contrary is true in my species. If the horizontal rows of scales have been counted correctly, and in the same way in both species, there is one more row above the lateral line in mine than in Professor Cope's species. The mouth in *H. tuditanus* is said to be very small and inferior, as in *Hyborhynchus notatus*. The latter feature certainly does not belong to the present species.

31. Alburnops longirostris, Hay, sp. nov. (No. 27,440.)

The general appearance of this species is much like that of small specimens of *Ericymba buccata*.

Head rather small, contained in the body $4\frac{1}{2}$ times. Eye small, being contained in the head 4 times; not equaling the snout, which is one-third the length of the head. The upper jaw is rounded and much overlaps the lower jaw. The mouth, therefore, inferior, rather large, horizontal. The maxillary attains a vertical from the anterior of the orbit. Teeth 4–4, hooked, and having a triturating surface.

Lateral line somewhat decurved. Scales large, there being 36 along the lateral line, 4 horizontal rows above, and only 3 below. About 12 large scales in front of the dorsal. Depth in length $4\frac{3}{4}$ to 5.

Origin of the dorsal fin midway between the tip of the snout and the base of the caudal and directly over the insertion of the ventrals. Rays of dorsal I, 8; anal I, 7. Dorsal nearly twice as high anteriorly as long; anal short and low. Caudal deeply forked, nearly one-fourth the length of the body. Pectorals far from reaching the ventrals; these extending fully to the vent.

Caudal peduncle in body $3\frac{3}{4}$ times; its greatest width nearly one-half its length.

This fish is of a pale straw color, slightly dusky from the brown edges of the scales. There is a very narrow, dark dorsal line; also an obsolete lateral band just below the lateral line. Top of the head brown; the vertical fins dusky.

Length of the largest specimen 2 inches. Seined in considerable numbers at Enterprise. The females teem with eggs.

32. Alburnops xænocephalus, Jor. (No. 27,435.)

Hybopsis xænocephalus, JORDAN, Annals N. Y. Lyc. Nat. Hist. 1877, 335.
Alburnops xænocephalus, JORDAN, Bull. U. S. Geol. Surv., vol. iv, No. 2, 420

Several specimens of a dark-colored minnow were seined at Enterprise the resemblance of which to *H. xænocephalus* is so close that I have referred them to that species, so well described by Professor Jordan in his "Fishes of Upper Georgia". There are some differences, however, that I have thought worthy of mention.

The body in my specimens is deeper, the depth being contained in the length but 4½ times or less. The back does not seem to be so broad nor the caudal peduncle so deep. The dark band that occurs on the caudal peduncle of typical specimens from Georgia is, in these from Mississippi, continued forward along the side to the snout; being, however, slightly broader and less perfectly defined anteriorly.

I do not, however, think that the differences form sufficient grounds for establishing a new species. My largest specimens have a total length of 3 inches.

Professor Jordan's specimens were obtained in the upper tributaries of the Alabama River.

Genus HEMITREMIA, Cope.

33. Hemitremia maculata, Hay, sp. nov. (No. 27,438.)

Body long and slender, slightly elevated at the dorsal, somewhat compressed. Depth in the length 5 times. Head flattened above; snout, looked at from above, obtuse. Mouth small, the maxillary falling considerably short of the anterior border of the orbit, terminal, slightly oblique. Teeth 4–4, with grinding surface.

Head in the length 4½ times. Eye in head 3½, about equal to the snout.

The fin-rays are, D. I, 8; A. I, 8. The dorsal begins slightly behind the ventrals. Its length three-fifths, its height four-fifths, of the head. Anal, in length, one-half, in height two-thirds, the head. Caudal peduncle one-fourth the length of the body. Dorsal situated nearer to the snout than to base of caudal.

The pores of the lateral line are found on but 8 or 10 scales, anteriorly. Scales 5–38–3.

This fish is of a straw-color above, with the scales brown edged. There is a faint, narrow dorsal band, and another narrow, dark line running from the vent on each side of the anal fin to the base of the caudal. A leaden band runs along the sides, which is rendered dusky by numerous black punctulations on the scales within this band. Besides these minute punctulations there is on each scale along the center of the band a pair of larger black points. Posteriorly the lateral band ends in a black spot nearly as large as the eye. Snout and top of the head dusky.

A single specimen, 2½ inches long, and a few young, were obtained at Enterprise.

Three other species of *Hemitremia* are recorded. *H. vittata*, Cope, has teeth 4–5, with a black lateral band, and other paler ones above this. *H. heterodon* and *H. bifrenata*, described by the same author, both have teeth 4–4. They both appear to be less elongated species than the one described above, and neither are mentioned as having the conspicuous caudal spot of *H. maculata*, which is exhibited in all the specimens that I secured. In *H. heterodon* the "lateral line is posteriorly imperfect". In *H. bifrenata* there are 12–13 rows of scales in front of dorsal, and

there are 7 rays in the anal fin. In *H. maculata* there are about 16 scales in front of the dorsal, and the anal rays are I, 8.

This species will come under Professor Jordan's genus *Chriope*. (Bull. U. S. Geol. Surv. vol. iv, No. 4, 787.)

Genus LUXILUS, Rafinesque.

34. Luxilus cornutus (Mitch.) Raf.

Hypsilepis cornutus, Cope, Trans. Amer. Phil. Soc. 1869, 372.

Three specimens of the young of this widely diffused species were obtained at Corinth, and many others at Enterprise.

35. Luxilus chickasavensis, Hay, sp. nov. (No. 27,419.)

This species closely resembles *Codoma stigmatura*, Jordan, from the Alabama River, originally described as *Photogenis stigmaturus*. (Annals N. Y. Lyc. Nat. Hist. 1877, 337.) If *Codoma* is to be regarded a valid genus, and if *Ph. stigmaturus* belongs to that genus, then the present species will be *Codoma chickasavensis*. I do not, however, believe that there is sufficient grounds for putting *Photogenis stigmaturus* and *Luxilus analostanus* into different genera. So far as I can determine with the aid of a good microscope, the masticatory surface as truly exists on the teeth of *Ph. stegmaturus* as on those of *Lux. analostanus*. Sometimes in the former species one edge is serrated; and in some species of *Codoma*, as this genus is limited by Professor Jordan, occasionally both boundaries of the concave surface are serrated. I hope, at no distant period, to be able to discuss this subject still further. For the present I adopt the name *Luxilus* for both this species and *Luxilus analostanus* (Grd.) Jor.

In a close comparison of the present species with *Codoma stigmatura*, I find the following differences to exist: There are fewer scales along the lateral line, 38 to 40 instead of 45. The eye is also considerably larger, being contained in the head 3½ times instead of 4½, and about equal to the snout. The caudal spot is as intensely black as in *C. stigmatura*, but considerably smaller. It is about as large as the eye, sometimes smaller; whereas in that species it is nearly always larger, being in length "usually about one-third of the head". In this species it is about one-fourth of the head. Neither does it extend so far on the rays of the caudal fin. The form of the head and body, and the position and size of the fins, are apparently the same as in *C. stigmatura*, unless it be that the body is a little deeper, the depth being contained in the length from 4 to 4¼ times.

The black spot on the posterior rays of the dorsal fin is obsolete or wanting, while there is a narrow dark line running up on one or two of the anterior dorsal rays.

There are, on the heads of a few of my specimens, some evidences of the existence of tubercles.

This species appears to be quite abundant in the Chickasawha at Enterprise. The largest individuals obtained have a total length of 4 inches.

Genus ERICYMBA, Cope.

36. Ericymba buccata, Cope. (No. 27,421.)

Ericymba buccata, Cope, Proc. Acad. Nat. Sci. Phila. 1865, 87; Trans. Amer. Phil. Soc. 1869, 361.

Several individuals of this species were seined in the Chickasawha River at Enterprise. Its geographical distribution is stated by Professor Jordan, in his "Catalogue of the Fresh Water Fishes of North America" (Bull. U. S. Geol. Surv. vol. iv, No. 2), to be from Pennsylvania to Illinois. Judging from the numbers taken at Enterprise, the species is quite as common in the South as farther north. Some of the specimens taken were 3 inches long, exclusive of the caudal.

Genus OPSOPŒODUS, Hay, gen. nov.

(Ὀψοποιός + ὀδούς.)

Body fusiform, moderately elongated, slightly compressed. Mouth very small, very oblique, peculiar. Teeth raptorial, with a well-developed masticatory surface, both bounding edges of which are conspicuously serrated, standing in a single row of 5–5 on a prominent process of the pharyngeals. Dorsal somewhat behind the anterior line of the ventrals. Barbels none. Lateral line complete. Intestine short. Anal fin short.

This genus is apparently related to *Myloleucus*, Cope, and it is possible that the species that I describe below will have to be put under that genus. For the present, however, I think that the peculiar form of the mouth and the teeth, as well as the general organization of the animal, will serve to separate it from *Myloleucus*. The name is given in allusion to the thoroughness with which the food is prepared by the numerous serrated pharyngeal teeth.

37. Opsopœodus emiliæ, Hay, sp. nov. (No. 27,429.)

Form of the body as given above. Depth in the length $4\frac{1}{3}$ times. Head in the length $4\frac{1}{2}$. Muzzle blunt and rounded. Mouth very small, very oblique, the lower jaw in the closed mouth fitting within the upper. In this case the cleft is nearly vertical. The length of the mandible equal to the distance from the tip of the snout to the anterior margin of the orbit; while in *Notemigonus chrysoleucus*, which has a small mouth, the mandible reaches to the middle of the pupil. Eye greater than the snout, 3 in the head.

Dorsal and anal fin-rays as follows: D. I, 9; A. I, 8. Dorsal beginning over the posterior rays of the ventrals, nearer the snout than to the base of the caudal; length two-thirds the head; its height equal to the length of the head. The anal fin in its length one-half the head; its height a little less than the length of the head.

Pectorals not reaching the ventrals; the latter attaining the anal. The caudal is furcated for more than one-half its length. Caudal peduncle slender, 3½ times in the length of the body.

Scales in very regular rows, anteriorly somewhat higher than long; the rows 5 or 6–40–3.

Color in spirits pale yellow above, sides silvery, and golden yellow below. Above and on the caudal peduncle the scales with a narrow dusky edge, giving these parts of the body a regularly checkered appearance. A dusky band runs along the lateral line, back on the rays of the caudal, and forward over the opercle, through the eye, to the snout. Sometimes this band is almost black. Just above this band are two or three longitudinal rows of black dots, one of which dots is located at the tip of each scale. Below the lateral line is another similar row of dots. There is also a row of black points along the lateral line. The anterior rays of the dorsal fin are largely black, and there is also a black spot on the posterior rays.

This is an elegant and very interesting species. Its oblique mouth and rounded muzzle give it a peculiar appearance. It appears to be widely distributed through the State. I have one specimen from Artesia, several from Macon, and one from Enterprise.

Genus MINNILUS, Rafinesque.

38. Minnilus dilectus (Girard) C. & J.

Minnilus dilectus, Jordan, Proc. Acad. Nat. Sci. Phila. 1877, 80.
Alburnus dilectus, Girard, Proc. Acad. Nat. Sci. Phila. 1856, 193.
Alburnellus dilectus, Girard, Pac. R. R. Surv. vol. x, 259.
Notropis athermoides, Jordan, Bull. Ill. Lab. Nat. Hist. No. 2, 60; Bull. U. S. Geol. Surv. vol. iv, No. 2, 422.

A single specimen of a *Minnilus*, or *Alburnellus*, answering well enough to Girard's description cited above, was obtained at Enterprise.

Subgenus Lythrurus, Jordan.

39. Minnilus punctulatus, Hay, sp. nov. (No. 27,430.)

Body short, deep, and compressed. The back elevated in front of the dorsal. Depth in the length 4⅓. The head is short and deep, 4⅔ in the length. The profile is straight, or even a little concave; the snout pointed. Mouth large and quite oblique; the lower jaw longer than the upper. The maxillary reaches back to a perpendicular from the anterior rim of the orbit.

The eye is of medium size, being contained in the length of the side of the head 3½ times.

The scales are very small. There are 10 to 12 horizontal rows above the lateral line, and 3 below it; 48 to 50 scales along the lateral line, and 25 or more in front of the dorsal. The lateral line is much decurved above the ventrals.

Teeth, 2, 4–4, 2, usually with an evident triturating surface.

Fin-rays as follows: D. I, 8; A. I, 10–11. Dorsal beginning midway between the muzzle and the base of the caudal; its length one-half, its height two-thirds, the head. Anal in length three-fifths, in height four-fifths, the head. Caudal peduncle compressed, and contained in the length of the body 4½ times.

The body is of a straw-color above, silvery along the sides and below. The scales above the lateral line are dark-edged from a succession of black dots, which are large enough to be seen by the unaided eye. A dark dorsal line of similar, but a little larger, black points. Along the sides anteriorly are a few such dots; posteriorly they increase so much that on the caudal peduncle they form a dark band. The head, and especially the snout, are sprinkled with similar dots. There is a black spot at the base of the dorsal fin anteriorly. Opercles silvery. Size of largest specimens 2 inches. Corinth.

This minnow resembles somewhat *Notropis lirus*, Jord., but is a less slender species, has a smaller eye, and has not the conspicuous band of metallic blue of that species. *Notropis matutinus* (Cope) Jord., also appears to be a much slenderer species, the depth being contained in the length 6 times. Also there are said to be but 7 rows of scales above the lateral line.

I do not think that there are sufficient differences in the teeth of the species of *Notropis*, or *Minnilus*, and those of *Lythrurus* to justify the separation of these species into two genera. If there is such difference, *Notropis lirus* ought to be written *Lythrurus lirus*, for the masticatory surfaces of its teeth are as plain, to me at least, as in *L. diplœmius*.

40. Minnilus rubripinnis, Hay, sp. nov. (No. 27,420.)

Body long and slender, somewhat compressed, the depth in the length 4⅔ times. Head arched transversely above; muzzle very pointed. Mouth oblique, large; the lower jaw slightly longer than the upper; the maxillary reaching to a vertical from the front of the eye. The eye is large, being contained in the length of the side of the head 3 times, and its diameter slightly greater than the snout. Head contained in the length 4½ times.

Scales small, especially in front of the dorsal fin, somewhat higher than long, but not so densely imbricated as in the next species. Rows of scales represented by the formula 7 to 9–45±–3. Lateral line much decurved anteriorly.

The dorsal is situated far back, midway between the pupil of the eye and the base of the caudal, and considerably posterior to the ventrals; its rays, I, 8; its length one-half the head, its height three-fourths. The anal is long, being three-fourths the length of the head, height one-half the head; its rays, I, 12.

The pectorals do not reach the ventrals; the latter attain the vent.

The coloration of this species is dark in spirits, all the scales above the lateral line being covered with black points. Along the sides is a

broad leaden band, which narrows behind on the caudal peduncle and becomes a dusky band, ending in an ill-defined caudal spot. There is a narrow dorsal band. The top of the head and snout, as well as the lower jaw, are dusky. The belly is pale.

The dorsal and caudal are red, with more or less dusky. There is no dark spot at the base of the dorsal, as in some species of *Lythrurus;* but there is a distinct black spot on the upper part of the anterior rays of the dorsal. There is a similar black spot at the distal ends of the anterior anal rays. The anterior rays of the pectorals are dusky.

Large numbers of this species were collected at Enterprise. The largest specimens have a total length of $2\frac{1}{4}$ inches.

41. Minnilus bellus, Hay, sp. nov. (No. 27,426.)

Adults of this species resemble much the young individuals of *Notemigonus chrysoleucus.*

The body is short, deep, and considerably compressed. The dorsal region is elevated. Depth contained in the length about $3\frac{3}{4}$ times. Head short, in length of body from 4 to $4\frac{1}{3}$ times. Muzzle short, rather pointed; the profile in adults concave; mouth quite oblique, large, the maxillary reaching back to the anterior rim of the orbit; the lower jaw rather longer than the upper. The eye moderate, $3\frac{1}{2}$ in the head.

The lateral line is much decurved anteriorly. Scales 7 or 8–40 to 42–3, crowded forward, higher than long, about 25 in front of the dorsal. Teeth 2, 4–4, 2, "sharp-edged", but *with* a "masticatory surface".

Fin-rays, D. I, 8; A. I, 10–11. Dorsal situated midway between the tip of the snout and the origin of the caudal, wholly posterior to the ventrals, nearly twice as high as long, its length being contained in the head $1\frac{2}{3}$ times. Anal contained in the head $1\frac{1}{2}$ times, a little higher than long, ventrals reaching the vent, the pectorals not extending to the ventrals. Caudal peduncle very little longer than the head, and rather slender.

Color (in spirits) somewhat dusky above, with a narrow, dark dorsal line; sides silvery, with a dull, leaden line along the caudal peduncle. Occasionally, in some of the most highly colored specimens, a few scales on the side are widely margined with black, so that the sides appear splotched. The lower part of the body is in life almost flame-color. All the fins orange, at least at their bases. At least the tips of the dorsal, ventral, and caudal jet-black. No spot at the base of dorsal. In some adults the whole dorsal has black pigment mingled with the orange, besides having the rays tipped with black, and the distal half of the ventrals and anal black. Very few specimens are without the black tips to the fins, so that this becomes a distinctive character. Evidences of the existence of tubercles were observed on the heads of a few specimens.

Thirty-six individuals were captured at Artesia and four at Macon. Length from 2 to $2\frac{3}{4}$ inches.

This species must be closely allied to *Lythrurus atripes*, Jordan, found by Prof. S. A. Forbes in Southern Illinois. The differences are, however, sufficiently evident. The larger eye, shorter head, fewer scales along the lateral line, and the fewer soft rays in the dorsal fin will distinguish my species from that. The peculiar coloration of the fins and the lack of the dorsal spot will furnish the most obvious differences.

This species illustrates well the little value of the character most relied on for separating the *Lythruri* as a genus from the species of *Minnilus*. While the external characters are all, or nearly all, those of a typical *Lythrurus*, the teeth are decidedly "sharp-edged", as that term must be defined in order to be applicable to other species with "sharp-edged" teeth.

Under the subgenus *Lythrurus* I would arrange the following species. There may be others that ought to be included:

Minnilus diplœmius (Raf.) Hay.—Cope, Proc. Acad. Nat. Sci. Phila. 1867, 162. Pennsylvania to Illinois.

M. cyanocephalus (Copeland) Hay.—Jordan, Proc. Acad. Nat. Sci. Phila. 1877, 70. Michigan to Minnesota.

M. atripes (Jord.) Hay.—Jordan, Bull. Ill. Lab. Nat. Hist. No. 2, 59. Southern Illinois.

M. rubripinnis, Hay.—Mississippi.

M. ardens (Cope) Hay.—Cope, Proc. Acad. Nat. Sci. Phila. 1867, 163. Virginia and North Carolina to Kentucky.

M. bellus, Hay.—Mississippi.

M. lirus, Jordan.—Jordan, Annals N. Y. Lyc. Nat. Hist. 1877, 342.

M. punctulatus, Hay.—Mississippi.

As an aid to the identification of the species given above, I insert the following analytical table:

I. Elongated species; depth in length $4\frac{1}{2}$ or more times.
  1. Color pale, with a lateral metallic blue band ..... M. LIRUS.
  2. Colors conspicuous—steel-blue, red, and purplish.
    a. A black spot at the base of the dorsal; first ray of dorsal opposite the ventrals; A. I, 11 ..... M. ARDENS.
    b. A black spot at the tips of the anterior dorsal rays; first dorsal ray behind the ventrals; A. I, 12 ..... M. RUBRIPINNIS.

II. Deep and compressed species; depth $4\frac{1}{3}$ times or less in the length.
  1. Species with a distinct black spot at the base of dorsal.
    a. Species with conspicuous hues; the dorsal surface dusky; sides and fins with more or less crimson.
      * Eye small, 4 in head; depth $3\frac{1}{3}$ in length; D. I, 7; A. I, 11 ..... M. ATRIPES.
      ** Eye in head $3\frac{1}{3}$; depth in length $3\frac{3}{4}$; D. I, 9; A. I, 11 ..... M. DIPLÆMIUS.
      *** Eye in head $3\frac{1}{3}$; depth in length 4; D. I, 8; A. I, 11 or 12. M. CYANOCEPHALUS.
    b. Color pale; scales coarsely punctulated, small, 10 to 12–48 to 50–3; spot small. M. PUNCTULATUS.
  2. No distinct spot at the base of the dorsal; fins tipped with black ..... M. BELLUS.

GENUS NOTEMIGONUS, Rafinesque.

42. Notemigonus chrysoleucus (Mitch.) Jor. (No. 27,423.)

Stilbe americana, COPE, Trans. Amer. Phil. Soc. 1869, 389.
Notemigonus chrysoleucus, JORDAN, Bull. U. S. Nat. Mus. No. 2, 404 (Synonomy).

Specimens of this fish were obtained at Corinth, Artesia, and Macon.

GENUS SEMOTILUS, Rafinesque.

43 Semotilus corporalis (Mitch.) Put.

Semotilus corporalis, COPE, Trans. Amer. Phil. Soc. 1869, 363.

A single young specimen was seined from the ponds along Catawba Creek at Artesia.

GENUS CERATICHTHYS, Baird.

44. Ceratichthys biguttatus (Kirt.) Bd. (No. 27,422.)

Ceratichthys biguttatus, COPE, Trans. Amer. Phil. Soc. 1869, 366.

A few immature individuals from the Chickasawha River at Enterprise.

45. Ceratichthys amblops (Raf.) C. & J. (No. 27,436.)

Ceratichthys amblops, JORDAN, Annals N. Y. Lyc. Nat. Hist. 1877, 328.

An individual of this species, having a total length of five inches, and differing in no important respect from a specimen of the same size caught in Indiana, has been sent to me by Mr. Warner.

46. Ceratichthys winchelli (Grd.) Jor.

Hybopsis winchelli, GIRARD, Proc. Acad. Nat. Sci. Phila. 1856, 211.
Ceratichthys hyalinus, COPE, Journ. Acad. Nat. Sci. Phila. 1869, 226.
Nocomis winchelli, JORDAN, Annals N. Y. Lyc. Nat. Hist. 1877, 330.

A single specimen of a fish answering well enough to the descriptions of this species was obtained at Enterprise. It is probably but a variety of *C. amblops*.

The dark lateral band is very decided the whole length of the body. It is continued from the front of the eye around the snout, and is here quite black.

FAMILY CATOSTOMIDÆ.

GENUS MOXOSTOMA, Rafinesque.

47. Moxostoma macrolepidotum (Le Sueur) Jordan, var. *duquesnii*.

Catostomus duquesnii, DEKAY, Fauna N. Y. Fishes, 203.
Teretulus duquesnii, COPE, Journ. Acad. Nat. Sci. Phila. 1869, 236.
Ptychostomus duquesnii, COPE, Proc. Amer. Phil. Soc. 1870, 476.
Myxostoma macrolepidotum, subsp. *duquesnii*, JORDAN, Bull. U. S. Nat. Mus. No. 12, 120.

Several individuals of the widely spread "Red Horse" were obtained at Enterprise.

48. Moxostoma pœcilurum, Jordan. (No. 27,463.)

One specimen from Enterprise.

Genus ERIMYZON, Jordan.

49. Erimyzon sucetta (Lac.) Jordan. (No. 27,448.)

Catostomus sucetta, DeKay, Fauna N. Y. Fishes, 203.
Moxostoma clariformis, Girard, Pac. R. R. Surv. vol. x, 219.
Erimyzon sucetta, Jordan, Bull. U. S. Nat. Mus. No. 12, 144.

A specimen of this species, a female, was obtained at Corinth. Another female was caught in a shallow branch of Catawba Creek whilst depositing her spawn, in company with the male. Another very young specimen was seined at Macon.

Genus CATOSTOMUS, Le Sueur.

50. Catostomus nigricans, Le Sueur. (No. 27,447.)

Hypentelium nigricans, Jordan, Bull. U. S. Nat. Mus. No. 9, 34.
Catostomus nigricans, Jordan, Bull. U. S. Nat. Mus. No. 10, 162.

One specimen from Enterprise.

Family SILURIDÆ.

Genus ICTALURUS, Rafinesque.

51. Ictalurus punctatus (Raf.) Jordan. (No. 27,448.)

Ictalurus cærulescens, Cope, Proc. Amer. Phil. Soc. 1870, 489.
Pimelodus olivaceus, Girard, Pac. R. R. Surv. vol. x, 211.
Ichthælurus punctatus, Jordan, Bull. U. S. Nat. Mus. No. 10, 76.

I obtained specimens of this Catfish from the Noxubee River at Macon; others have since been sent me from Enterprise, on the Chickasawha, by Mr. Warner.

Genus AMIURUS, Rafinesque.

52. Amiurus vulgaris (Thomp.) Nelson. (No. 27,437.)

Pimelodus ailurus, Girard, Pac. R. R. Surv. vol x, 210.
Amiurus vulgaris subsp. *ælurus*, Jordan, Bull. U. S. Nat. Mus. No. 10, 88.

Two Catfishes were purchased from a young negro, who had caught them in Sand Creek near Artesia. One of these, having a total length of 10 inches, I identify as above. It is, I have no doubt, Girard's *P. ailurus*, and if this is, as Professor Jordan in his "Synopsis of the Fresh Water Siluridæ of the United States" affirms, identical with Thompson's *P. vulgaris*, the latter name will be the proper one to employ.

The discovery of this specimen reveals a much greater range southward in this species than was previously suspected. Hitherto it has not been known to occur further south than Saint Louis, and has been supposed to be peculiar to our northern lakes and rivers.

The other Catfish purchased was—

53. Amiurus melas (Raf.) Jord. & Copeland. (No. 27,462.)

Amiurus melas, Jordan, Bull. U. S. Nat. Mus. No. 10, 89.

One specimen from Sand Creek, Artesia, and two from Noxubee River at Macon.

GENUS PILODICTIS, Rafinesque.

54. Pilodictis olivaris (Raf.) Gill. & Jor.

Hopladelus olivaris, GILL, Proc. Bost. Soc. Nat. Hist. 1862, 45.—COPE, Journ. Acad. Nat. Sci. Phila. 1869, 237.

Pelodichthys olivaris, JORDAN, Bull. U. S. Nat. Mus. No. 10, 95.

The skin of a fine specimen of this species was obtained at Shubuta, the fish having been hooked from a branch of the Chickasawha.

GENUS NOTURUS, Rafinesque.

55. Noturus leptacanthus ? Jordan. (No. 27,442.)

Noturus leptacanthus, JORDAN, Annals N. Y. Lyc. Nat. Hist. 1877, 352; Bull. U. S. Nat. Mus. No. 10, 102.

I have in my collection a specimen of a *Noturus* which agrees pretty well with the descriptions given by Professor Jordan of his *N. leptacanthus*, as above cited. There are, however, some important differences which I am not able to account for satisfactorily. My specimen is not quite 2 inches long to the base of the caudal, and is, therefore, most probably a young one. Hence, the differences noted below may be due either to its being immature or to its being a different species. It seems that Professor Jordan knew of but a single specimen, and therefore his description may not be applicable to every individual belonging to the species.*

The head is small and narrow, widening gradually from the narrow snout to the shoulders; the lateral outlines of the head, therefore, straight; its length $4\frac{1}{5}$ times in the body. Upper jaw projecting, *spines rather long and slender*, instead of being short as in the type, the pectoral spine being one-half the length of the head. *The color is quite dark.*

In other respects the characters assigned by Professor Jordan to his species apply reasonably well to my specimen. I think, therefore, that until more material is collected it will be better to assign the specimen as above.

Collected at Enterprise.

56. Noturus gyrinus (Mitchill) Raf.

Noturus gyrinus, COPE, Journ. Acad. Nat. Sci. Phila. 1869, 237.—JORDAN, Bull. U. S. Nat. Mus. No. 10, 102.

Another *Noturus*, 2 inches long, collected at Macon, belongs to the above species.

I append the following list of species collected at each of the localities visited:

1. CORINTH. Water flowing toward the Mississippi.

1. Vaillantia chlorosoma.
2. Microperca præliaris.
3. Zygonectes notatus.
4. Hyborhynchus notatus.
5. Luxilus cornutus.
6. Minnilus punctulatus.
7. Notemigonus chrysoleucus.
8. Erimyzon sucetta.

* Professor Jordan informs me that he has additional specimens of his *N. leptacanthus*, in all of which the spines are short, less than one-third the length of the head. The skin, however, is said to be dark, as in my specimen.

2. Artesia. Catawba Creek, into Tombigbee.

1. Pœcilichthys artesiæ.
2. Vaillantia chlorosoma.
3. Micropterus pallidus.
4. Apomotis cyanellus.
5. Lepomis pallidus.
6. Zygonectes melanops.
7. Zygonectes notatus.
8. Hyborhynchus notatus.
9. Opsopœodus emiliæ.
10. Minnilus bellus.
11. Semotilus corporalis.
12. Notemigonus chrysoleucus.
13. Erimyzon sucetta.
14. Amiurus vulgaris.
15. Amiurus melas.

3. Macon. Noxubee River, into Tombigbee.

1. Boleosoma maculatum.
2. Vaillantia chlorosoma.
3. Apomotis cyanellus.
4. Lepomis pallidus.
5. Pomoxys nigromaculatus.
6. Pomoxys annularis.
7. Elassoma zonatum.
8. Aphredoderus sayanus.
9. Zygonectes melanops.
10. Zygonectes notatus.
11. Dorosoma cepedianum.
12. Hyborhynchus notatus.
13. Hybognathus argyritis.
14. Opsopœodus emiliæ.
15. Minnilus bellus.
16. Notemigonus chrysoleucus.
17. Erimyzon sucetta.
18. Ictalurus punctatus.
19. Amiurus melas.
20. Noturus gyrinus.

4. Narkeeta. Sucharnochee River, into Tombigbee.

1. Lepomis obscurus.
2. Centrarchus macropterus.

5. Enterprise. Chickasawha River.

1. Ammocrypta gelida.
2. Percina caprodes.
3. Hadropterus spillmani.
4. Nanostoma elegans.
5. Nanostoma zonale.
6. Pœcilichthys saxatilis.
7. Micropterus pallidus.
8. Ambloplites rupestris.
9. Chænobryttus gulosus.
10. Lepomis pallidus.
11. Lepomis fallax.
12. Zygonectes notatus.
13. Hyodon selenops.
14. Clupea chrysochloris.
15. Hybognathus argyritis.
16. Alburnops taurocephalus.
17. Alburnops longirostris.
18. Alburnops xænocephalus.
19. Hemitremia maculata.
20. Luxilus cornutus.
21. Luxilus chickasavensis.
22. Ericymba buccata.
23. Opsopœodus emiliæ.
24. Minnilus dilectus.
25. Minnilus rubripinnis.
26. Ceratichthys biguttatus.
27. Ceratichthys amblops.
28. Ceratichthys winchelli.
29. Moxostoma macrolepidotum.
30. Moxostoma pœcilurum.
31. Catostomus nigricans.
32. Ictalurus punctatus.
33. Noturus leptacanthus?

6. Shubuta. Chickasawha River.

1. Pilodictis olivaris.

Butler University,
Irvington, Ind., October, 1880.

SYNOPSIS AND DESCRIPTIONS OF THE AMERICAN RHINOBATIDÆ.

By SAMUEL GARMAN.

RHINOBATIDÆ.

Trunk broad, flat; tail long, strong, continuous with the body; dorsals and caudal well developed; pectorals not reaching the end of the snout (except species of *Discobatidae*); covered with shagreen; with spines in a vertebral row and on the shoulders; generally viviparous.

RHINOBATUS.

Nasal valves not extended upon the space between the nostrils;
  two folds on the spiracle; rostral cartilage
    medium, the ridges
      separate;
        snout pointed ..... *leucorhynchus*
      confluent half their length;
        snout rounded on the end ..... *productus*
    produced, narrow; groove short, small; ridges
      confluent more than half their length. ..... *spinosus*
    long; ridges straight, confluent
      less than half their length;
        four patches of spines on the shoulders;
          color uniform ..... *horkelii*
      more than half their length;
        two patches of spines on shoulders;
          clouded or blotched ..... *undulatus*
      close together, narrowly separated at the base;
        rarely with spines on the shoulders;
          freckled with whitish ..... *lentiginosus*
  one fold on the spiracle; snout blunt, rounded;
    head flat ..... *planiceps*

SYRRHINA.

Nasal valves extended on the internarial space;
  a fold on the hinder margin of the spiracle;
    rostral ridges meeting ..... *brevirostris*
  no fold on the spiracle;
    rostral ridges not meeting ..... *exasperata*

PLATYRHINOIDIS.

Labial fold distinct;
  no fold on the spiracle;
    posterior lobe of nasal valve rudimentary ..... *triseriata*

Rhinobatus.

Rostral cartilage rather slender, pointed, ridges meeting or close together in front; dorsal fins far behind the ventrals; nasal valves not extending between the nostrils; disk, without the ventrals, subtriangular; claspers slender, pointed.

Rhinobatus leucorhynchus.

Günther, 1866, Proc. Zool. Soc. Lond. 604.

Length of disk, including ventrals, $11\frac{1}{2}$, width $7\frac{3}{4}$, snout from mouth to tip $3\frac{3}{4}$, and total length 23 inches. Anterior margins very slightly undulating, posterior broadly curved. Posterior margin of ventral nearly straight. Head moderately broad, slightly concave; width between the eyes three and one-half times in the length of the snout. Rostral cartilage strong, moderately long; ridges separate in their entire length, approaching each other regularly toward the end of the snout, which they do not reach. Tip of the snout more pointed than in other species. Eyes moderate, larger than the spiracle. Spiracle with two folds on its posterior border. Anterior nasal valve small, not dilated, extending over little more than half the length of the nostril. Mouth slightly arched in the middle.

Body covered with shagreen above and below. A row of small spines along the vertebræ, a pair on each shoulder, one above each eye, and a row of smaller ones along the orbital ridges. Tail depressed, with a fold on each side. Dorsals equal, second distant from the caudal the length of its base, and from the first by the length of its anterior border.

Light reddish or olivaceous brown. Translucent spaces in front of the head white. White beneath.

Panama.

Rhinobatus productus.

Girard, 1854, Proc. Acad. Nat. Sci. Phila. 196.

Disk having the form of that of *planiceps*. Snout shorter than that of *undulatus*, rounded at the end. Rostral ridges confluent half or more of their length. Head slightly concave between the orbital ridges. Spiracles with two folds on the posterior border. Fins as in *planiceps*. Young with a dorsal row of compressed hooked spines commencing immediately behind the head, a pair on each shoulder, a series of smaller ones in front and above each eye, and a row of small ones on each of the ridges of the rostrum.

Color a clouded brown, white on the translucent spaces in front of the head, a black spot beneath the end of the snout. The brown is grayish and somewhat dull, rather than rich and dark, as in the flat-headed species. Large specimens have small, indistinct spines in dorsal and orbital series, rostral ridges confluent for a greater portion of their length, and uniform coloration. Distinguished from *R. planiceps* by the folds on the spiracle, confluence of the ridges, and color; from *R. undu-*

latus by the stoutness of body, shortness of snout, and color. Thirty-eight specimens were collected at San Diego, Cal., by the Hassler expedition.

Rhinobatus spinosus.

Günther, 1870, Cat. Fish. Brit. Mus. viii, 518.

Anterior nasal valve not dilated laterally. Snout much produced, the distance between the outer angles of the nostrils being one-half of that between the mouth and the end of the snout. The rostral ridges are confluent, very narrow, with a very small and short groove at the base, and in their entire length provided with spines. Mouth nearly straight. Compressed spines with dilated base along the median line of the back, on the shoulder, and above the eye and spiracle; the entire upper surface rough. Snout white. (Günther.)

Mexico.

Rhinobatus horkelii.

Müller & Henle, 1841, Syst. Beschr. Plagiost. 122.

Rhombic. Disk, including ventrals, 19, width 11.62, tip of snout to mouth, 6.87, and total length 35.5 inches. Head broader than that of *R. undulatus*; crown flat. Anterior margins slightly sinuous. Angles and posterior margins of pectorals broadly rounded. Margins of ventrals nearly straight. Snout long, rather less than four times the width of the head between the eyes. Rostral cartilage strong; ridges distant at base, close together somewhat less than half their length, expanded near the extremity. Eye smaller than the spiracle. Spiracle with two folds on the posterior border. Anterior nasal valve not dilated, not extending half the length of the nostril. Mouth nearly straight; a pair of concave curves meet to form a low arch on the symphysis. Covered with shagreen above and below. A row of hooked spines along the vertebræ, a row of several near the middle of each half of the shoulder-girdle, and a few smaller ones on the orbital ridge and in a group upon the end of the snout. Tail depressed, with a fold on each side. Second dorsal distant from the caudal less than the length of its base, and from the first less than the length of its anterior border.

Uniform light grayish or olivaceous brown, without cloudings or spots. Whitish below. Translucent spaces on the snout white in young, darker in old. Sometimes a small patch of brown under the tip of the snout.

Bahia; Rio Grande; Rio Janeiro and northward.

Rhinobatus undulatus.

v. Olfers, 1831, Die Gattung Torpedo, 22.

Rhombic. Disk, including ventrals, 18, width 10.75, from tip of snout to mouth 5.75, and total length 33 inches. Anterior margins nearly straight, slightly concave. Angles and posterior margins of pectorals broadly rounded. Posterior margin of ventral straight a portion of its length; posterior angle blunt. Head moderate; crown concave.

Snout long, about four and one-half times the width of the head between the eyes. Rostral cartilages narrow, ridges close together more than half their length, expanded near the extremity. Eye moderate, larger than the spiracle. Spiracle with two tubercles on the hinder margin. Anterior nasal valve not dilated, extending over little more than half of the length of the nostril. Mouth straight or slightly arched forward. Covered with shagreen above and below. A row of small spines in a vertebral series to the caudal, a row of several near the middle of each half of the shoulder-girdle, and several above each eye and spiracle. No spines on the snout. Tail depressed, with a fold on each side. Second dorsal distant from the caudal more than the length of its base, and from the first by the length of its anterior border.

Claspers long, slender, but little swollen at the end.

Olivaceous brown, transversely clouded with darker. A few small round spots of white above the gills and behind the shoulder-girdle. Translucent spaces of snout white; below there is a lozenge-shaped spot of dark, from each side of which a dark line passes to the anterior rays of the pectorals. Old specimens more uniform in color; dark marks of snout sometimes faded.

Rio Janeiro and southward.

Rhinobatus lentiginosus.

Garman, 1880, Bull. Mus. Comp. Zool. 168.

Outlines of body and fins similar to those of *horkelii* and *undulatus*. Rostral cartilage long and narrow, a small groove near the head; ridges close together from base to extremity. Eyes large. Spiracles half as large as the eyes, with two folds. Head narrow, concave between the eyes. The width of the interocular space equals that of the nostrils or their distance apart. Half the length of the snout is less than the distance between the outer angles of the nostrils. Mouth nearly straight, a little less than twice the width of the head between the eyes. Scales small, smooth. Spines of the dorsal series and the three in front of each eye very small; those above the eye and spiracle not noticeable. The largest spines on the body are a group of five on the top of the end of the snout, a pair of which resemble small horns. Shoulders smooth or with a single small spine.

Color a light grayish brown, densely freckled with small spots of lighter; uniform brownish below. On the lower side of the snout there are faint indications of markings similar to those of *undulatus*.

Distinguished from *horkelii* and *undulatus* by the colors, the horn-like spines on the end of the snout, the absence of spines on the shoulders, the narrowness of the head as compared with the width of the mouth, the shorter distance from snout to mouth, and the greater distance from mouth to vent. Total length 22.9, snout to mouth 4.1, snout to vent 9.9, and width of pectorals 7.4 inches.

Florida; South Carolina.

Rhinobatus planiceps.

Garman, 1880, Bull. Mus. Comp. Zool. No. 11, 168.

Disk, including ventrals, rhombic, about one and a half times as long as wide. Anterior borders of pectorals straight, more than twice as long as the convex posterior margins. Angles of pectorals rounded, the hinder not extending farther than to the vent. Outer angle of ventrals rounded, posterior acute. Head broad, flat. Rostral cartilage medium, dilated at the extremity, with the ridges close together in the anterior third of their length. Snout rather broad, with rounded extremity. Eyes moderate. Spiracle immediately behind the eye, smaller than the orbit, with a single fold on the posterior side. Anterior nasal valve not dilated, posterior two-lobed. Mouth nearly straight. Body covered with shagreen above and below. Tail appearing as if continued on the posterior portion of the abdomen, much depressed, with a fold on each side, bearing two elevated dorsals behind the ventrals and a caudal with convex border at its extremity. Second dorsal distant from the caudal the length of its base. Bases of the dorsals distant from each other the length of the anterior borders. Scales larger over the central portions of the disk. Compressed hooked spines in a median row on back and tail, in two patches on each shoulder, and a series above each eye. On the young these spines are much more prominent and regular in size than in the adult. Color brown; light between and on each side of the rostral ridges; white below. Young specimens with a number of small, round, white spots on each side of the dorsum.

The following measurements are taken from a young male:

	Inches.
Total length	19.0
Snout to end of ventrals	10.2
Snout to mouth	3.5
Width of pectorals	6.9

Payta, Callao, and Galapagos Islands.

Syrrhina.

Characters in general those of *Rhinobatus*. Disk somewhat shorter and broader. Nasal valves dilated and extending upon the internarial space.

Syrrhina brevirostris.

Müller & Henle, 1841, Syst. Beschr. Plagiost. 114.

Disk, including the ventrals, rhombic, longer than wide; width about seven-eighths of the length. Anterior margins nearly straight, slightly indented opposite the gill-openings, at the end of the snout forming an angle of less than ninety degrees. Angles and posterior margins of pectorals rounded. Ventrals rounded. Posterior angle rather blunt. Head moderate; crown concave. Snout short, slightly rounded at the tip; length about twice the width of the head between the eyes. Rostral ridges distant at the head, meeting at the end of the rostrum. Eye

moderate, rather larger than the spiracle. Spiracle with one tubercle on the hinder margin. Anterior nasal valves dilated, extending across about one-third of the space between the nostrils. Mouth arching forward slightly. Body rough with shagreen above and below. Small hooked spines scattered over back and tail. A row of tubercular spines along the vertebræ to the second dorsal. Two or three similar tubercles over each extremity of the shoulder-girdle and a pair a short distance from these toward the vertebral row. A couple of spines above each spiracle and one or two in front of each eye. Tail depressed, with a fold on each side. Dorsals equal, second distant from the caudal the length of its base and from the first the length of its anterior border.

Light grayish or olivaceous brown; margins lighter; whitish below. Sometimes clouded with brown.

The claspers, as far as may be judged from young specimens, are similar to those of *R. undulatus*.

Total length 18½, length of disk, including ventrals, 10, and width of disk 8¾ inches.

Rio Janeiro.

Syrrhina exasperata.

Jord. & Gilb. 1880, Proc. U. S. Nat. Mus. 32.

Disk, including the ventrals, rhombic, longer than wide. Anterior borders of pectorals nearly straight; posterior convex. Snout truncated, as wide on the end as the space between the eyes. Rostral cartilage wide and strong, deeply grooved on its upper surface. Rostral ridges prominent, widely separated, nearly or quite parallel from base to extremity. Spiracles large, equal in diameter to the orbit, without a fold on the side. Fin-angles rounded, except the obtuse posterior angles of the dorsals. Dorsals elevated, behind the ventrals, the length of the base of the first less than the length of its posterior border, base of the second equal to its posterior margin. The base of the first is equal to its distance from ventral or from second dorsal. Anterior nasal valves dilated, continued a little beyond the inner angles of the nostrils; posterior two-lobed. Anterior extremities of the pectorals widely separated from the rostral cartilage, extending very little in advance of the eyes. Mouth wide, forming a low arch, regularly curved from the corners. Labial fold distinct for a short distance at the symphysis. Teeth small, blunt, in a hundred and ten series in the upper jaw. Claspers long, slender, knobbed at the ends. Tail with a thick fold on each side; caudal fin rounded, without indentation. Back thickly covered with small scales, among which are scattered larger ones. A median row of large, blunt tubercles on the back and tail, and two short rows parallel to this on each shoulder. The bases of the tubercles are so covered by the skin and small scales that they appear as rounded prominences with a small spine on the summit.

Color grayish brown. Near the ends of the rostral ridges there is a

band of dark brown; between this and another dark band which crosses the bases of the ridges there is a light band. A dark band across the head between the eyes is somewhat confluent with the band in front of it, which makes the fore part of the head dark, but leaves the prominences in front of the eyes light colored. The remainder of the upper surface is more or less clouded by faint indications of transverse bands. These are more distinct in the young. With the exception of a dark spot on the posterior angle of each pectoral, the lower surface is white.

Total length 33.4, snout to end of ventrals 18, snout to mouth 4.1, and width of disk 15.5 inches. Specimen described an adult male. The kindness of the officers of the National Museum has enabled me to satisfy myself of the identity of *Trigonorhina alveata*, described from old, and *Platyrhina exasperata*, from very young specimens.

Southern California.

Platyrhinoidis, gen. nov.

Disk broad, flat, rounded. Tail moderate, depressed, caudal fin broad. Dorsals posterior. Tubercular spines in vertebral series and on anterior margins of pectorals. Labial fold well developed. Nasal valves not reaching the mouth, posterior lobe rudimentary. Viviparous.

Distinguished from *Syrrhina* and *Trigonorhina* by the labial fold, nasal valves, and marginal series of spines, and from *Platyrhina* by the fold, valves, separation of pectorals, and viviparity.

Platyrhinoidis triseriata.

Jord. & Gilb., 1880, Proc. U. S. Nat. Mus. 36.

Disk, including ventrals, subrhomboid, a little longer than broad, anterior borders convex, anterior and lateral extremities forming broad curves. Snout broad, rounded in front, length from upper jaw equal to distance between outer borders of nostrils. Rostral cartilage stout, ridges approaching rapidly and meeting near the end to form an acute point. Spiracles moderate, larger than the eyes and close behind them, without folds on the sides. Eyes small, distant from the end of the snout one and one-fourth times the distance between the spiracles. Crown broad, concave. Nostrils broad, narrower than the distance between, which is nearly four times the space between them and the mouth. Nasal valves medium, hardly reaching upon the space between the nostrils, outer lobe narrow, posterior rudimentary. Mouth not large, moderately curved, distant from the end of the snout about one and one-third times its width. Teeth small (82 series in the upper jaw of the adult female described), subhexangular on the base, smooth or with a low, blunt cusp. Pectorals separated from the rostral cartilage by a translucent space. Dorsals similar, longer than high, separated by one and one-half times the length of their bases, insertion of anterior a little in advance of the middle of the tail, posterior reaching a little behind the insertion of the caudal. Tail strong, more distinct from body than

in species of *Syrrhina*, length from vent little more than that from snout to extremity of ventrals, with a broad cutaneous fold on each side below, which extends to the ventrals and is continuous with the lower lobe of the caudal. Caudal rather large, somewhat more than twice as long as wide, margins entire. Covered with shagreen above and below. Several (three to four) series of sharp, erect, immovable spines along the anterior margin of the pectoral, a group of several above the extremity of the rostral cartilage, and several on the orbital ridge. A vertebral series of larger spines on back and tail extending to the second dorsal, a pair near the middle and on each end of each branch of the shoulder girdle, and a series on each side of the upper surface of the tail parallel with the median.

In fœtal specimens the lateral series on the tail are not developed, and the inner pairs on the shoulder-girdle are represented by single spines. The upper portion of each spine is long, narrow, subfusiform, depressed, and, resting upon a low, narrow support, appears as if merely applied to the skin by a portion of its lower side.

Disk to end of ventrals 12, width of disk 11.2, vent to end of tail 12.6, and total length 22 inches.

Uniform olivaceous brown, whitish beneath.

Specimens described from U. S. Nat. Museum. Hab. Southern California.

DISCOBATIDAE, fam. nov.

Form intermediate between that of the *Rajidæ* and *Rhinobatidæ;* nearer the latter. Tail less distinct from the body than in the former, to which there is also less similarity in dorsals, ventrals, caudal, and nasal valves. Oviparous. Provisionally placed as a subfamily of the *Rhinobatidæ.*

DISCOBATUS.

Platyrhina, preoccupied.

Disk broad, flat, subcircular. Pectorals approximating in front of the head. Ventrals separate, entire. Dorsals and caudal as in *Syrrhina.* Nasal valves resembling those of the *Rhinobatidæ;* anterior lobes united across the internarial space. Egg-cases similar to those of certain *Scylliidæ.*

D. schönleinii, sp. Müller & Henle, India.
D. sinensis, sp. Lacépède, China.

The species recently described as *Platyrhinæ* having been withdrawn, the genus contains no American representatives at present.

LIST OF THE NORTH AMERICAN SPECIES OF MYRIAPODS BELONGING TO THE FAMILY OF THE LYSIOPETALIDÆ, WITH A DESCRIPTION OF A BLIND FORM FROM LURAY CAVE, VIRGINIA.

By JOHN A. RYDER.

Without specimens of each of the species identified by the authors who have described them, the writer finds himself quite unable to make a greatly needed revision of this group. The sexual appendages have not been described in *Spirostrephon cæsioannulatus* Wood, *S. copei* Packard, or *?S. rudii* and *S. cavernarum* Cope. In the cases of the two last, Professor Cope, who described them in 1869, at first thought that they were provided with two pairs of lateral pores to each segment, and in the belief that *Spirostrephon* had no lateral pores he proposed the genus *Pseudotremia*. He afterwards seemed to agree with Packard that the last-named genus was not valid, and appears to have considered the *P. cavernarum* a *Spirostrephon*, as he adopts the last name as its genus in his paper on the Wyandotte Cave fauna, which he published in the American Naturalist in July, 1872. His principal reasons for this step seem to have been the foregoing, and that the species was not hairy and was furnished with well-developed triangular eye-patches. "The allied form found by Mr. Cooke in the Mammoth Cave has been described by Dr. Packard as *Spirostrephon copei*." And, Professor Cope continues, "It is eyeless, and is, on this account alone, worthy of being distinguished generically from *Spirostrephon*, though the absence of pores, asserted by Dr. Packard, would also constitute another character. *Spirostrephon* possesses a series of lateral pores, as I have pointed out in accordance with Wood's view." At this point Professor Cope refers to a paper by himself in the Proceedings of the American Entomological Society for 1870, where, in a foot-note, he says: "I must correct my character 'no lateral pores' for *Spirostrephon* (Proc. Am. Phil. Soc., 1869, p. 179) to one series of pores'." He then proposes the genus *Scoterpes* for Packard's *Spirostrephon copei*. We are accordingly led to believe that he has abandoned the genus *Pseudotremia*. But when we come to learn the character of the external generative organs of the forms described by both Cope and Packard, I would be greatly disappointed if it was not found necessary to separate *S. cavernarum*, *?S. rudii*, and *S. cæsioannulatus* Wood from *Spirostrephon* and refer them to another genus. For it is a very singular fact that, out of eight species of *Lysiopetalidæ* which have been described since the *S. lactarius* of Say, none are known to have more than 32 or less than 28 segments, while the type species has no less than 59, according to Wood. I am therefore inclined to believe with Cope that the *S. cæsioannulatus* is congeneric with *S. cavernarum* and *S. rudii*, for which the name *Pseudotremia* would perhaps become available in case they should be found to be dis-

tinct. Not only do the segments of *S. lactarius* greatly exceed in number those of the curious little Lysiopetalids now under discussion, but the secretion from the *foramina repugnatoria* of the former must be copious, for Say remarks that "when irritated it discharges a lacteous globule from the lateral portion of each segment, diffusing a strong and disagreeable odor". And Cope remarks (Proc. Am. Ent. Soc., 1870, p. 67) that "*Spirostrephon lactarius* exudes from a series of lateral pores a fluid which has in its odor a strong resemblance to creosote". Whether the genus *Scoterpes* is well enough characterized by the absence of eyes may be a matter of opinion; otherwise the form agrees too closely with *Trichopetalum* to warrant us in being certain that it is not closely related. Both *S.* (*Scoterpes*) *copei* and the three known species of *Trichopetalum* have no lateral pores, according to their describers, and are therefore probably a pretty closely related group, especially since they closely agree in the number of segments and the arrangement of the hairs or bristles on the back. The figure given by Packard (Am. Naturalist, v, 1871, p. 749) does not enable one to decide if it is male or female, on account of the carelessness of the artist with the first five pairs of legs, though it appears as if it were a female. Moreover, in the figure of the head from the front he contradicts his description on page 748, where he says: "No ocular depression behind the antennæ, the surface of the epicranium being well rounded to the antennal sockets." The figure 130 *a*, on page 749, would fairly represent the front of the head of the species which I shall describe farther on, only that the antennæ are relatively longer in Dr. Packard's species.

Taking a retrospective glance at the genera of American *Lysiopetalidæ*, we find that a single species has furnished the basis for the genus *Spirostrephon*, defined by J. F. Brandt, in 1841, in his *Recueil*. His description is only comparative with other groups of *Julidæ* of equal rank; the family character of the Lysiopetalids (sterna rudimentary, not conjoined with scuta) was used by him to define the genus *Lysiopetalum*. In this way *Spirostrephon* was characterized, mainly with respect to the characters presented by the maxillo-labial elements. Can it be considered safe, in view of the facts before us, to indiscriminately assign species to a genus which has been quietly embraced amongst the ill-defined forms which have been discovered since the family has been founded? To the writer the answer seems to be in the negative. No reference to the characters assigned to the genus or the description of the typical species of *Spirostrephon* has been made by some of the authors of American species of *Lysiopetalidæ*. The present systematic condition of the group is not good, and we are reluctantly forced to admit that it is very little better than a mere list of names. While the intention is not to belittle any one, there has been a very manifest lack of definiteness as well as accuracy and completeness of the descriptions. From the description of *S. carernarum*, ? *S. vudii*, and *S. copei*, we would be led to infer that the antennæ were 8-jointed, but when we observe Dr. Pack-

ard's figure of the last species (Am. Nat., v, p. 749) we find that there are but seven joints represented, which is in agreement with what we find in *Trichopetalum*, *Zygonopus*, *Craspedosoma*, and *Lysiopetalum;* and in the case of the two first, Professor Cope's virtual assignment of them to *Spirostrephon* makes the number of joints in their antennæ doubtful. *Trichopetalum* Harger, might probably have been more closely defined as to its generic characters, since those given by its author would not define it from *Zygonopus*, and it differs only from *S.* (*S.*) *copei* in having eyes, from *Craspedosoma* in having free sterna, though the latter may have free sterna too. Mr. Harger, however, admits the difficulties which beset him, at page 119, in a foot-note (Am. Jour. Sci., iv, 1872).

While examining some living specimens of *Trichopetalum lunatum* under the microscope, about a year since, I observed that the respiration of the animal appeared to be conducted in a most singular manner. The air seemed to be drawn in under the labrum and in some way to enter the dorsal cardiac sinus as bubbles, which could be traced for some distance, more than half the length of the animal, as they traveled slowly backwards, until they disappeared over the opaque mass of ingested food contained in the intestine. These bubbles of air always passed backwards. It may have been that they passed backwards inside of the intestine, but the impression I got was that they were traveling through the cardiac sinus or dorsal heart of the animal. This circumstance may explain why it is that there are no pores on the side of the body, though it is true that the lateral pores of millipeds are usually foramina repugnatoria, and have nothing to do with the trachea or respiratory apparatus. This raises the question whether our *Lysiopetalidæ* are not distinguished from other forms in some more important way than has been hitherto supposed.

The species which have been described are the following, though it is to be understood that they are only given as a list for reference; no arrangement is yet possible and none is attempted:

1. SPIROSTREPHON LACTARIUS Say, Wood (Trans. Am. Phil. Soc., n. s., xiii), Art. Myriap. of N. Am., p. 192, with synonomy; Cope, Proc. Am. Phil. Soc., xi, p. 179.
   Habitat.—Eastern United States.
2. S. CÆSIOANNULATUS Wood, op. cit., p. 194.
   Habitat.—Allegheny County, Pennsylvania.
   Length 1 inch.
3. PSEUDOTREMIA CAVERNARUM Cope, Proc. Am. Phil. Soc., xi, p. 179, 1869; Cope, Proc. Am. Ent. Soc., iii, p. 67, 1870; Packard, Am. Nat., v, p. 749, 1871.—*Spirostrephon cavernarum* Cope, Am. Nat., vi, p. 414, 1872.—*P. cavernarum* Harger, Am. Jour. Sci., iv, pp. 118, 119. 1872.
   Habitat.—Caverns in Virginia and Indiana.
   Length 11 lines.

4. Ps. VUDII Cope, loc. cit., p. 180; Packard, Am. Nat., v, pp. 748, 749, 1871; Harger, loc. cit., pp. 118, 119.
Habitat.—? Montgomery County, Virginia.
Length 11 lines.

5. SPIROSTREPHON (PSEUDOTREMIA) COPEI Packard, Am. Nat., v, pp. 748, 749, 1871.—*Scoterpes copei* Cope, Am. Nat., vi, p. 409, genus *Scoterpes* proposed and defined p. 414; Harger, loc. cit., pp. 118, 119; Packard, Zoology, pp. 356, 357.
Habitat.—Mammoth Cave, Kentucky.
Length .35 inch.

TRICHOPETALUM Harger, Am. Jour. Sci., iv, p. 118, pl. ii, 1872.

6. T. LUNATUM Harger, loc. cit., p. 119; Ryder, Am. Nat., xiv, p. 376, 1880.
Habitat.—New Haven, Conn., and Philadelphia, Pa.
Length 6mm.

7. T. GLOMERATUM Harger, loc. cit., p. 120.
Habitat.—John Day River, Oregon.
Length 10mm.

8. T. JULOIDES Harger, loc. cit., p. 120.
Habitat.—Simmons' Harbor, north shore Lake Superior. (Smith.)
Length 8 mm.

The ninth American species, described below, is the third form of Lysiopetalid which is known to inhabit caves, and the only one beside the species which stands fifth in the above list which is totally blind. I name the species for Dr. C. A. White, United States paleontologist. It is a hairy form, like the four preceding, and will, no doubt, with those constitute a pretty homogeneous group.

ZYGONOPUS,* nov. gen.

Char. gen.—Sixth pair of legs very robust and with the third joint greatly swollen (a unique feature amongst Myriapods, and one which, like the claspers and intromittent organ of Branchipods, is to be regarded as a secondary sexual character, and of value in the characterization of a genus).

9. ZYGONOPUS WHITEI, n. sp.

Char. specif.—Head with short, dense hairs. No eyes, but there is a well-marked depression, or rather vertical excavation, extending from the end of the labrum to behind and above the insertion of the antennæ. Behind the antennæ the head is much swollen, owing to the outwardly bulging basal pieces of the jaws; labrum emarginate inferiorly; epicranium emarginate behind to receive the anterior semicircular margin of the first

Fig. 1. Front view of head and antennæ.
Fig. 2. Swollen 6th leg or clasper.
Fig. 3. Normal leg.

* From ζυγός, a yoke, pair; γονέ, that which generates; and ποῦς, foot (leg).

scutum. Antennæ pilose, rather robust, 7-jointed, 5th longest; next longest in the 3d joint, then the 4th, 2d, 6th, 1st, and 7th, which last is provided with two or three blunt, tactile processes at the tip. Segments 32, including the head; an impressed dorsal line as in *Spirostrephon cæsioannulatus*. Delicate and numerous impressed lines on the hind margins of the dorsal scutes. Six bristles surmount each scute; two are placed obliquely on each side, and another is closer to the median line on each side; the upper ones on the four penultimate segments are at or near the posterior margin, and are shorter, blunter, and stouter; two of them project backwards from the margin of the preanal scute. Apparently no pores. Forty-seven pairs of legs in ♂, of which 45 are of the normal shape; 1st, 2d, 3d, 4th, and 5th gradually longer; a wide interval between the 5th and 6th pairs, the latter very robust, the 3d joint being much swollen and somewhat flattened inside, with the terminal and basal joints stouter than in the remaining legs; 7th pair weak, but normal; place of copulatory apparatus in the position of the 8th; 9th pair 2-jointed, with basal joint very short, while the 2d is four or five times as long and greatly swollen, looking in shape like a minute melon, and is extended horizontally outwards the same as the similar pair of organs in *Trichopetalum*. Forty-eight pairs of legs in ♀; appendages of 3d segment aborted as usual; sexual openings bounded laterally by rounded elevations. Normal posterior legs slender and pilose. The bristles on the back of the animal are received into basal sockets, and when removed give the appearance of a pore with an elevated rim. A yellowish substance adheres to the hairs in drops or beads in alcoholic specimens, which may be the offensive secretion of the animal which has exuded at the base of the bristles, though there is none of the characteristic odor apparent to the smell. Length of the animal 8.5mm. Color nearly white.

Of the above singular form I have received four specimens, three males and one female, which were sent me by Dr. C. A. White, who obtained them from the owner of Luray Cave, in Virginia, who had collected them in the cavern himself. Some time last summer he sent me specimens which, upon being subjected to a test with acetic acid, proved to be only a calcareous crust which had been deposited over dead specimens lying in the cave. These were collected by himself, and were interesting as showing how pseudomorphs of organic forms might be developed in caverns. The acid, however, dissolved them completely, and no vestige of the organic basis upon which they were molded remained. I at first supposed them to be some form of *Julus*, but could not be certain.

Out of nine related species known to inhabit this country but two are blind, the other being the *Spirostrephon* (*Scoterpes*) *copei* Packard, which inhabits Mammoth Cave, Kentucky. Another, which, according to Professor Cope, inhabits Wyandotte Cave, Crawford County, Indiana; Erhart's Cave, Montgomery County; and Spruce Run and Big Stony Creek

Caves, in Giles County, Virginia, curiously enough, is not blind. This is paralleled in the case of two species of spiders, however, which were collected for me in a cave in Oregon, over a year ago, by Professor Cope. In one of them there is not a vestige of the eyes remaining, while in the other they are well developed. A Myriapod, which appears to be a *Julus*, from the same cavern also has eyes. The *Polydesmus cavicola* Packard, from a cave in Utah, seems to have well-developed eyes. The *Orchesella cæca*, which still remains to be fully described, has very undeveloped eyes, but differs in no other essential from its congeners. It was also collected in an Oregon cavern by Professor Cope. Multitudes of facts might be added, but the subject is too large a one for hasty generalizations, and must be approached with the same thoroughness of purpose which has characterized the work of Messrs. Darwin and Wallace in their essays upon kindred subjects relating to the origination of species. We may be allowed, however, to add that, in the absence of proof to the contrary, with the increase in the number of known blind forms which are often congeneric with light-loving species, there is the strongest kind of ground for supposing that they have descended from forms which had eyes, and which wandered into these recesses, where, after many generations had lived and died, a blind form appeared, which resulted from the gradual abortion of the visual organs of its ancestors. In proof of this we have the partially blind *Orchesella*, which now seems to be verging towards such a condition. In the absence of a greater number of facts we are not justified in inferring more. True, we have a few instances amongst the mollusks, some of which in their larval states have useful eyes, but which afterwards become useless and abort as the shell develops and gets thicker. Some terrestrial Myriapods are blind, such as *Eurypauropus*; so is *Lumbricus*, the earth-worm, and some of the dirt-abiding *Thysanura*, which also live among fallen leaves, such as *Campodea*, while in the burrowing *Symphyla* (*scolopendrellæ*) the eyes are reduced to a single pair, with little or no red or dark coloring in the tapetum, differing widely in this respect from the compound-eyed, terrestrial Myriapods.

DESCRIPTION OF A NEW SPECIES OF PRIONOTUS (PRIONOTUS STEPHANOPHRYS), FROM THE COAST OF CALIFORNIA.

By W. N. LOCKINGTON.

Prionotus stephanophrys, sp. nov.

L. lat. 53; D. 10–12; A. 11; P. 12; V. 1–5; C. 3–1–8–1–3.

Body less elongate than in *P. carolinus*, head not quite three and a half; greatest depth five and a third times in total length. Greatest depth under third dorsal ray.

Snout concave in profile; forehead convex immediately in front of eye, from which to the origin of the dorsal fin the profile rises in almost a

straight line. Dorsal outline from origin of dorsal fin to caudal slightly sigmoid, the portion under base of second dorsal nearly straight, while the caudal peduncle widens at its extremity, is two and a half times as long as its least depth, and at its narrowest place one-third as deep as the greatest depth of the fish. Abdominal outline slightly curved.

Snout twice as long as longitudinal diameter of eye, which is contained about four and a half times in the side of the head; interorbital width slightly less than longitudinal diameter of eye.

Bones of head less conspicuously striated than usual in the genus. Preorbital, suborbital ring and stay, and operculum distinctly striated, the striæ radiating; upper surface of head punctate, with short striæ on the upper margins of the orbit and on the occiput. Top of head and interocular space almost flat, a serrated, crest-like ridge over each eye (hence the specific name). The interorbital space unusually broad, not at all concave, as broad as eye; a slight trace of a cross furrow behind the eye. Central ridge of operculum distinct, and continued backwards considerably beyond its membranous edge as a strong, sharp spine. A similar sharp spine on the angle of the preoperculum. A strong spine, smaller than those on the gill-covers, on the scapular bone, and a similar one on the suprascapular region. A backward-directed preocular spine.

Mouth rather large, somewhat oblique, the maxillary extending to opposite front of eye; jaws nearly equal; entire upper edge of mandible hidden by the preorbital when the mouth is closed; lower edge of preorbital set with small spines terminating the striæ. Upper jaw two and one-sixth times in length of side of head.

A band of several rows of villiform teeth along both jaws; tip of the upper jaw emarginate and toothless; villiform teeth on palatines and vomer. Tongue thick and fleshy. Eye lateral, almost circular; interorbital area flat transversely.

Gill-openings continuous, the membrane not joined to the isthmus; branchiostegals seven. Gill-rakers long and slender, about three-fourths as long as the diameter of the orbit.

First dorsal arising a little anterior to the tip of the operculum; the third and longest spine nearly equal to half the length of the head, the ninth and tenth spines very short, nearly hidden in the skin. First and second dorsal spines serrated anteriorly. Second dorsal with a nearly straight upper margin, but slightly highest in front; rays all once bifurcate. Anal commencing and ending slightly posterior to the origin and termination of the second dorsal; rays all once bifurcate. Posterior margin of caudal slightly concave when expanded; all the long rays except the two outer ones branched, the four central ones three times bifurcate.

Pectoral pear-shaped when expanded; the membrane between the rays very wide; all the rays bifurcate except the uppermost and lowermost; the tip of the fin reaching to the eighth or ninth anal ray when

turned straight backwards. The three pectoral filaments very slender, the uppermost about half as long as the pectoral fin, which is contained two and two-thirds times in the total length.

Ventrals four and three-fourths times in total length, their tips nearly reaching the vent; all the rays once bifurcate, the last united by membrane at its base to the abdomen.

Bases of pectoral and ventral fins oblique, the pectoral filaments in advance of the ventrals, which are inserted vertically below the anterior margin of the pectorals.

Scales of moderate size, finely ciliate. Lower jaw, gill-membrane, and sides and upper surface of head scaleless. Scales of breast rather smaller than those of back. A row of scales along the basal part of the outer caudal rays, other fins scaleless. Lateral line simple.

General color of body slaty gray or leaden upon the upper two-thirds, the lowest third white. A black spot on the dorsal between the fourth and fifth spines, traces of it between the fifth and sixth. Three rows of black spots on the second dorsal, the spots set saddlewise across the rays. Three rows of black spots on caudal, the terminal row between the rays. Anal white. Pectoral black, with whitish cloudings. Upper part of head rather darker than the body, a silvery tint about the posterior portion of maxillary, lower part of gill-cover, and base of pectoral.

A single specimen of this species was procured in the market of San Francisco, October, 1880, and was taken off Point Reyes. It is now in the United States National Museum, numbered 27048.

A large proportion of the fish brought to the San Francisco markets is procured in the tolerably deep water of the region between the rocky islets known as the Farallones, the entrance of San Francisco Bay, and Point Reyes, a rocky promontory some forty miles north of San Francisco. This locality yielded the first specimens of *Artedius quadriseriatus* Locktn., *Odontopyxis trispinosus* Locktn., *Agonus rulsus* J. & G., *Brachyopsis verrucosus* Locktn., *Brachyistius rosaceus* J. & G., *Hippoglossoides exilis* J. & G., *Atheresthes stomias* J. & G., *Cynicoglossus pacificus* Locktn., and *Glyptocephalus zachirus* Locktn. *Brachyopsis xyosternus* J. & G. and *Artedius pugettensis* Steind. occur there in tolerable abundance, and it has now furnished the first example of a genus hitherto not known to occur north of the Gulf of Fonseca.

Günther (Cat. Fish. Brit. Mus. ii, 195, 196) gives a short diagnosis of three species of *Prionotus* from the Pacific, *P. horrens* Rich., *P. birostratus* Rich., both from the Gulf of Fonseca, and *P. miles* Jenyns, from the Galapagos. *P. stephanophrys* most resembles the latter species, but has much longer pectorals and a different coloration, the latter being "above mottled brilliant tile-red; beneath silvery white".

Table of proportionate measurements.

Locality	Point Reyes, Cal.	
	Inches and 100ths.	100ths of length.
Extreme length	7.60	
Length to base of middle caudal rays	6.35	100
Body:		
Greatest height		26
Least height of tail		7
Length of caudal peduncle		15
Preopercular spine		4
Head:		
Greatest length to tip of opercular spine		41
Distance from snout to nape		28
Greatest depth at occiput		22
Width of interorbital area		7
Length of snout		15½
Length of operculum to end of spine		14½
Length of maxillary		16
Length of mandible		20
Occipital process		7½
Diameter of orbit		8½
Dorsal:		
Distance from snout		36½
Length of base		25½
Height at third spine		17
(*Soft*) length of base		28
Height at longest ray		15
Height at last ray		7
Anal:		
Distance from snout		62
Length of base		26
Height at longest ray		11½
Caudal:		
Length of middle rays		21
Length of external rays		25
Pectoral:		
Upper appendage		25
Second appendage		21
Third appendage		17½
Length		47½
Ventral:		
Distance from snout		32
Length		25
Branchiostegals		VII
Dorsal		X-12
Anal		I-10
Pectoral		13-III
Number of scales in lateral line		54

San Francisco, Cal., *November* 15, 1880.

THE FRIGATE MACKEREL, AUXIS ROCHEI, ON THE NEW ENGLAND COAST.

By G. BROWN GOODE.

The United States Fish Commission has obtained numerous specimens of a fish before entirely unknown in the Western Atlantic. This is the frigate mackerel, *Auxis Rochei*, twenty-eight barrels of which were taken in a mackerel seine ten miles east of Block Island, on the 3d of August, by the schooner "American Eagle", Capt. Josiah Chase, of Provincetown, Mass.

The frigate mackerel resembles, in some particulars, the common mackerel; in others, the bonito—the genus *Auxis* being intermediate in

its character between the *Scomber* and the related genera *Pelamys* and *Orcynus*. It has the two dorsal fins remote from each other, as in *Scomber*, and the general form of the body is slender, like that of the mackerel. The body is, however, somewhat stouter, and, instead of being covered with small scales of uniform size, has a corselet of larger scales under and behind the pectoral fins. Instead of the two small keels upon each side of the tail, which are so noticeable in the mackerel, it has the single, more prominent keel of the bonito and the tunny. Its color is grayish blue, something like that of the pollack, the belly being lighter than the back. Under the posterior part of the body, above the lateral line, are a few cloudings or maculations resembling those of the mackerel. The occurrence of a large school of this beautiful species in our waters is very noteworthy, for the fish now for the first time observed are very possibly the precursors of numerous schools yet to follow. It is not many years since the bonito became an inhabitant of our waters, and the distribution and habits of the frigate mackerel are supposed to be very similar to those of the bonito, *Sarda pelamys*, and the little tunny, *Orcynus thynnus*, which also first came on the coast in 1871, and have since been found in considerable numbers.

The frigate mackerel has been observed in the West Indies and other parts of the tropical Atlantic, as well as on the coast of Europe. In Great Britain it is called the "plain bonito". It is not unusual in the Bermudas, where it is called the "frigate mackerel", a name not inappropriate for adoption in this country, since its general appearance is more like that of the mackerel than the bonito, while in swiftness and strength it is more like the larger members of this family.

Since the first appearance of this fish many new observations of its abundance have been received. These fish seem to have come in immense schools into the waters between Montauk Point and George's Bank; and from Mr. Clarke's statements it appears that they have been observed in small numbers by fishermen in previous years. Several vessels have come into Newport recently reporting their presence in immense numbers in the vicinity of Block Island. It will interest the "ichthyophagists" to know that several persons in Newport have tested the fish, and pronounce it inferior to the bonito. Part of the flesh, that on the posterior part of the body, is white, but behind the gills it is black and rank, while the meat near the backbone is said to be of disagreeable, sour flavor.

It is hard to predict what its influence will be upon other fishes already occupying our waters. Its mouth is small and its teeth feeble, so that it is hardly likely to become a ravager, like the bonito and the bluefish. There is little probability, on the other hand, that its advent will be of any special importance from an economical point of view, for its oil does not seem to be very abundant, and it would hardly pay at present to capture it solely for the purpose of using its flesh in the manufacture of fertilizers.

Mr. A. Howard Clarke, in charge of the Fish Commission station at Gloucester, has communicated to Professor Baird some interesting facts regarding its abundance. From these statements it would also appear that the species has been observed occasionally in past years. He writes under date of August 10: "I have received this morning from the schooner 'Fitz J. Babson', just arrived from Block Island, a fish answering to your description of the *Auxis*, having a corselet of scales around the pectoral fin, as in the tunny. The captain of the vessel, Joshua Riggs, reports that about a week ago he had a hundred barrels in the seine at one time, and saw over twenty schools of them. He saw them as far east as Sow-and-Pig Light Ship. They are very easy to catch, flip like menhaden, do not rush, and are not frightened at the seine. They go in immense numbers; he thinks as many as one thousand barrels to a school. The day after the appearance of these fish the mackerel disappeared, but he does not know whether the mackerel were driven away by them or not. They feed on mackerel food. Mr. Daniel Hiltz, of the same vessel, says that he caught one of just the same kind, in February, 1879, on a haddock-trawl on the eastern part of the Middle Bank, in forty fathoms of water. He took it to Boston, where it was called a young bonito.

"Mr. John Henderson, of the schooner 'Sarah C. Wharf', says that two vessels caught such fish recently eastward of here. The schooner 'American Eagle', of Provincetown, took a number of barrels of them into Newport, and sold them for a dollar a barrel. Another Cape Cod vessel"—he does not know her name—"took about fifty barrels of them and threw them away. All the mackerel-seiners from Block Island report seeing quantities of this new fish within the past fortnight. The captain of the schooner 'Sarah C. Wharf' says he first saw them a fortnight ago, some fifteen miles off Block Island. The captain and several of the crew of the 'Ella M. Johnson', of Newburyport, just arrived from Block Island, state they saw abundance of the *Auxis*, but did not know what it was until reports came from you at Newport. They opened one and found in its stomach the ordinary red-mackerel food. This crew differ with the crew of the schooner 'Fitz J. Babson', with regard to the ease of capturing them; think them rather difficult to take; say they flip like porgies, and do not rush like mackerel. They saw ten large schools of them on Saturday last, when some fifteen miles south of Block Island."

I hope that any reader of the American Naturalist who has seen this fish will mention it. Some may, perhaps, have an opportunity of studying its habits. The length of those I have seen ranges from 12 to 16 inches, and their weight from three-quarters of a pound to a pound and a half or more. Those sent to New York market were part of the lot taken by the schnooer "American Eagle" and brought into Newport, whence they were shipped by Mr. Thompson, a fish-dealer of that place. It would require from eighty to one hundred of them to fill a barrel; so

the estimate of Captain Riggs, that there are a thousand barrels in one of the schools, shows how exceedingly abundant they must be. The name "frigate mackerel", used in Bermuda, would seem to be the best name for use in this country, since the fish resemble the mackerel more than they do the bonito or tunny.

Capt. N. E. Atwood, of Provincetown, Mass., the veteran fisherman-ichthyologist, has examined the specimens, and is satisfied that they belong to the same species with a fish which he found abundant in the Azores in 1840, when, led by the reports of Cape Cod whalers, he went to these islands in search of mackerel, the mackerel-fishing being poor at home. No mackerel were found except the frigate mackerel referred to in this note.

NOTACANTHUS PHASGANORUS, A NEW SPECIES OF NOTACANTHIDÆ FROM THE GRAND BANKS OF NEWFOUNDLAND.

By G. BROWN GOODE.

The United States Fish Commission has received from the schooner "Gatherer," of Gloucester, Captain Briggs Gilpatrick, a remarkable fish taken from the stomach of a ground-shark, *Somniosus brevipinnis*, on the Grand Bank of Newfoundland.

Notacanthus, Bloch.

Notacanthus, Bloch.

Acanthonotus, Bloch, Ichthyologia, xii, 1797, p. 113, pl. ccccxxxi. (No description separate from that of species *A. nasus*.)—Schneider, Bloch, Syst. Ichth. 1801, p. 390, pl. xlvii.

Notacanthus, Lacépède, Hist. Nat. Poiss. 1804.

Head and body much compressed, the body elongate, produced in a long pointed tail, shaped like that of *Macrurus* or *Fierasfer*. Snout produced, obtuse, rounded at its tip. The cleft of the mouth inferior. (The specimen is mutilated, but the maxillaries do not appear to be protractile. Dorsal fin almost rudimentary, consisting of very short, flexible spines, remote from each other and not connected by a membrane. Anal fin very long; its origin close behind the vent, which is situated nearly midway of the length of the body; its anterior portion is composed of separate flexible spines, without membrane, resembling those of the dorsal; these gradually lengthen, grading into the articulated branched rays. No caudal. Ventrals broad, with broad, peduncle-like bases, closely contiguous, separated only by a slight groove at the base, situated near the vent. Teeth acicular, in single rows upon maxillaries, in a double row upon mandibulars, villiform and in a double row upon the palatines. Vomerine teeth not apparent (?). Scales very numerous, of moderate size, round, thin, flexible. Branchiostegals about 8; gills 4.

Notacanthus phasganorus, new species.

The body is much compressed, its greatest width slightly more than one-third the height of the body at the vent, its width at the tail from

one-fourth to one-fifth of its height, and about one-thirteenth of the length of the head. Its length is about one-eighth its height at the vent.

The scales are round, thin, flexible, very small upon the head, not wider than the diameter of one of the dorsal spines, but upon the anterior half of the body they are about three times as large, decreasing in size upon the posterior half, until upon the tail they are smaller than upon the head. The number of scales in the lateral line is not far from 400, but in the partially digested specimen before me it is impossible to make an exact enumeration. The number between the lateral line and the dorsal fin is about 20, between the lateral line and the anal fin about 36. The head is covered in every part, even the lips, with small scales. There are about 40 between the eye and the end of the opercular flap. The scales are deeply imbedded, and in life are probably hidden beneath a slimy epidermis.

The length of the head is contained about seven and one-third times in that of the body. Its bones are all flexible, and their outlines are invisible without dissection, the whole being covered with a leathery skin protected by scales. The width of the interorbital space appears to be (in the mutilated head) somewhat greater than the length of snout, and about one-fourth the length of the head. The diameter of the orbit appears to be about one-half the width of the interorbital space. The length of the postorbital portion of the head is nearly three times that of the snout. The length of the mandibular bone slightly exceeds twice the diameter of the eye; that of the upper jaw is considerably greater. The teeth in the upper jaw are blunt, acicular, set side by side like the teeth of a comb, about 32 on each side. In the lower jaw they are shorter, slenderer, and in double rows. Villiform teeth upon the palatines.

The dorsal fin begins at a distance from the snout not far from two and three-fourth times the length of the head, and nearly over the one hundred and tenth scale of the lateral line. It consists of ten low, widely separated spines, unconnected by any membrane. The distance between the first and tenth spine is nearly double the length of the head.

The spines from the fourth to the ninth are about equidistant, while the other interspaces are shorter.

The distance from the snout to the anal fin is equal to about four times the length of the head. The anterior spinous portion of the anal resembles the dorsal and is devoid of connecting membrane. The membrane is also absent from the posterior half of the fin, but may possibly have been destroyed. The anal rays extend to the tip of the elongate tail and number about 130, the number of spines being 19. The anal begins immediately behind the vent, and its length of base is slightly less than half that of the body—less by a length about equal to the distance from the angle of the mouth to the gill-opening.

The pectoral fin is placed at a distance behind the gill-opening about equal to the width of its own base. Its length is at least double this

distance—how much more cannot be determined, but the fin is evidently short and rounded in contour, the upper rays longest. Its base is stout-peduncular, and thickly covered with scales.

The distance of the ventrals from the snout is equal to that of the dorsal, though its insertion is slightly in advance of that of the dorsal. The two ventrals are closely adjacent, separated by a narrow groove, broad, with peduncle-like bases, thickly covered with scales. They are provided with two spines and eight or nine (as nearly as the specimen will permit determination) rays.

D. X; A. XIX (130); C. 0; P. (17); V. II, 8–9.

Measurements.

	Millimeters.
Extreme length	968
Body:	
Height at vent	110
Greatest width	(40)
Head:	
Greatest length	132
Width of interorbital area	(34)
Length of snout	30
Length of postorbital portion (measured diagonally)	87
Length of upper jaw	40
Length of mandible	36
Diameter of orbit	17
Dorsal:	
Distance from snout	350
Length of base	215
Length of first spine	2
Length of last spine	7
Distance between first and second spines	7
Distance between second and third spines	19
Distance between third and fourth spines	22
Distance between fourth and fifth, fifth and sixth, sixth and seventh, seventh and eighth, and eighth and ninth spines	25
Distance between ninth and tenth spines	21
Anal:	
Distance from snout	437
Length of base	525
Height at first spine	2
Pectoral:	
Distance from snout	150
Length	(40)
Ventral:	
Distance from snout	350
Length	20+

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