

## REVIEW OF THE MARINE CRUSTACEA OF LABRADOR.

By SIDNEY I. SMITH.

Almost the only source of information in regard to the crustacean fauna of the coast of Labrador has been Professor Packard's "A list of the animals dredged near Caribou island, southern Labrador, during July and August, 1860" (Canadian Naturalist and Geologist, viii, pp. 401-429 (1-29), December, 1863), and his "View of the recent invertebrate fauna of Labrador" (Memoirs Boston Soc. Nat. Hist., i, pp. 262-303, pl. 7, 8, 1867). At the time these papers were written it was exceedingly difficult in this country to identify the marine invertebrata of our northern coast, and the lists of crustacea given by Professor Packard were necessarily very imperfect; the species described as new had apparently all been previously described by European authors; the identifications were in many cases incorrect; and in several cases the same species appears under different names. Of this last class of errors several are due to the fact that some of the Amphipoda were identified for Professor Packard by Dr. Axel Boeck, others were determined by comparison with Arctic specimens from Dr. Lütken, of Copenhagen, while still others were determined from the published descriptions by American and European authors. In the following pages I have attempted not only to revise Professor Packard's lists, but also to give a complete catalogue of all the species known from the Labrador coast. In determining Professor Packard's species I have been greatly aided by a set of his specimens collected in 1864 and labeled by him for the Museum of Yale College. This collection has enabled me to determine many of the species enumerated by Professor Packard which were otherwise indeterminable, and also to add a number of species overlooked or incorrectly determined by him. The nomenclature adopted for the Amphipoda is mainly that of Boeck (Skandinaviske og Arktiske Amphipoder), and for the Isopoda that of Harger (Marine Isopoda of New England, Report U. S. Fish Com., part iv, for 1878). I have not attempted to give synonymy except to show to what species the names in Professor Packard's lists are referred, but I have intended to insert references to all the names of marine species in each of his lists. For the distribution of the species along the Labrador coast I have thought it sufficient to indicate only whether the species has been found on the Gulf or Atlantic coast, or on both coasts, and for this purpose I arbitrarily divide the coast at 51° 50' north latitude, a little south of Chateau and Temple Bays, regarding all south and west of this point as Gulf coast and all north of it as Atlantic coast. When not otherwise indicated the regions from which I have examined specimens are followed by a mark of affirmation (!).

## BRACHYURA.

**Cancer irroratus** Say.

*Cancer borealis* Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 303, 1867.

Straits of Belle Isle! (Packard). Packard also says that he was informed that it was found at Hamilton Inlet.

**Chionocetes opilio** Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (*Chionocetes*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Straits of Belle Isle, 10 to 50 fathoms and Chateau Bay, 30 to 50 fathoms (Packard). Young specimens sent to the museum of Yale College by Packard are labeled "Henley Harbor."

**Hyas araneus** (Linn.).

Packard, Canadian Nat. and Geol., viii, pp. 419 (19), 425 (25), 1863 (*aranea*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*aranea*).

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

**Hyas coarctatus** Leach.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (*coarctata*); Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*coarctata*).

Gulf coast! (Packard); Atlantic coast! (Packard, Stearns exped.).

## ANOMURA.

**Eupagurus pubescens** Kröyer (Brandt).

Packard, Canadian Nat. and Geol., viii, 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

**Eupagurus Kröyeri** Stimpson.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867. Whole coast (Packard); Atlantic coast! (Stearns exped.).

## MACRURA.

**Homarus Americanus** Milne-Edwards.

Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast, and rare at Henley Harbor (Packard).

**Ceraphilus boreas** Kivahan (Phipps).

*Crangon boreas* Fabricius (Phipps).—Packard, Canadian Nat. and Geol., viii, p. 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

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**Crangon vulgaris** Fabricius (Linn.).

Packard, Canadian Nat. and Geol., viii, p. 425, 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Caribou Island, Straits of Belle Isle (Packard).

**Sabinea septemcarinata** Ross (Sabine).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Atlantic coast (Packard).

**Nectocrangon lar** Brandt (Owen).

*Argis lar* Packard, Canadian Nat. and Geol., viii, pp. 419 (19), 425 (25), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Atlantic coast! (Packard, Stearns exped.).

**Hippolyte Fabricii** Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867.

Gulf coast! (Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

**Hippolyte Gaimardii** Milne-Edwards.

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 302, 1867 (*Gaimardi*).

Gulf and Atlantic coasts! (Packard, Stearns exped.).

**Hippolyte spinus** White (Sowerby).

*Hippolyte spini* Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863 (Caribou Island).

*Hippolyte Sowerbyi* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867 (Square Island).

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.).

**Hippolyte Phippsii** Kröyer.

*Hippolyte Phippsii* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867 (Domino Harbor).

*Hippolyte turgida* Packard, loc. cit., p. 301, 1867 (Straits of Belle Isle).

Gulf coast! (Stearns exped.); Atlantic coast (Packard).

**Hippolyte macilenta** Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Atlantic coast! (Packard).

**Hippolyte polaris** Ross (Sabine).

Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.). Only one specimen from Labrador was sent to the Museum of Yale Col-

lege by Packard. This specimen, a female 31<sup>mm</sup> long, differs from ordinary specimens in having the tip of the telson armed with five median ciliated spines, with two stout spines each side, making nine in all.

**Hippolyte Grœnlandica** Miers (J. C. Fabricius).

*Hippolyte aculeata* Packard, Canadian Nat. and Geol., viii, p. 424, 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

**Pandalus Montagus** Leach.

*Pandalus annulicornis* Packard, Canadian Nat. and Geol., viii, p. 424 (24), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! and Atlantic coast! (Packard, Stearns exped.).

#### SCHIZOPODA.

**Mysis oculata** Krøyer (O. Fabricius).

*Mysis spinulosus* Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863.

*Mysis oculata* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

"Abundant along the whole coasts" (Packard); Atlantic coast! (Stearns exped.).

#### CUMACEA.

**Diastylis Rathkii** Bate (Krøyer).

*Alauna Goodsiri* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 301, 1867.

Gulf coast! (Packard); Atlantic coast! (Packard, Stearns exped.).

#### PHYLLOCARIDA.

**Nebalia bipes** Fabricius.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Atlantic coast (Packard).

#### AMPHIPODA.

**Hyperia medusarum** Bate (Müller).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Atlantic coast! (Packard, Stearns exped.). I have not seen Packard's specimens. He quotes as a synonym "*Metæcus medusarum* (Fabr.) Kr.," which is not an *Hyperia*, but the Greenlandic *Tauria medusarum* Boeck, which may possibly be the species to which Packard's specimens belong.

**Anonyx nugax** Miers (Phipps).

*Anonyx ampulla* Krøyer, Naturh. Tidssk. II, i, p. 578, 1844.

"*Anonyx ampulla* (Phipps), Voyage, 1873", Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

*Anonyx lagena* Packard, loc. cit., p. 300.

*Lysianassa appendiculata* [*appendiculosa*] Packard, loc. cit., p. 301.

Atlantic coast! (Packard, Stearns exped.).

*Cancer ampulla* Phipps, was supposed by Krøyer to be this species, but it really belongs to Krøyer's genus *Siegeocephalus*, and is *S. ampulla*

Bell (*S. inflatus* Kröyer); so that it might appear doubtful what species Packard included under "*Anonyx ampulla* (Phipps)" were it not that he says that it was "compared with arctic specimens received from Copenhagen," which seems to leave no doubt that he really had in view *Anonyx nugax*, although he subsequently, as indicated above, enumerates this same species under two other names.

*Anonyx pumulus* Lilljeborg.

"*Anonyx producta*, fide Boeck," Packard, Mem. Bost. Soc. Nat. Hist., p. 301, 1867.

I have seen no specimens. The species is placed immediately after "*Anonyx Hørringii*" by Packard, who says only "these two forms were found together in fifteen fathoms, sand," although under the first of the two species he has nothing except the remark, "A common form, occurring abundantly on the coast of Maine, in Casco Bay, ten fathoms."

*Onisimus Edwardsii* Boeck (Kröyer).

Atlantic coast! (Packard's collection.) This species is not mentioned by Packard, but a single specimen of it was sent, with *Anonyx nugax*, by him to the Museum of Yale College. In the form of the epimeron of the third somite of the abdomen, however, this specimen does not agree fully with Kröyer's figure in the *Voyages en Scandinavie*, nor with Boeck's diagnosis, but with Miers's description and figure (*Ann. Mag. Nat. Hist.*, IV, xx, p. 99, 1877), the acute postero-lateral angle of the epimeron being slightly upturned.

*Orchomene minutus* Boeck (Kröyer).

Atlantic coast! (Stearns exped.). Not mentioned by Packard, but all the specimens sent to the Museum of Yale College as "*Anonyx Hørringii*" are apparently of this species, which occurs upon the New England coast, and is sometimes very abundant in Vineyard Sound in winter.

*Tryphosa Hørringii* Boeck.

? "*Anonyx Hørringii*, fide Boeck," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300.

Boeck undoubtedly had specimens of this species from Packard's collection, for he (*Skandinaviske og Arktiske Amphipoder*, p. 184) distinctly mentions it as having been found in Labrador by Packard, but, as just noticed, all the specimens sent by Packard under the above name to the Museum of Yale College belong to Boeck's genus *Orchomene*, so that it is very doubtful if the "common form, occurring abundantly on the coast of Maine," was the same species as the specimens sent to Boeck.

*Pontoporea femorata* Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard); Atlantic coast! (Stearns exped.).

**Phoxus Holbölli** Kröyer.

Gulf coast! (Stearns exped.).

**Acanthozone cuspidata** Boeck (Lepechin)

Gulf coast! (Stearns exped.).

**Acanthonotozoma serratum** Boeck (O. Fabricius).

Atlantic coast! (Stearns exped.).

**Acanthonotozoma inflatum** Boeck (Kröyer).

Gulf coast! (Stearns exped.).

**Ædiceros lynceus** M. Sars.

*Monoculodes nubilatus* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, pl. 8, fig. 4, 1867.

Gulf coast! (Stearns exped., Packard); Atlantic coast! (Packard, Stearns exped.).

**Pleustes panoplus** Bato (Kröyer).

*Amphithonotus cataphractus* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Gulf coast! (Stearns exped.); Atlantic coast! (Packard).

**Pleustes bicuspis** Boeck (Kröyer).

A single specimen of this species was sent, with "*Atylus (Paramphitoe) inermis*" (see *Halirages fulvocinctus*), to the Museum of Yale College by Packard. No special locality was given for the specimens, but they were most likely from Henley Harbor, as that is the only locality given by Packard for the "*Atylus*."

**Pontogenia inermis** Boeck (Kröyer).

*Atylus vulgaris* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard).

**Halirages fulvocinctus** Boeck (M. Sars).

"*Atylus (Paramphitoe) [—thoe] inermis* (Kröyer, fide Boeck)," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, pl. 8, figs. 3-3b, 1867.

Atlantic coast! (Packard).

The specimens sent to Europe and identified by Boeck as above quoted by Packard were undoubtedly *Pontogenia inermis*, but the species described and figured by Packard under the name given by Boeck is certainly distinct from that species. Two specimens which were evidently supposed by Packard to be the species described by him were sent to the Museum of Yale College under a manuscript name as a new species of *Atylus*: one of these specimens, as stated above, is *Pleustes bicuspis*, and is evidently not the species described and figured by Packard; the other specimen is *Halirages fulvocinctus*, and is, I think, the species described and figured by him. Packard describes his species as having "the first three abdominal segments produced into three strongly-hooked projections, the third of which is much the largest;

fourth segment deeply, broadly sinuate"; but, as his figure shows, it is the last thoracic and first two abdominal somites which are produced, and the fourth abdominal which is sinuate. Excepting this and the rounded instead of angular abdominal epimera, the description and figure agree with *Halirages fulvocinctus*.

**Calliopeus læviusculus** Boeck (Kröyer).

*Calliope læviuscula* Packard, Canadian Nat. and Geol., viii, p. 425 (25), 1863 (*læviuscula*); Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard).

**Gammarus locusta** Fabricius.

*Gammarus mutatus* Packard, Canadian Nat. and Geol., viii, pp. 402 (2), 419 (19), 425 (25), 1863.

*Gammarus locusta* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Gulf coast! (Whiteaves); Atlantic coast! (Stearns exped.); "whole coast" (Packard).

**Melita dentata** Boeck (Kröyer).

*Gammarus purpuratus* Packard, Canadian Nat. and Geol., viii, p. 419, 1863.

*Gammarus dentatus* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Gulf coast (Packard); Atlantic coast! (Packard, Stearns exped.).

**Rhachotropis aculeata** Smith (Lepechin).

*Amphitoeus Edwardsii* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 298, 1867.

Atlantic coast! (Packard, Stearns exped.).

**Ampelisca Eschrichtii** Kröyer.

Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard). No special locality was given for the specimens sent as this species to the Museum of Yale College by Packard, but they are presumably from Caribou Island, the only locality mentioned in his papers. Specimens of this species were, however, sent by him with *A. macrocephala* and *Byblis Gaimardii* from Chateau Bay.

**Ampelisca macrocephala** Lilljeborg.

*Ampelisca pelagica* Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Gulf coast! (Packard, Stearns exped.); Atlantic coast! (Packard, Stearns exped.).

**Haploops tubicola** Lilljeborg.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 300, 1867.

Atlantic coast! (Packard). There were specimens of this species sent to the Museum of Yale College with *Ampelisca Eschrichtii*, which were probably from Caribou Island, as mentioned under that species.

**Byblis Gaimardii** (Kröyer).

*Amphiscia Gaimardi* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 299, pl. 8, figs. 1, 1a, 1867.

Atlantic coast! (Packard, Stearns exped.).

**Amphithoe podoceroideis** Rathke, 1843.

*Amphithoe maculata* Stimpson, Invert. Grand Manan, p. 53, 1853; Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867 (*Amphithoe*); Smith, Invert. Vineyard Id., Report U. S. Com. Fish and Fisheries, i, p. 563 (269), pl. 4, fig. 16, 1874.

Atlantic coast (Packard). I have seen no specimens from Labrador, but the species is common from Halifax, Nova Scotia, and the Bay of Fundy to Long Island Sound.

**Eriethonius difformis** Milne-Edwards.

*Eriethonius difformis* Milne-Edwards; Smith, Trans. Conn. Acad., iv, p. 278, 1880.

*Cerapus rubricornis* Stimpson, Invert. Grand Manan, p. 46, pl. 3, fig. 33, 1853; Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867 (*rubiformis*).

Gulf coast (Packard).

**Unciola irrorata** Say.

*Unciola irrorata* Say, Jour. Acad. Nat. Sci., Philadelphia, i, p. 389, 1818; Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1863; Smith, Trans. Conn. Acad., iv, p. 280, 1880.

*Glaucanome leucopis* Kröyer, Naturh. Tidsskrift, II, i, p. 491, pl. 7, fig. 2, 1845.

Gulf Coast (Packard); Atlantic coast! (Packard coll.). Packard does not mention this species in his final paper, although he had previously mentioned it in his "List of the animals dredged near Caribou Island," as quoted above. He undoubtedly collected it on his last expedition, however, for two specimens were sent to the Museum of Yale College with *Pontogenia inermis* from Henley Harbor.

**Dulichia porrecta** Bate.

*Dulichia porrecta*, fide Bocck, Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Packard says only, "This is a rarely found species."

**Caprella septentrionalis** Kröyer.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 297, 1867.

Atlantic coast! (Stearns exped.).

## ISOPODA.

**Phryxus abdominalis** Lilljeborg (Kröyer).

Gulf coast! (Stearns exped.).

**Dajus misidis** Kröyer.

*Bopyrus mysidum* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, pl. 8, fig. 5, 1867.

Packard does not state from what part of the coast his specimens came, nor upon what they were parasitic, but they were undoubtedly



from *Mysis oculata*, which he says is "abundant along the whole coast." I have seen no specimens.

**Jæra albifrons** Leach.

*Jæra copiosa* Stimpson, Invert. Grand Manan, p. 40, pl. 3, fig. 29, 1863; Packard, Canadian Nat. and Geol., viii, p. 419 (19), 1853 (Caribon Island).

*Jæra nivalis* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867 (Sandwich Bay).

"*Asellus Grœnlandicus* Krøyer," Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867 (Square Island! and Hopedale!).

Gulf coast (Packard); Atlantic coast! (Packard and Stearns exped.).

Of "*Asellus Grœnlandicus*," Packard says: "Specimens agreeing in length with those noticed by Fabricius were common at Square Island and Hopedale, in soil under stones, &c., in company with *Limax*"; but the specimens sent under this name and from these localities to the Museum of Yale College are all *Jæra copiosa*, which, on the New England coast, is often found at some little distance from high-water mark, associated with some species of *Oniscida*, &c., and it is probable Packard's specimens were found in a similar locality. Other specimens sent to the Museum of Yale College by Packard are labeled "*Jæra* sp., Indian Tickle" (Atlantic coast).

**Synidotea bicuspidata** Harger.

*Idotea bicuspidata* Owen, Crustacea of the Blossom, p. 92, pl. 27, fig. 6, 1839.

*Idotea marmorata* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, pl. 8, fig. 6, 1867.

*Synidotea bicuspidata* Harger, Proc. U. S. National Mus., ii, 1879, p. 160, 1879.

Atlantic coast (Packard).

**Æga psora** Krøyer.

Whiteaves mentions the occurrence of this species on the north shore of the Gulf of Saint Lawrence, and it is probably the species referred to by Packard as *Æga* sp., "taken from the under side of a cod in the Straits of Belle Isle" (Mem. Bost. Soc. Nat. Hist., i, p. 296).

**Gnathia cerina** Harger.

*Pramiza cerina* Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867.

"Chateau Bay, Long Island" (Packard).

**Tanais filum** Stimpson.

Gulf coast (Packard, Mem. Bost. Soc. Nat. Hist., i, p. 296, 1867).

OSTRACODA.

**Cypridina excisa** Stimpson.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Inserted without remark by Packard. I have seen no specimens.

## COPEPODA.

*Lernæa branchialis* Linn.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867 (*Leonæa*).

Variety *sigmoidea* (Stearns exped.), without special locality. Packard gives no special locality, and says his specimens were attached to the skin of the codfish, which makes it almost certain that he observed some entirely different parasite.

## CIRRIPEDIA.

*Coronula diadema* De Blainville (Linn.).

Packard, Canadian Nat. and Geol., viii, p. 418 (18), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Gulf coast (Packard).

*Balanus crenatus* Bruguière.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Gulf coast! (Stearns exped.); whole coast (Packard).

*Balanus balanoides* Stimpson (Linn.).

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Inserted without remark, by Packard.

*Balanus porcatus* Costa.

Packard, Canadian Nat. and Geol., viii, p. 418 (18), 1863; Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Whole coast (Packard).

## RHIZOCEPHALA.

*Peltogaster paguri* Rathke.

Packard, Mem. Bost. Soc. Nat. Hist., i, p. 295, 1867.

Atlantic coast! (Stearns exped.). Packard recorded the species from Maine, not Labrador.

NEW HAVEN, CONN., May 1, 1883.

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**NOTES ON THE FISHES OF TODOS SANTOS BAY, LOWER CALIFORNIA.**

By **ROSA SMITH.**

During the past winter (1882-'83) the writer, with a party of naturalists, spent three weeks on Todos Santos Bay and points northward to San Diego.

The bay of Todos Santos has a shore line of about forty miles, a little more than half of it being a smooth sand-beach, the remainder bluffs of dark red or blackish lava, extending into the sea at intervals, forming rocky tide-pools, interspersed with longer or shorter shingle beaches. About 20 miles below the town of Ensenada the land slopes gently to and below the sea-level, allowing the water to cover the shallower por-