DECAPOD CRUSTACEANS OF THE NORTHWEST COAST OF NORTH AMERICA

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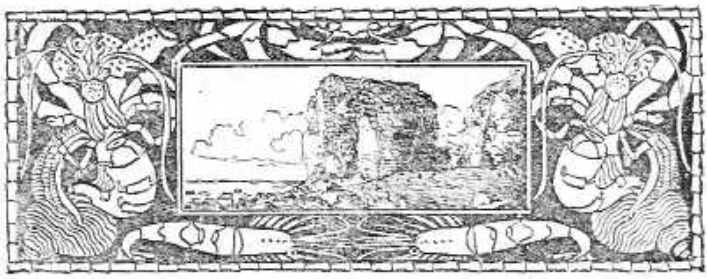

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INTRODUCTION.

THIS report includes primarily the crabs and shrimps collected by the Harriman Expedition. In order to name the shrimps it became necessary to overhaul the large collection of undetermined material of that group which has accumulated in the U. S. National Museum. This was derived from several years' work of the *Albatross*, and from the investigations of Dr. W. H. Dall and others, and embraces the entire coast from Arctic Alaska to southern California. The results of this study are given below, short descriptions of the new species having already been published in the Proceedings of the National Museum (XXIV, pp. 885–905, May, 1902). More than that, the accompanying list of species is designed to serve as a check-list of the Decapoda[1] known to inhabit the region indicated, together with their distribution.

The collection in the National Museum affords exceptional

[1] The Anomura of the Museum collection, here listed, have been determined by Dr. J. E. Benedict. The Alpheidæ are to be reported upon by Dr. H. Coutière of the Museum at Paris; therefore the data given herein are quoted largely from Dr. Holmes.

opportunities for studying the Pacific fauna, as the material is in some cases remarkably abundant. So rich in crabs and shrimps were some parts of the sea bottom explored by the *Albatross* that only a portion of each dredge haul was preserved for study, many a 'peck' or 'quart' of these animals being thrown overboard by the ship's naturalists.

Our knowledge of the Decapod fauna of the Northwest is, for the most part, of recent growth. More than two fifths of the species enumerated below have been described within the last twelve years, while during that time our acquaintance with the species known to Brandt, Stimpson, Lockington, and other pioneers in this field has been greatly extended.

In 1900 Dr. S. J. Holmes published a very useful 'Synopsis of California Stalk-Eyed Crustacea,'[1] with descriptions of genera and species, and it has been thought unnecessary to repeat citations for the species which he gives. An effort has been made to figure all the little-known species.

In addition to the general collection of Decapods made by Dr. William E. Ritter of the Harriman Expedition, those obtained by Dr. W. R. Coe and Professor Trevor Kincaid have been placed at my service.

One new species, a *Betæus*, is notable as the first Alpheid reported from as high a latitude as Sitka.

A remarkable case of dimorphism is here recorded for the first time: the cosmopolitan species *Processa canaliculata* Leach, more commonly known by the later name *Nika edulis* Risso, is found to possess in certain cases two chelate feet of the first pair instead of the characteristic asymmetrical disposition of a chelate foot on one side and a simple one on the other.

General features.—The Decapod fauna of the North Pacific is rich in individuals, if not in species or in variations of form.

In the mass of material examined (about 50,000 specimens) certain types were found to be largely in excess, namely, the Pandalid, Hippolytid, and Crangonid shrimps, the Pagurids or hermit-crabs, the Maioids or true spider-crabs, and the Lithodids or Anomuran spider-crabs.

In point of numbers the Pandalids take the lead. The most

[1] Occas. Papers Calif. Acad. Sci., VII, pp. 1–262, pls. I–IV, 1900.

abundant species are *Pandalus borealis* and *P. montagui*, both boreal forms which descend from the Arctic regions into the Atlantic as well as the Pacific, but in the latter find conditions most favorable to their increase. The form of *P. montagui* inhabiting the Pacific exhibits modifications which entitle it to recognition as a distinct subspecies.

In number of species the genus *Spirontocaris* of the family Hippolytidæ is unsurpassed. Like *Pandalus*, it is primarily a boreal genus, and is common to the Atlantic and the Pacific. In the Pacific it is represented by 51 species, exhibiting great diversity in form. Several are identical with Atlantic species.

Quite as conspicuous in the North Pacific fauna are the Crangonidæ. These occur in great numbers, and exhibit 32 different forms, for the most part restricted to the Pacific.

The Paguridæ, or hermit-crabs, occur in vast numbers, and some of the species appear to have local centers of distribution. Each of these species attains its maximum development, both as to size and numbers, in a particular area, while elsewhere it is stunted and infrequent.

Several of the spider-crabs (Maiidæ) abound in shallow as well as in deeper water, and *Oregonia*, *Chorilia*, the two *Chionœcetes*, and the two species of *Hyas* form no inconsiderable part of every haul of the dredge.

Less abundant are the Lithodidæ or Anomuran spider-crabs, which include the giant Decapods of the region.

The crowding of crustacean life in certain localities is especially favorable to parasitism. Bopyrids (of a few species only) are of frequent occurrence on many species of shrimps[1]; Rhizocephalids are less common, while worm parasites have been noticed in several instances embedded underneath the carapace of *Spirontocaris*.

The Decapods contribute without doubt a large proportion of the food of fishes, several species having been taken from their stomachs; but our knowledge on this subject is very fragmentary.

Many species are caught for the market, to be used for the table or for bait. The list of these furnished in 'The Fisheries and Fishery Industries of the United States,' Washington, 1884,

[1] Miss Harriet Richardson will publish a report on the Bopyridæ of the Museum collection in the Proceedings of the U. S. National Museum during the next year.

is the only one so far published, but it is necessarily incomplete.

Geographic distribution.—The following points are brought out in the accompanying table of distribution:

That Arctic species often continue southward through Bering Strait along the west coast of Bering Sea to Okhotsk Sea and the Kurile Islands.

That some of these species may also stretch along the Alaska shores southward, occasionally to Puget Sound or even farther south.

That the winter line of floating ice in Bering Sea determines the northern limit of many species. This line extends approximately from the neighborhood of Nunivak Island westward just north of the Pribilof and Commander Islands to the Kamchatkan shore.

While many species range continuously from this line southward to California, others indicate a division of that stretch of coast-line into several faunæ. So far as the Crustacea are concerned, the vicinity of Kadiak appears to be a boundary between subregions. Aleutian species, however, are often found out of their normal region, in the cold glacier-fed bays and sounds of southeastern Alaska.

The Straits of Fuca and Puget Sound also form a partial boundary between species, partial because, while nineteen species have Puget Sound for a southern limit, and nine species find here their northern limit, seventy others run uninterruptedly north and south of this point.

The vicinity of Monterey Bay, California, is a more striking barrier to species than those above mentioned, the crustacean fauna south of that promontory being strongly Mexican or Lower Californian in character.

In exceptional cases, as in *Philyra pisum* and *Cancer amphioetus*, a Japanese species is found to occur in approximately the same latitude on the American coast, without obvious connection by way of Alaska.

As is to be expected, the inhabitants of the deeper waters of Bering Sea (below 500 fathoms) are likely to extend much farther south in the North Pacific Ocean than the shoal-water

species which follow the coast-line. The occurrence of some abyssal forms, as *Hymenodora glacialis* and *H. frontalis*, in the deep pocket (1569 fathoms) east of Prince of Wales Island is worthy of note.

The following is a list of the genera occurring below the 500-fathom line. Those whose range extends below 1000 fathoms are printed in italics:

Pasiphæa
Parapasiphæ
Acanthephyra
Hymenodora
Pandalopsis (1 species)
Spirontocaris (5 species)
Crangon (3 species)
Sergestes
Benthesicymus
Gennadas
Calastacus
Pagurus (2 species)
Parapagurus
Pristopus
Leptolithodes
Lithodes
Munida
Munidopsis
Chorilia
Chionœcetes
Hyas

Dr. Dall[1] divides his Oregonian fauna, which stretches from the end of the Aleutian chain to Point Conception, California, into three subfaunal areas, with divisions at Yakutat Bay or Mount St. Elias, Alaska, and at Cape Mendocino, California.

Professor Nutting,[2] on the other hand, reasoning from his study of the Hydroids, emphasizes the effectiveness of Puget Sound as a faunal barrier and the continuity of the area between that point and the end of the Aleutian chain.[3]

It is highly probable that future research will make it possible to subdivide the coast into several small areas. The accompanying table shows the intricate overlapping of species.

[1] The Fur Seals and Fur-Seal Islands of the North Pacific Ocean, Pt. III, 539–546, 1899.

[2] Proc. Wash. Acad. Sci., III, 161, 1901.

[3] Professor Nutting had not consulted Dr. Dall's report above cited, in which statements made twenty-three years earlier are considerably modified.