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THE HERMIT CRABS OF THE PAGURUS BERNHARDUS TYPE.

By JAMES E. BENEDICT,

First Assistant Curator, Division of Marine Invertebrates.

It is the purpose of this paper to bring to notice that section of the genus *Pagurus* of which *P. bernhardus* is the type.

Pagurus bernhardus occurs in the shallow waters of northwestern Europe, and is represented by *P. acadianus* in the waters of northeastern North America; by *P. alaskensis*, *P. aleuticus*, and *P. ochotensis* in the waters of the northwest coast; by *P. patagoniensis* and *P. barbiger* in Patagonian waters.

Of these species *P. acadianus* and *P. alaskensis* are more nearly related than any others. Next is *P. bernhardus*, more closely related to the former two species than to *P. aleuticus*, which, in turn, is much more closely related to the first three than to the spiny-handed forms, *P. ochotensis*, *P. patagoniensis*, and *P. barbiger*.

In the author's opinion the validity of the specific distinctions made can only be contradicted, if at all, after more collecting has been done in intermediate localities, when it is possible that the more closely related American forms may be reduced to subspecies.

KEY TO THE SPECIES.

- a. Hands granulated.
 - b. Width of the left hand at base less than one-half of its length
bernhardus (p. 452).
 - b. Width of the left hand at base one-half of its length.
 - c. Dactyles of the ambulatory feet not grooved on outer margin.
 - d. Acicle slender, without serrate outer edge.....*acadianus* (p. 454).
 - d. Acicle broad, edge serrate.....*alaskensis* (p. 456).
 - c. Dactyls of the ambulatory feet with a deep groove on the outer margin
aleuticus (p. 460).
- a. Hands spiny.
 - b. Spines of the hands without black points.....*ochotensis* (p. 463).
 - b. Spines of the hands with black points.
 - c. Antennules much longer than the eyes.....*patagoniensis* (p. 465).
 - c. Antennules not as long as the eyes.....*barbiger* (p. 466).

PAGURUS BERNHARDUS (Linnæus.)

- Cancer bernhardus* LINNÆUS, Syst. Nat., 1758, p. 631; Mus. Lud. Ulr., 1764, p. 454.—HERBST, Natur. der Krabben und Krebse, II, 1796, p. 14, pl. XXII, fig. 6.
- Astacus bernhardus* PENNANT, Brit. Zool., IV, 1777, p. 23, pl. XVII.—DE GEER, Mem. pour servir a l' Hist. des Insects, VII, 1778, p. 405, pl. XXII, figs. 3-12.—OLIVIER, Enc. Meth. Insects, VIII, 1791, p. 641.
- Pagurus bernhardus* FABRICIUS, Suppl. Ent. Syst., 1798, p. 411.—LATREILLE, Hist. des Crust. VI, 1805, p. 160; Gen. Crust. et Ins., I, 1807, p. 46; Consid. Genr. sur les Crust. des Arach. et des insect, 1810, p. 422.¹—LAMARCK, Hist. des Anim. sans Vert., V, 1818, p. 220.—DESMAREST, Consid. sur les Crust., 1825, p. 173, pl. XXX, fig. 2.—MILNE EDWARDS, Ann. des Sci. Nat., 2d ser., VI, 1836, p. 266; Hist. Nat. des Crust., II, 1837, p. 215; Atlas du Regne Anim., 3d ed., Crust., pl. XLIV, fig. 2; Ann. des Sci. Nat., 3d ser., X, 1848, p. 59.—BELL, Brit. Crust., 1853, p. 171.—WHITE, Pop. Hist. Brit. Crust., 1857, p. 74.—BATE, Rept. Brit. Assoc., 1865, p. 52.—NORMAN, Rept. Brit. Assoc., 1868, p. 264.—BENEDICT, Ann. & Mag. Nat. Hist. (6), XVIII, 1896, p. 99.
- Pagurus streblonyx* LEACH, Malac. Brit., 1815, pl. XXVI, figs. 1-4.—LATREILLE, Encyc. Meth., 1825, pl. CCCIX, figs. 3-6.
- Pagurus ulidianus* W. THOMPSON, Rept. Brit. Assoc., 1843, p. 267.—BELL, Brit. Crust., 1853, p. 180.—WHITE, Pop. Hist. Brit. Crust., 1857, p. 76.—BATE, Rept. Brit. Assoc., 1856, p. 52.
- Eupagurus bernhardus* var. *A. granulata* and var. *B. granalata-denticulata* BRANDT, Middendorff's Sibir. Reise, Zool., 1851, p. 107.
- Bernhardus streblonyx* DANA, Proc. Acad. Nat. Sci., Phila., VI, 1852, p. 6.
- Eupagurus ulidianus* STIMPSON, Proc. Acad. Nat. Sci., Phila., X, 1858, p. 236.
- Eupagurus bernhardus* STIMPSON, Proc. Acad. Nat. Sci., Phila., X, 1858, p. 236.—HELLER, Crust. Sudl. Eur. 1863, p. 160.—HENDERSON, Proc. Royal Phys. Soc., IX, 1886, p. 68.—POCOCK, Ann. Nat. Hist., 6th ser., 1889, p. 427.

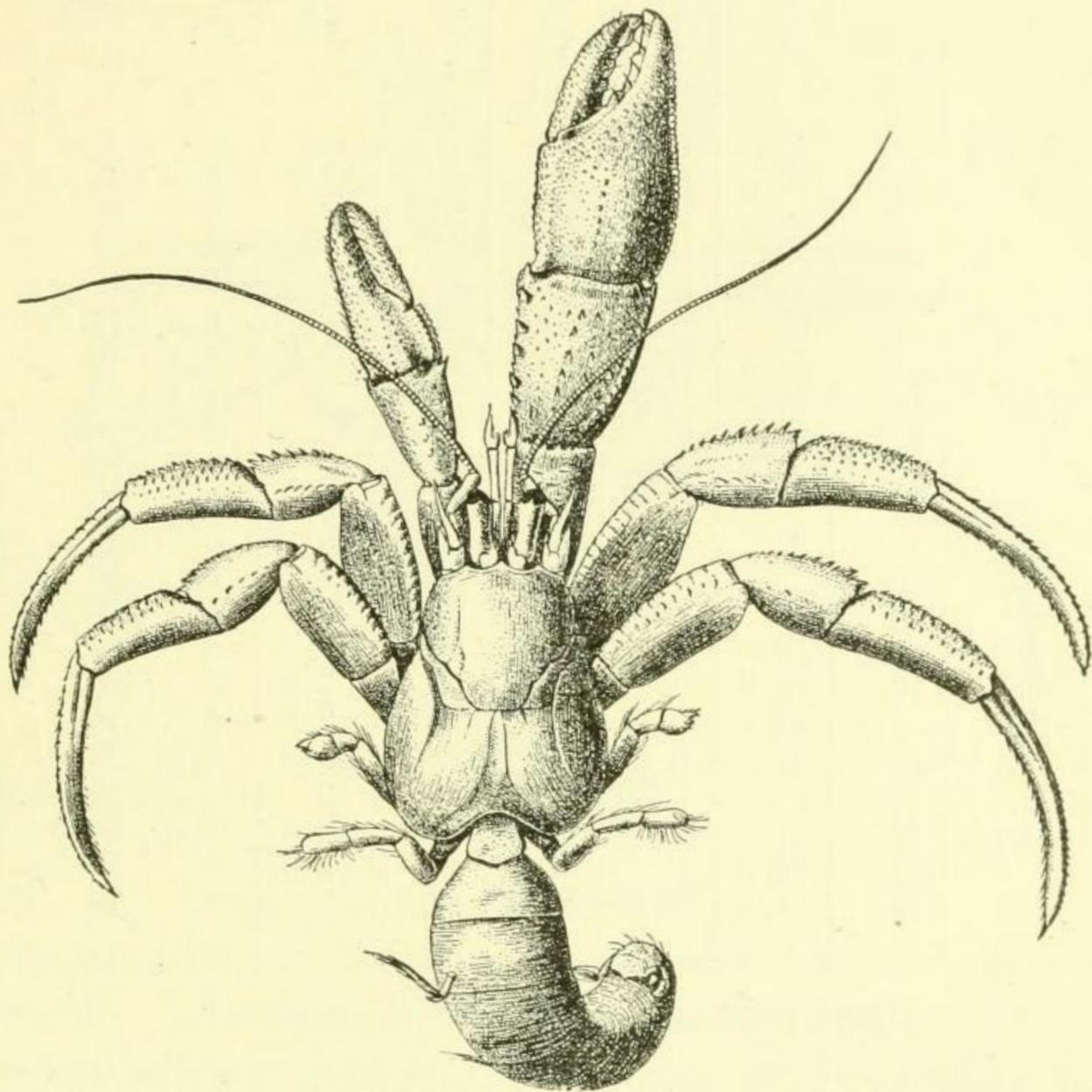
The anterior portion of the carapace is usually about as broad as long, varying in individuals to broader or longer. The three projections of the front are pointed; the median is a little in advance of the lateral, which are each armed with a single tubercular spine. The eye scales are suboval, armed just below the point with a spine which projects and gives the scales a sharp appearance. The eyestalks are stout, constricted in the middle, dilated at the cornea. The terminal joints of the antennula are a little in advance of the corresponding parts of the antenna. The acicle of the antenna is three-sided, slender, and smooth, except on the inner edge, where it is rough and hairy.

The right cheliped is stout and strong; in the smaller specimens it does not reach the tips of the ambulatory legs, while in older and larger specimens it often exceeds them in length. The upper surface of the carpus is armed with a number of short spines, the larger of which are in the inner marginal row. The hand is about one-third longer than the carpus; the dactyl is usually longer than the palm; its average length in 21 specimens was found to equal the breadth of the palm. The left cheliped is much smaller than the right and varies much in relative length, sometimes reaching the base of the dactyl of

¹*P. bernhardus* is here made the type of the genus.

the latter, sometimes not to the middle of the palm. The width of the palm averages a little less than one-half of its length. The carpal and propodal joints of the ambulatory legs are spiny above; the dactyls are curved and twisted.

A good description of the color can not be made from the specimens at hand. Stripes of red are shown on the three distal joints of the ambulatory legs. The upper surface of the hands, near the prehensile edges of the fingers and along the middle of the palm, is tinged with red. The measurements of the 21 specimens given below will probably show the average relative measurements of the



PAGURUS BERNHARDUS.

species. The carapace is measured from the point of the median projection of the front to the margin of the hardened portion; the hand from the tip of the immovable finger to the middle of the margin when the hand is bent downward from the carpus; the dactyl from the tip to the condyle. Many of the specimens are worn. This will in part account for the more slender dactyls of the ambulatory legs, as the thin edges become worn in the movements of the animal over a rough bottom. The fact that the fingers of the large chelipeds are worn off at the tip also reduces their length in proportion to the width of the hand.

RECORD OF SPECIMENS EXAMINED.

Norway; G. O. Sars (Yale Univ. Mus.). Shetland; A. M. Norman (Yale Univ. Mus.). Firth of Clyde; John Murray (16988). Firth of Forth; A. M. Norman (16979). Channel Islands; Edward Lovett (6526). Jersey; A. M. Norman (6792). Holland (Yale Univ. Mus.). Europe (16980).

Measurements of Pagurus bernhardus.

Locality.	Length of carapace.	Length of large hand.	Length of dactyl of large hand.	Width of large hand.	Length of small hand.	Length of dactyl of small hand.	Width of small hand.	Length of dactyl of right anterior ambulatory leg.	Sex
British Isles	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	
(loc.?)	14.5	30.5	16	15	20	12.5	8.5	23.5	Male.
Do	16	32	18	17	20	13	9	26	Do.
Do	15	30	16	15	20	12.5	8.5	25	Do.
Do	12.5	23.5	12	12.5	15.5	10	7	19	Do.
Do	11.5	20	10	10	13	9	6.5	17.5	Do.
Do	11	21.5	11.5	11	14.5	9.5	6.5	19	Do.
Firth of Forth	14	24.5	12	13	17	11	7.5	22	Do.
Do	11.5	22	11	11	15	10	6	20.5	Do.
Do	16	26	12.5	14.5	19	11	8.5	22	Female.
Jersey	12.5	22	12	11	15	10	6	19	Male.
Do	12	20	10	10	13	9	6.5	17.5	Female.
Do	10.5	17.5	9	9	12.5	8	6	16	Male.
Do	10	17	9	9	11	8	5.5	15.5	Do.
Holland	10	18	9	9.5	12	8	6	14	Do.
Do	10	18.5	9	9	12.5	7.5	6	15	Do.
Do	9.5	18	8.5	8	12	7.5	5	16	Do.
Shetland	12.5	24	12	12	16	10.5	6.5	20	Do.
Norway	14.5	23	11	13	16	10	7.5	19	Female.
Channel Islands	12	24	12	12	16	10.5	6.5	20.5	Male.
Do	11	21.5	11	11	14	9.5	6	19.5	Do.
Do	12	21.5	11.5	10.5	14.5	9.5	6	19	Do.

PAGURUS ACADIANUS, new species.

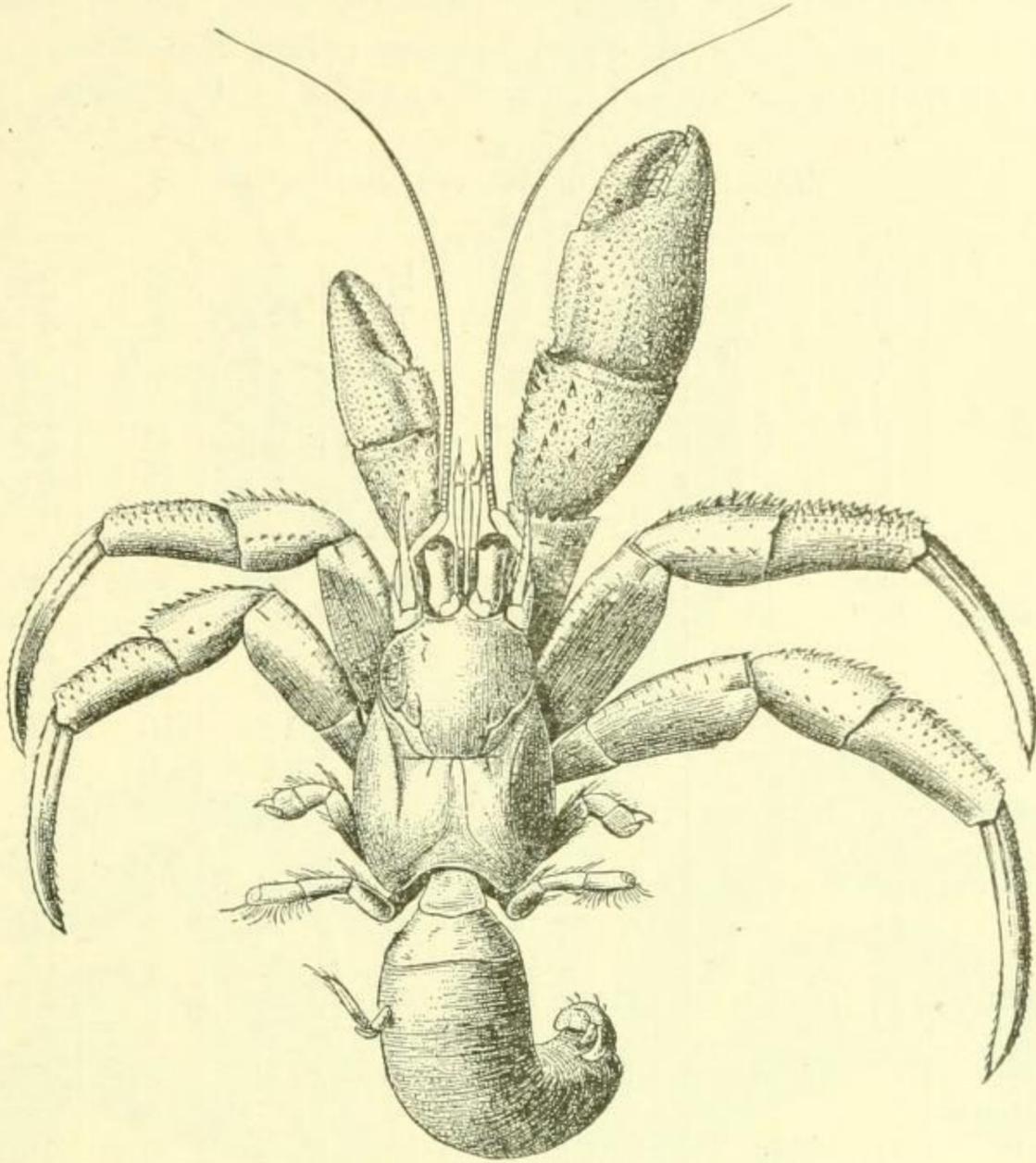
Pagurus bernhardus GOULD, Invert. of Mass., 1841, p. 329.—DE KAY, Nat. Hist. New York, Crust., 1843, p. 20.

Bernhardus streblonyx STIMPSON, Marine Invert. of Grand Manan, 1853, p. 59.

Eupagurus bernhardus STIMPSON, Ann. Lyc. Nat. Hist., New York, 1859, p. 89.—S. I. SMITH, Rept. U. S. Fish Commr. for 1871 and 1872 (1874), p. 548; Trans. Conn. Acad., V, 1879, p. 46; Proc. U. S. Nat. Mus., III, 1880, p. 428; VI, pp. 28, 29, 1883, pl. v, fig. 1.—SMITH and HARGER, Trans. Conn. Acad., III, 1874, p. 27.—R. RATHBUN, Fishery Industries of the U. S., 1st sec., 1884, p. 779.

A comparison of *E. bernhardus* from northwestern Europe with the common northeastern coast species of America has convinced me that they are specifically distinct. In both hands the fingers of *E. bernhardus* are much longer, in proportion to the length and breadth of the palm, than in *acadianus*. The granules of the hands in the American form are sharper than in the European species; especially is this true of the lower outer curve of the dactyl of the large hand, where in the Amer-

ican form the granules make a sharp and rather thin edge. The worn condition of the European specimens may account for a part of this difference. The eyestalks in the American form are relatively larger, as shown in fig. 1. The measurements of *acadianus* were made from specimens averaging larger than those with which they are compared. Much of the utility of the study of geographical distribution



PAGURUS ACADIANUS.

of a genus must be lost if forms closely related are grouped under one specific name. The name *bernhardus* as readily designates our species from its associates, *pubescens*, *kröyeri*, etc., as will *acadianus*, but the latter name will much better emphasize the difference separating it from the European species or from the more closely related North Pacific form.

RECORD OF SPECIMENS EXAMINED.

From the Grand Bank of Newfoundland to the mouth of Chesapeake Bay, 7 to 265 fathoms, U. S. Fish Commission.

Station.	Cat. No.	Station.	Cat. No.	Station.	Cat. No.
.240	3972	1165	5894	2082	5889
365	3916	1250	} 12803	2254	8695
865	5072	1251		2255	8694
900	4836	2017	5631	2576	11022
982	} 3348	2057	5965	2578	10793
983		2058	5952	2579	11023
990		5073	2081	5896	

Off Cape Sable, Nova Scotia, 16 fathoms (12604); Gloucester Harbor, Massachusetts, 7 to 10 fathoms (2564, 2610, 2849); off Cape Ann, 19 to 29 fathoms (2580, 2597); off Cape Cod, 10 to 34 fathoms (3338, 4582, 4583, 5034); Vineyard Sound, 17 fathoms (3882, 3884, 4542); off Gay Head (14397); Block Island Sound, 13 to 18½ fathoms (4543, 12853).

Gloucester donations.

Southwestern edge of Grand Bank, 200 fathoms (3721); off St. Peters Bank, 265 fathoms (3762); Georges Bank, 32 to 46 fathoms (3723, 3758-3760); off Plymouth, Massachusetts (3534); Grand Manan, New Brunswick, S. F. Cheney (12332).

Measurements of Pagurus acadianus.

Locality.	Length of carapace.	Length of large hand.	Length of dactyl of large hand.	Width of large hand.	Length of small hand.	Length of dactyl of small hand.	Width of small hand.	Length of dactyl of right anterior ambulatory leg.	Sex.
	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	<i>mm.</i>	
Georges Bank..	20	36	17	17.5	23	15	11	31.5	Male.
Do	19.5	34.5	15.5	18	22	13	10	30	Do.
Do	19.5	35.5	17.5	18	23.5	15	11	30	Do.
Do	17	29.5	13.5	15.5	20	12	10	26	Do.
Do	16.5	27	12.5	14.5	19.5	11.5	9	25	Do.
Do	17.5	29	14	15.5	20	12.5	10	24.5	Do.
Off Cape Cod ..	16	21.5	10	12.5	16	9.5	8.5	19.5	Female.
Do	13.5	25	9	11.5	15	8.5	8	18	Do.
Do	14	23	11	10	16	11	8	20	Do.
Do	11.5	20	9	10.5	13	8	6.5	18	Male.
Off Cape Ann..	15.5	28	12.5	14	19	12	9	23.5	Do.
Do	13.5	25	10	12.5	15	9	8	18.5	Do.
Do	13	21	10	11	15	9	7.5	19	Do.
Off Marthas									
Vineyard....	11	19.5	8.5	10	13.5	8	6.5	18	Do.
Do	13	22	10	12	15	9.5	8	20	Do.
Do	11.5	18	9	10	14	8	6.5	17	Do.
Vineyard Sound	11	17	7.5	10	12.5	7	7	14.5	Female.
Do	10	12.5	6	7	11	6.5	5	14	Male.
Do	10	17	7.5	9.5	12	7	6	15	Female.
Do	10	16	7	9.5	12	7	6	15	Male.
Do	9.5	14	6	8.5	9.5	5.5	5	12	Do.

PAGURUS ALASKENSIS (Benedict).

Eupagurus bernhardus var. *B. granulata-denticulata*? BRANDT, Middenørff's Sibir. Reise, Zool., 1851, p. 107.

Eupagurus bernhardus STIMPSON, Boston Jour. Nat. Hist., VI, 1857, p. 483.

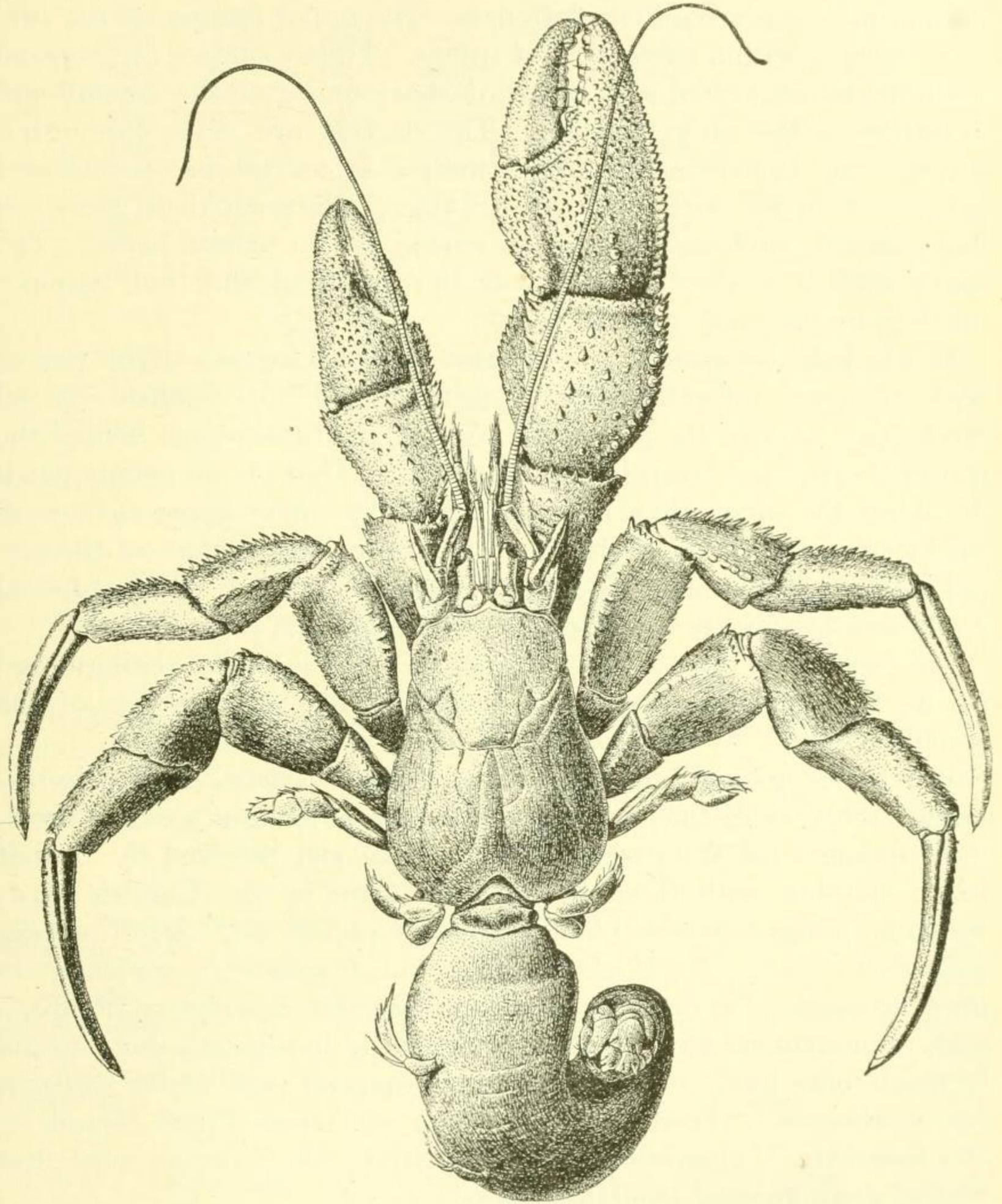
Eupagurus alaskensis BENEDICT, Proc. U. S. Nat. Mus., V, 1892, p. 2.

Pagurus alaskensis HOLMES, Occasional Papers Cali. Acad. Sci., VII, 1900, p. 135.

The anterior portion of the carapace is a little broader than long. The rostral tooth is produced to the base of the eye scales; the lateral projections are much less produced. The eyestalks are short and stout, constricted in the middle. The eye scales taper from the base to a blunt apex; the subterminal spine is conspicuous from above. The acicles of the antennæ reach the proximal end of the flagella and are

three-sided; sides flat, iridescent. The inner margin is armed with from 12 to 16 short conical teeth, and is set with bunches of hair.

The merus of the right cheliped is very stout and strong, and extends beyond the eye by about one-half its length. The carpus is armed on its inner margin with a line of stout spines; there are also



PAGURUS ALASKENSIS.

two longitudinal rows of spines on its upper surface; it is elsewhere thickly set with spiny granules. The hand is set with spiny granules forming a border on the outer margin. On the fingers the surface is very coarsely granular.

The left cheliped is much smaller than the right; its carpus has a row of strong spines on the inner margin, and a parallel row farther

down on the outer surface; otherwise it is set with spiny granules as in the large hand. The dactyl does not show from above any flattened surface, but from the prehensile edge to the outer margin it is evenly rounded.

The ambulatory legs of the right side overreach the right cheliped but little; in very large specimens not at all. The upper surface of the merus joints are a little flattened. The upper margin of the carpus is armed with a single row of spines. Upper surface of propodal joints flattened, armed with a row of short spines on the summit and elsewhere with spiny granules. The dactyls are very wide, compressed, and twisted. The upper surface is convex, its summit and margins each set with a row of granules. Between these rows are long, smooth surfaces. The inner surface of the dactyl is flat. The outer surface is very convex near the proximal end, but becomes much more flattened near the tip.

In alcoholic specimens the general color above is a light purple with iridescent reflections; below, light, tinged with reddish. A red streak runs around the prehensile edge of the thumbs and behind the dactyls to the inner margins of the hands. There is an oblong patch of red on the outer distal margins and on the inner upper surface of the merus joints of the cheliped. The lower outer surface of the carpal joints of the ambulatory legs are pointed with red. The propodal joints and dactyls are longitudinally streaked with red.

This species is very close to *bernhardus*, but is easily distinguished by its broader and shorter left hand, by the wide dactyls of the ambulatory legs, by the acicula, and by its pearly iridescence.

Brandt recognized but one North Pacific "variety" of *bernhardus* besides the very distinct *ochotensis*; of this he had but a single specimen obtained by Wosnesenski at Unalaska and believed by Brandt to be identical with the very common form on the English coast, which he designates under the descriptive phrase as "var. *B. granulata-denticulata*." As *alaskensis* has a much greater resemblance to the true *bernhardus* than has *aleuticus*, Brandt's descriptive phrase is made synonymous with it, though from the locality *aleuticus* would be much more likely to be obtained. Stimpson says under *Eupagurus bernhardus*,¹ "Specimens have been sent from Puget Sound by Dr. Kennerly." Specimens from the Straits of Fuca are small but readily distinguished from *acadianus*.

¹ Ann. Lyc. Nat. Hist., New York, VII, p. 89.

RECORD OF SPECIMENS EXAMINED.

Alaska, from Unimak Island to Bristol Bay, 5 to 47 fathoms; U. S. Fish Commission steamer *Albatross*, 1890 and 1891:

Station.	Cat. No.						
3215	16353	3248	16363	3286	16374	3297	16385
3218	16392	3249	16364	3287	16375	3298	16386
3231	16354	3250	16365	3288	16376	3300	16387
3233	16355	3268	16366	3289	16377	3301	16388
3234	16356	3269	16367	3290	16378	3302	16389
3235	16357	3270	16368	3291	16379	3304	16390
3236	16358	3271	16369	3292	16380	3305	16391
3240	16359	3278	16370	3293	16381	3448	16784
3242	16360	3281	16371	3294	16382	3456	16785
3246	16361	3283	16372	3295	16383	3460	16786
3247	16362	3285	16373	3296	16384	3463	16787

From Gulf of Georgia, British Columbia, to Cape Flattery, Washington, 31 to 67 fathoms; U. S. Fish Commission steamer *Albatross*, 1888:

Station.	Cat. No.
2863	16406
2867	16393
2868	16352
2869	16408
2872	16351

Port Townsend, Washington; U. S. Fish Commission steamer *Albatross*, 1889 (16394).

Siberia and Alaska; W. H. Dall:

Locality.	Fathoms.	Bottom.	Cat. No.
Port Providence, Plover Bay.....	8-20	Mud	16395
Nazan Bay, Atka.....	10-16	Sand	16398
Port Möller.....	Beach to 17	do	16400
Chignik Bay.....	7-18	do	16402
Chirikoff Island.....	9-14	do	16397
Chajafka Cove, Kadiak.....	15-20	Gravel	12502
Port Mulgrave, Yakutat Bay.....	6-40	16396
Lituya Bay.....	6- 9	Sandy mud .	16401

Killisnoo, Alaska; Lieut. Commander H. E. Nichols, U. S. N. (12407). Kasa-an Bay, Prince of Wales Island, Alaska; Dr. T. H. Streets, U. S. N. (16404). Victoria, British Columbia, 10 fathoms; Dr. C. F. Newcombe (15803).

Measurements of *Pagurus alaskensis*.

Locality.	Length of carapace.	Length of large hand.	Length of dactyl.	Width of hand.	Length of small hand.	Length of dactyl.	Width of small hand.	Right ambulatory leg. Length of dactyl.	Sex.
3248	mm. 19.5	mm. 43.5	mm. 22	mm. 24	mm. 29	mm. 18	mm. 15	mm. 35	Male.
	16	29	14	16	20.5	13	12	24	Female.
	15	27.5	13	16	20	11.5	11	23	Do.
3250	24	56	27	29	35.5	21	16.5	43	Male.
3294	19.5	39	19	21.5	28	17	14.5	34	Do.
	18.5	37	18	21	26.5	16.5	14.5	31	Do.
	15.5	30	14	16.5	22	14	11	27	Do.
3246	15	28	13	16	21	12.5	10	25	Do.
	22	52	26	27	33	20.5	16	39	Do.
	17.5	35	18	19	24	15.5	12	29	Do.
	16.5	30	15	17	22	14	11	27	Do.
3286	16.5	30.5	16.5	17.5	22	13	12.5	24.5	Female.
	18	31.5	16	17.5	23	13.5	12	25	Do.
	16	28.5	13	16.5	22	13	11.5	26	Male.
	15.5	30	14.5	17	21.5	13	11	25	Do.
	12	22	10.5	12	16	10	8.5	20	Do.
	12	20.5	9.5	11	15.5	9.5	8	18.5	Do.
	10	18	8.5	11	13	8	7	16	Do.
	10	16.5	8	9.5	13	7.5	7	15	Female.
10.5	18	8.5	11	14	8	7.5	15	Male.	
9	17	8	9.5	12	7	6.5	14.5	Do.	

PAGURUS ALEUTICUS (Benedict).

? *Pagurus streblonyx* OWEN, Beechey's Voy., Zool., Crust., 1839, p. 81 (not Leach).

Eupagurus aleuticus BENEDICT, Proc. U. S. Nat. Mus., XV, 1892, p. 3.

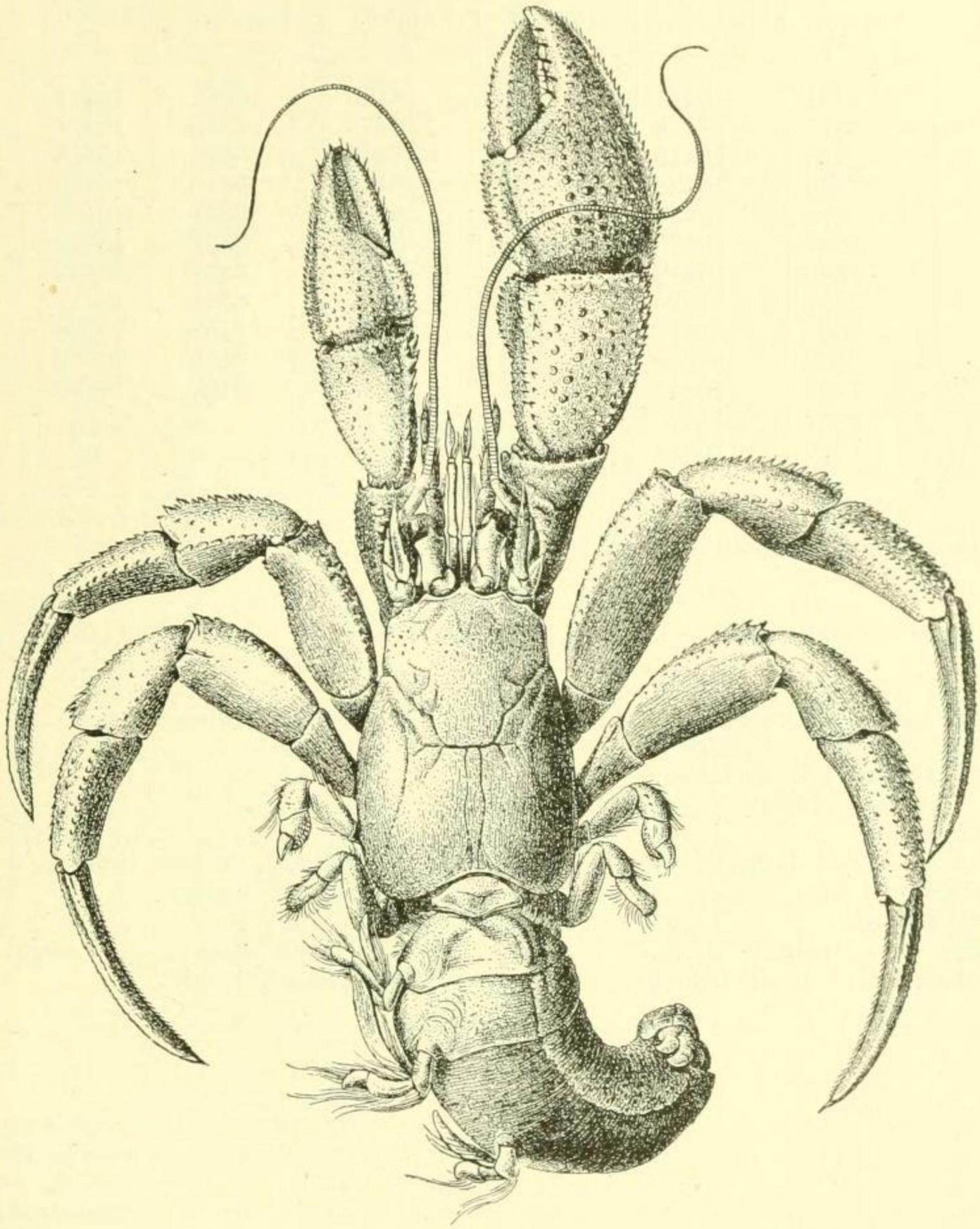
Pagurus aleuticus HOLMES, Occasional Paper Cali. Acad. Sci., VII, 1900, p. 136.

The front has the three teeth sharper and a little more prominent than in *alaskensis*. The middle or rostral tooth is not quite so much produced. The eyestalks are much stouter and some longer than in *alaskensis*. The eye scales are larger and less acuminate. The subterminal spine does not show from above. The acicles are broader at the base than in *alaskensis*.

The chelipeds are stout. The carpal joints are armed with numerous sharp spines. That of the left cheliped is three-sided, and not four, as in *alaskensis*. The dactyls of both hands show from above a smooth oblique surface, either flat or a trifle concave. In the small hand this surface is free from hair and granules; in the large hand it is bordered with short spiny granules, and the granules inclosed are very small. The spiny granules of both hands are bifurcate, except those of the margin, which are simple. The dactyls of the ambulatory legs are very wide and thin. The upper surfaces are entirely occupied by a sulcus, deep at the base of the article, becoming shallow at the

end. This character of the dactyls is sufficient to distinguish this from any other species of the *bernhardus* type. The color is dark in most specimens.

The dactyl of the large hand has a horny tip on the prehensile edge



PAGURUS ALEUTICUS.

in old and young. In *alaskensis* this character is present in the young only, as is also true of *acadianus*.

Owen's remarks on the two specimens taken at Kamchatka will apply well enough to this species. The color is usually "a dirty brown hue, and the left hand is quite variable."

RECORD OF SPECIMENS EXAMINED.

From Unalaska to Oregon, 13 to 238 fathoms; U. S. Fish Commission steamer *Albatross*, 1888 to 1890.

Station.	Cat. No.	Station.	Cat. No.	Station.	Cat. No.
2844	16441	3216	16409	3282	16411
2847	16425	3217	16433	3310	16424
2848	16415	3224	16440	3311	16418
2849	16428	3225	16437	3313	16420
2852	16430	3257	16434	3321	16436
2854	16423	3258	16438	3322	16429
2855	16419	3259	16416	3334	16432
2856	16426	3260	16442	3335	16412
2862	16413	3267	16414	3453	16788
2866	16439	3273	16435	3458	16789
2882	16444	3278	16443	3460	16790
2884	16427	3279	16410		
3076	16421	3280	16431		

Alaska, from Unalaska to Cook Inlet; W. H. Dall.

Locality.	Fathoms.	Bottom.	Cat. No.
Captains Harbor, Unalaska.....	9-15	Gravel, stones.....	16405
Captains Harbor, Unalaska, between South Flat and West Head.	30	Sand.....	16780
Ridge, Captains Harbor.....	80	do.....	16781
Port Levasheff.....			12500
West of Amaknak Island.....	60	Rock, stones, mud.....	16399
Coal Harbor, Unga.....	8-9	Sand, stones.....	16407
Chiachi Islands.....	20	Mud.....	16779
Chajafka Cove, Kadiak.....	12-14	Mud, sand.....	16782
Kachekmak Bay, Cook Inlet.....	20-60	Sandy mud.....	12512

Measurements of *Pagurus aleuticus*.

Locality.	Length of carapace.	Length of large hand.	Length of dactyl.	Width of large hand.	Length of small hand.	Length of dactyl.	Width of small hand.	Right ambulatory leg. Length of dactyl.	Sex.
2845	mm. 23	mm. 54	mm. 21	mm. 24	mm. 33	mm. 20	mm. 15.5	mm. 42	Male.
	20	47	22.5	22.5	29.5	17.5	13.5	40	Do.
	20	35	16.5	19	25	15	13	33	Female.
	22.5	46	22	23	30	17.5	16.5	35	Male.
2856	20	41.5	20	22	27.5	16	13.5	33	Do.
	2854	17	32	14.5	17	22	12.5	11.5	27.5
3259	18	32	14.5	17	22	12	11.5	28.5	Female.
	13	23	10.5	12	16	9.5	9	20	Male.
	18.5	39	18.5	21	24.5	14	13.5	30	Do.
	20	40	19	20.5	26	15.5	14.5	31	Do.
3216	16.5	30	13	16.5	20.5	11.5	11.5	27	Do.
	18	29	12.5	17	21	11.5	12	25.5	Female.
	14	25	10.5	14.5	17.5	9.5	10	21	Do.
	15.5	31	14	16.5	21	11.5	11	27.5	Male.
	13	23.5	11	13	16	9.5	9	21	Female.
	13	24.5	11.5	12	17	10	9	22	Male.
	12	22	10	11.5	15	9	8	21	Do.
	10.5	19	9	10	13	7.5	7	19	Female.
	12	20.5	10	11	14.5	8	8	20	Male.
	10	17.5	8	9.5	12.5	7	6	17.5	Do.
10	16	8	8	9	12	7	6.5	16	Female.

Summary of tables of measurements.

Name.	Average length of carapace.	Average length of large hand.	Average length of dactyl of large hand.	Average width of large hand.	Average length of small hand.	Average length of dactyl of small hand.	Average width of small hand.	Length of dactyl of the right anterior ambulatory leg.
<i>Pagurus bernhardus</i> .	mm. 12.3	mm. 22	mm. 11.5	mm. 11.1	mm. 14.7	mm. 9	mm. 6.7	mm. 19
<i>Pagurus acadianus</i> .	14	23.5	10.5	12	16	10	8	20.5
<i>Pagurus alaskensis</i> .	15	31	14	17.5	21.5	13	11	25.5
<i>Pagurus aleuticus</i> .	16	30	14	16	20.7	12	11	26.5

PAGURUS OCHOTENSIS Brandt.

Pagurus (*Eupagurus*) *bernhardus* var. *C. spinimana*; or sp. *ochotensis* BRANDT, Middendorff's Sibir. Reise, Zool., 1851, p. 108.

Bernhardus armatus DANA, U. S. Expl. Exped. Crust., I, 1852, p. 442, pl. xxvii, fig. 2.

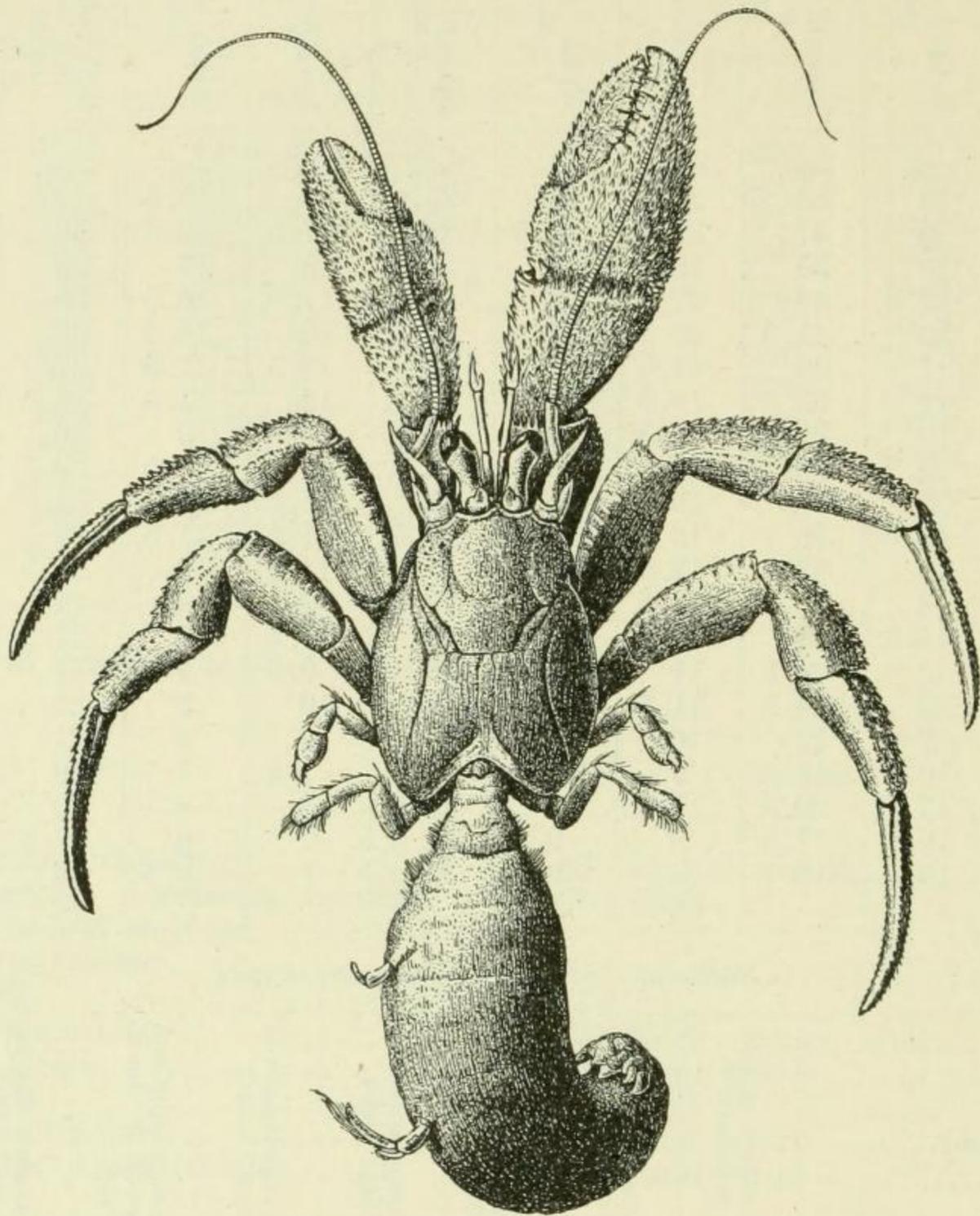
Eupagurus armatus STIMPSON, Boston Jour. Nat. Hist., VI, 1857, p. 484.—BATE, Nat. in Brit. Columbia, II, 1866, p. 287.

Pagurus ochotensis HOLMES, Occasional papers, Cali. Acad. Sci., VII, 1900, p. 137.

The front is tridentate, the teeth of nearly equal prominence; the eyestalks are moderately large; the eye scales pointed, the subterminal spine showing from above. The antennal acicula is very large, flat, its inner edge hairy and very uneven, but not spiny as in *aleuticus*

and *alaskensis*, the inner surface highly iridescent. The outer angle of the basal article is very much produced, and the inner edge is spiny.

Chelipeds not long, the merus extending but very little beyond the eyes. Where the preceding species of the *bernhardus* type are granu-



PAGURUS OCHOTENSIS.

lar or with spiny granules, this species is thickly set with slender spines. The hands are hairy, the hairs not reaching to the end of the spines.

The color of alcoholic specimens is a straw yellow. Slender streaks of red run longitudinally on the carpal, propodal, and dactyl joints of the ambulatory legs. The merus joints have two transverse streaks of the same color.

RECORD OF SPECIMENS EXAMINED.

From Vancouver Island to San Diego, California, 20 to 62 fathoms; U. S. Fish Commission steamer *Albatross*, 1888 and 1890.

Station.	Cat. No.	Station.	Cat. No.
2879	16512	3111	16516
2880	16513	3146	16517
2881	16514	3150	16518
2934	16515	3154	16519

Alaska; W. H. Dall:

? Port Levasheff, 70 to 80 fathoms, mud, stones (16778).

Sitka, 10 to 25 fathoms (14951).

Menzies Bay, Discovery Passage, British Columbia, 6 fathoms, soft bottom; Lieut. Commander H. E. Nichols, U. S. N. (5929).

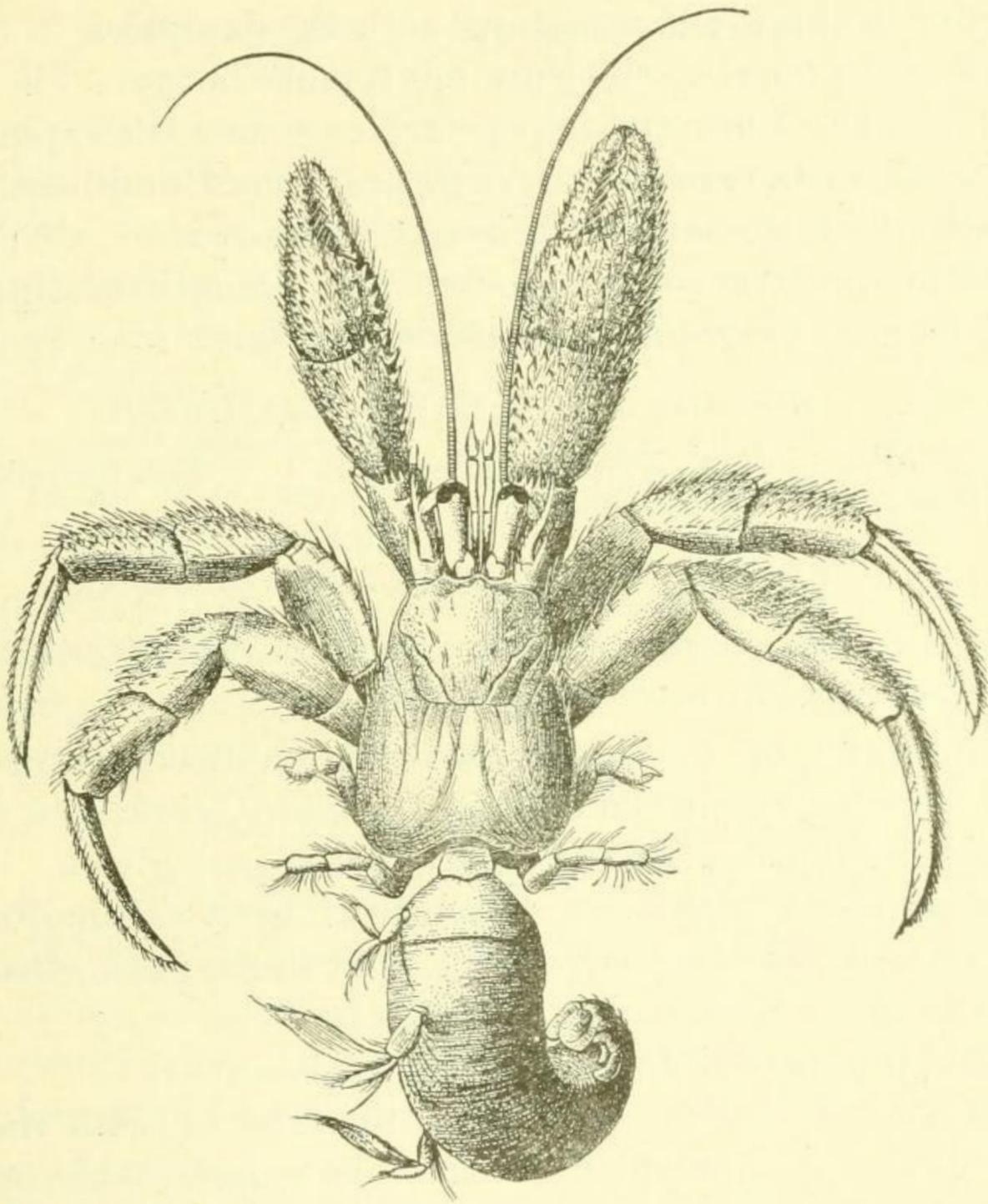
Victoria, British Columbia, 10 fathoms; Dr. C. F. Newcombe (15801).

Straits of Fuca (3397).

PAGURUS PATAGONIENSIS (Benedict).

Eupagurus patagoniensis BENEDICT, Proc. U. S. National Museum, XV, 1892, p. 3.

The anterior portion of the carapace is a little broader than long. The front has three rounded lobes equally produced. The lateral lobes



PAGURUS PATAGONIENSIS.

are armed with a single small, sharp spine, which points directly forward. The length of the eyestalks laid off on the front equals the distance from the angle of the front to the middle of the eyestalk on the opposite side; they are stout, constricted in the middle, and dilated and flattened at the cornea. The eye scales are much as in *P. alaskensis*; the subterminal spine is black tipped and shows from above; the acicles reach the base of the flagella. In form they are very closely like that of *bernhardus*, and not so much flattened as in the related Alaskan species.

The chelipeds are a little shorter than the ambulatory legs of their respective sides. The carpus of the large cheliped is shaped like that of *P. bernhardus*, but it is evenly set with short, sharp spines with black, horny tips. The spines of the upper surface of the hand are like those of the carpus, and are arranged in seven more or less distinct rows. The hand is more than twice as long as broad; the outer margin is arcuate; the inner margin is nearly straight. The prehensile edges of the fingers are armed with large turbicles, and are horny near the tips.

The merus joints of both chelipeds are very smooth on their large surfaces, but bordered with spines below.

The left cheliped reaches to the base of the dactyl of the large hand. It is similar in shape and armature, with the exception of the prehensile edges of the fingers, which are much more horny. The carpus has an evenly convex outer and upper surface armed with spines.

The dactyls of the ambulatory legs are curved and bent, as in *bernhardus* and allied species, but are not compressed.

Length of the larger specimen 105 mm.; length of right cheliped 68 mm.; length of right ambulatory legs 85 mm.

RECORD OF SPECIMENS EXAMINED.

East coast of Patagonia, 43 fathoms, station 2768; U. S. Fish Commission steamer *Albatross*, 1888 (16772), two specimens.

PAGURUS BARBIGER (A. Milne-Edwards).

Bernhardus barbiger A. MILNE-EDWARDS, Crustacea, Mission Scientifique du Cap Horn, Paris, 1891, p. F'28, pl. III, fig. 1 a-e.

The description of *P. patagoniensis* was published before the U. S. National Museum received a copy of the above work, or a comparison would have been made and the differences in part given.

As the figures of *P. barbiger* were drawn by A. Milne-Edwards and agree very well with his descriptions, they must, in the absence of the type specimens, be assumed to be correct.

The main points of difference are as follows:

The front of *P. barbiger* is slightly three lobed, with the middle a little in advance of the lateral lobes. The length of the eyestalk laid off on the front equals it in length. The carpus of the right hand is nearly rectangular. The outline of the left hand is evenly arcuate on both sides. The figure of the second foot shows a broad dactyle, a very broad propodus arcuate beneath, the carpus is also broad, and both it and the propodus are armed with teeth or spines markedly different from those on the chelipeds. Notwithstanding these differences, it is not impossible that the species may prove to be identical, as the type and only specimen of *P. barbiger* is very much smaller than either specimen in this museum. The length of the right cheliped is given as 23 mm.