

CRABS OF PUGET SOUND, WASHINGTON

by

HAROLD GLEN COFFIN

A THESIS

submitted to

WALLA WALLA COLLEGE

**WALLA WALLA COLLEGE LIBRARY**

in partial fulfillment of  
the requirements for the

degree of

MASTER OF ARTS

March 1952

46189

AN ABSTRACT OF THE THESIS OF

Harold Glen Coffin for the M. A. in Zoology

March 24, 1952

CRABS OF PUGET SOUND, WASHINGTON

Abstract Approved

*R. A. Underhill*  
(Major Professor)

This thesis fills a need for a complete paper of the Brachyura and crab-like Anomura of Puget Sound, Washington. It includes 51 species which comprise all those known to occur in the area with the exception of two or three extremely rare forms.

The arrangement is in the following order: introduction, genera key, species keys and descriptions, glossary, literature cited and plates.

The data were gathered while attending Walla Walla College Biological Station, Anacortes, Washington, during the summers of 1947, 1949, 1950 and 1951. Reference was made to numerous volumes and journals of which 18 are cited in the thesis. The work was done under the direction of Drs. R. A. Underhill and E. S. Booth of Walla Walla College, College Place, Washington. Much help was received from Dr. John S. Garth of the Allan Hancock Foundation, University of Southern California.

The genera and species keys utilize an original organization. The characteristics are mainly those used by previous authors. Cross references have been used to facilitate identification of the more difficult species. The species descriptions have been composed in the following order: scientific name, synonymy, description, color, dimensions, range, specimens collected and comparisons or remarks.

A detailed glossary including all important terms used has been prepared. An illustration of each crab has been included in the plates. In instances where both sexes are different an illustration of each sex is found. Included with the illustrations of the Pinnotherid crabs are line drawings of a cheliped of each sex.

The following is a list of the genera described.

<u>Pagurus</u>	<u>Rhinolithodes</u>	<u>Scyra</u>
<u>Paguristes</u>	<u>Munida</u>	<u>Telmessus</u>
<u>Orthopagurus</u>	<u>Petrolisthes</u>	<u>Cancer</u>
<u>Hapalogaster</u>	<u>Pachycheles</u>	<u>Lophopanopeus</u>
<u>Oedignathus</u>	<u>Oregonia</u>	<u>Pinnotheres</u>
<u>Acantholithodes</u>	<u>Pugettia</u>	<u>Fabia</u>
<u>Phyllolithodes</u>	<u>Chorilia</u>	<u>Pinnixa</u>
<u>Cryptolithodes</u>	<u>Chionoecetes</u>	<u>Scleroplax</u>
<u>Lopholithodes</u>	<u>Hyas</u>	<u>Hemigrapsus</u>

APPROVED:

*R. A. Underhill*

Associate Professor of Entomology

In Charge of Major

*Ernest S. Booth*

Head, Department of Biological Sciences

*Beatrice Emery*

Member of Thesis Committee

*Frank E. Meckling*

Member of Thesis Committee

*H. S. Sonnenberg*

Dean of Graduate School

## CONTENTS

Introduction.....	1
Key to Genera.....	5
Species Descriptions and Keys.....	9
Family Paguridae.....	9
Genus Pagurus.....	9
<i>P. alaskensis</i> .....	11
<i>P. aleuticus</i> .....	13
<i>P. ochotensis</i> .....	14
<i>P. brandti</i> .....	15
<i>P. dalli</i> .....	17
<i>P. beringanus</i> .....	18
<i>P. kennerlyi</i> .....	19
<i>P. setosus</i> .....	20
<i>P. hirsutiusculus</i> .....	22
<i>P. granosimanus</i> .....	23
<i>P. tenuimanus</i> .....	25
<i>P. gilli</i> .....	26
<i>P. splendescens</i> .....	27
Genus Paguristes.....	29
<i>P. turgidus</i> .....	29
Genus Orthopagurus.....	30
<i>O. schmitti</i> .....	30
Family Lithodidae.....	31
Genus Hapalogaster.....	31



	II
<i>H. mertensii</i> .....	31
Genus <i>Oedignathus</i> .....	32
<i>O. inermis</i> .....	32
Genus <i>Acantholithodes</i> .....	34
<i>A. hispidus</i> .....	34
Genus <i>Phyllolithodes</i> .....	35
<i>P. papillosus</i> .....	35
Genus <i>Cryptolithodes</i> .....	36
<i>C. typicus</i> .....	37
<i>C. sitchensis</i> .....	38
Genus <i>Lopholithodes</i> .....	39
<i>L. mandtii</i> .....	39
<i>L. foraminatus</i> .....	40
Genus <i>Rhinolithodes</i> .....	41
<i>R. wosnessenskii</i> .....	41
Family Galatheidae.....	43
Genus <i>Munida</i> .....	43
<i>M. quadrispina</i> .....	43
Family Porcellanidae.....	44
Genus <i>Petrolisthes</i> .....	44
<i>P. eriomerus</i> .....	44
Genus <i>Pachycheles</i> .....	45
<i>P. rudis</i> .....	45
Family Majidae.....	46
Genus <i>Oregonia</i> .....	47
<i>O. gracilis</i> .....	47

Genus Pugettia.....	48
<i>P. producta</i> .....	48
<i>P. gracilis</i> .....	49
<i>P. richii</i> .....	51
Genus Chorilia.....	52
<i>C. longipes</i> .....	52
Genus Chionoecetes.....	53
<i>C. bairdi</i> .....	53
Genus Hyas.....	54
<i>H. lyratus</i> .....	54
Genus Scyra.....	55
<i>S. acutifrons</i> .....	55
Family Atelecyclidae.....	56
Genus Telmessus.....	56
<i>T. cheiragonus</i> .....	56
Family Cancridae.....	58
Genus Cancer.....	58
<i>C. productus</i> .....	59
<i>C. gracilis</i> .....	61
<i>C. magister</i> .....	62
<i>C. oregonensis</i> .....	63
Family Xanthidae.....	65
Genus Lophopanopeus.....	65
<i>L. bellus</i> .....	65
Family Pinnotheridae.....	66
Genus Pinnotheres.....	67

	IV
<i>P. pugettensis</i> .....	67
Genus <i>Fabia</i> .....	68
<i>F. subquadrata</i> .....	68
Genus <i>Pinnixa</i> .....	70
<i>P. faba</i> .....	70
<i>P. littoralis</i> .....	72
<i>P. schmitti</i> .....	73
<i>P. eburna</i> .....	74
<i>P. tubicola</i> .....	76
Genus <i>Scleroplax</i> .....	77
<i>S. granulata</i> .....	77
Family Grapsidae.....	78
Genus <i>Hemigrapsus</i> .....	78
<i>H. nudus</i> .....	78
<i>H. oregonensis</i> .....	80
Glossary.....	82
Literature Cited.....	87
Plates.....	89

## CRABS OF PUGET SOUND, WASHINGTON

### INTRODUCTION

The need of a complete paper on the crabs of the Puget Sound area stimulated the production of this work. The majority of the crabs herein described have been collected by the writer or by previous individuals while in attendance at the Walla Walla College Biological Station, Anacortes, Washington, and are deposited in the Museum of Natural History, Walla Walla College, College Place, Washington. Those crabs not collected locally have been described by the use of the works listed in the bibliography.

The keys have usually employed the characteristics used by previous authors but the organization is original. When the male and female of a species are similar except for the usual sexual differences, the species description applies to both. If male and female are different in more than the usual sexual differences, they are described separately. The dimensions given are not necessarily the largest known dimensions but the dimensions of a mature crab. These measurements apply to both male and female unless otherwise noted.

Crabs of the pacific coast of North America were little collected or studied before the turn of the twentieth century. The comparatively recent settlement of the pacific coast partially accounts for this delay.

A United States Fish Commission steamer, the Albatross, collected crustaceans in the Puget Sound in 1887-1888. Recorded from this collection was a swimming crab, Portunus xantusii. This crab has since not been reported north of San Pedro, California. In 1898 S. T. Calman identified the Crustacea collected two years previous by a Columbia University expedition in Puget Sound. In this collection were two crabs, Pagurus middendorffii and Philyra pisum, which have never again been located in this area. The Philyra pisum is of special interest because it is the only occurrence of this genus and species ever recorded in the western hemisphere (Rathbun, 1937).

Mary J. Rathbun published several papers in the "American Naturalist" in 1900 which gave the distribution for some of the pacific coast crabs. Four years later she incorporated the findings of the Alaska Harriman Expedition into a revision of the crustaceans. After the establishment of the Puget Sound Biological Station at Friday Harbor in the San Juan Islands by the University of Washington, several papers appeared. The first was written by Evelyn Way in 1917. Belle A. Stevens' work on the hermit crabs appeared in 1925 and Wayne W. Wells' paper on the Pinnotherid crabs in 1928. Since this time the work of the station at Friday Harbor has been more toward oceanography. In 1947 the Walla Walla College Biological Station was established and work was begun

which resulted in the production of this paper.

Shore crabs were collected during low tide. Deeper forms were brought up by dredge. Collections from as many different habitats as possible were made. Some crabs were seldom found outside their specific habitats. The Pinnotherid crabs were in most cases living in or with specific hosts. In some localities almost one hundred per cent of the clams Schizothaerus nuttallii were found to contain Pinnixa faba or Pinnixa littoralis. Scleroplax granulata and Pinnixa schmitti were nearly always found just below the plug in the burrows of Upogebia. A shovel was quickly thrust into the sand to intersect the burrow below the plug and prevent the crabs from moving down the burrow.

Shore collecting was done in a pail containing sea water. Many of the crabs would be dead by the end of the collecting trip due to the rising of the temperature and the lack of oxygen. Some of the more hardy crabs had to be killed with fresh water or weak preservative. The crabs would lose their legs if placed in strong preservative before they were dead. Sixty per cent isopropyl alcohol was used as a final preservative. Formalin was found to make the crabs stiff.

I wish to thank Dr. John S. Garth, Research Associate, Allan Hancock Foundation, for reading the manuscript and supplying valuable information. Special thanks are due

Dr. Ernest S. Booth and Dr. Raymond A. Underhill for assistance and suggestions in the preparation and completion of this paper. I am also much indebted to the Board of Trustees of Canadian Union College, College Heights, Alberta, for making it possible for me to carry out this work. Certain photographs appearing in this work were copied with permission from the illustrations in The Marine Decapod Crustacea of California by Waldo L. Schmitt, published by the University of California Press. Some of the drawings of the Pinnotherid crabs have been based on illustrations appearing in Pinnotheridae of Puget Sound by Wayne W. Wells, published by the University of Washington Press.

## KEY TO GENERA

- 1a. Antennae arising external to eyes..... 2
- 1b. Antennae arising internal to eyes..... 14
- 2a. Shrimp-like; abdomen not folded or coiled. Munida  
page 43
- 2b. Not shrimp-like; abdomen folded or coiled..... 3
- 3a. Hermit crabs; living in shells of snails, in  
sponges or in worm tubes; abdomen soft and not  
folded under thorax..... 4
- 3b. Not hermit crabs; not living in shells of snails,  
in sponges or in worm tubes; abdomen hard or soft  
but folded under thorax..... 6
- 4a. Chelipeds approximately equal in size, or the left  
larger than the right. Paguristes page 29
- 4b. Chelipeds unequal in size and the right larger  
than the left..... 5
- 5a. Abdomen spirally coiled; fingers of chelipeds  
open and close horizontally; lives in shells of  
snails and in sponges. Pagurus page 9
- 5b. Abdomen not spirally coiled; fingers of chelipeds  
open and close obliquely; lives in worm tubes.  
Orthopagurus page 30
- 6a. Antennae as long as chelipeds; last pair of legs  
rudimentary and usually folded over carapace..... 13
- 6b. Antennae not as long as chelipeds; last pair of



- legs normal or if rudimentary then not folded over  
carapace..... 7
- 7a. Carapace extending over and concealing the ambula-  
tory legs. Cryptolithodes page 36
- 7b. Carapace not extending over or concealing the  
ambulatory legs..... 8
- 8a. Carapace with deep dorsal pits..... 9
- 8b. Carapace without deep dorsal pits..... 10
- 9a. Rostrum prominent and divided into diverging  
horns. Phyllolithodes page 35
- 9b. Rostrum short and blunt, not divided into diverging  
horns. Rhinolithodes page 41
- 10a. Abdomen soft..... 11
- 10b. Abdomen hard. Lopholithodes page 39
- 11a. Rostrum ending in one pointed spine..... 12
- 11b. Rostrum ending in three terminal spines and a fourth  
dorsal spine. Acantholithodes page 34
- 12a. Carapace and legs covered with tufts of hair.  
Hapalogaster page 31
- 12b. Carapace and legs not covered with tufts of hair.  
Oedignathus page 32
- 13a. Chela thick and rough. Pachycheles page 45
- 13b. Chela thin and roughened only with fine granules.  
Petrolisthes page 44
- 14a. Anterior portion of carapace narrower than pos-  
terior portion and usually produced into a narrow

- pointed rostrum..... 15
- 14b. Anterior portion of carapace as wide as or wider than posterior portion and not produced into a narrow pointed rostrum..... 20
- 15a. Fingers of chelipeds equal to or less than length of palm..... 16
- 15b. Fingers of chelipeds one and one half to two times length of palm. Chionoecetes page 53
- 16a. Carapace with flat, broad, lateral projecting spines or processes posterior to the eyes..... 17
- 16b. Carapace without flat, broad, lateral projecting spines or processes posterior to the eyes..... 18
- 17a. Preorbital tooth present; no calcareous knob on ventral rim of eye orbit. Pugettia page 48
- 17b. No preorbital tooth; calcareous knob on ventral rim of eye orbit. Hyas page 54
- 18a. A long sharp anterior pointing spine behind each eye..... 19
- 18b. No long sharp anterior pointing spine behind each eye. Scyra page 55
- 19a. Surface of carapace with spines. Chorilia page 52
- 19b. Surface of carapace without spines. Oregonia page 47
- 20a. Antero-lateral edge of carapace with teeth; not commensal with molluscs, tube worms or tunicates.. 21
- 20b. Antero-lateral edge of carapace without teeth;

- commensal with molluscs, tube worms or tunicates.. 24
- 21a. Carapace oval to round in shape..... 22
- 21b. Carapace rectangular to square in shape..... 23
- 22a. Carapace covered with stiff hair; six large teeth  
on lateral margins of carapace. Telmessus page 56
- 22b. Carapace not covered with stiff hair; more than  
six teeth on lateral margins of carapace. Cancer  
page 58
- 23a. Fingers of chelipeds black. Lophopanopeus page 65
- 23b. Fingers of chelipeds variable but never black.  
Hemigrapsus page 78
- 24a. Carapace one and one half to three times wider  
than long. Pinnixa page 70
- 24b. Carapace about equal in width and length..... 25
- 25a. Carapace with fine sulcus extending back from  
each orbit and enclosing median area. Fabia page 68
- 25b. Carapace without fine sulcus extending back  
from each orbit..... 26
- 26a. Third ambulatory leg longest. Scleroplax page 77
- 26b. Second or fourth ambulatory leg longest.  
Pinnotheres page 67

## SPECIES DESCRIPTIONS AND KEYS

## Family Paguridae

Carapace firm in anterior portion and soft in posterior portion; antennae and eye stalks usually long; first pair of legs chelate and usually unequal in size; fourth pair unlike the second and third; some appendages lost or reduced; abdomen soft and unsegmented, straight or coiled; fan-tail not adapted for swimming.

Genus Pagurus Fabricius

- 1a. Chelae roughened dorsally with granules, tubercles or spines..... 2
- 1b. Chelae smooth dorsally. Pagurus gilli page 26
- 2a. Large chela about equal in width and length; much broader than carpus. Pagurus tenuimanus page 25
- 2b. Large chela longer than wide; not much broader than carpus..... 3
- 3a. Frontal tooth approximately one half the length of the eye stalks; fingers of small chela much longer than palm. Pagurus splendescens page 27
- 3b. Frontal tooth never more than one fourth the length of the eye stalks; fingers of small chela not much longer than palm..... 4
- 4a. Chelae covered with long, slender, sharp spines..... 5
- 4b. Chelae not covered with long, slender, sharp spines. 7

- 5a. Ambulatory legs decidedly hairy..... 6
- 5b. Ambulatory legs with no hair or only slightly hairy. Pagurus ochotensis page 14
- 6a. Antennal acicle as long as or shorter than eye stalk. Pagurus kennerlyi page 19
- 6b. Antennal acicle longer than eye stalk. Pagurus setosus page 20
- 7a. Merus of right cheliped with two large tubercles on ventral surface..... 9
- 7b. Merus of right cheliped without two large tubercles on ventral surface..... 8
- 8a. Anterior portion of carapace wider than long; outer upper surface of small chela rounded..... 11
- 8b. Anterior portion of carapace equal in width and length or longer than wide; outer upper surface of small chela concave..... 10
- 9a. Ventral outer edge of small chela rounded; two tubercles on ventral surface of merus of large cheliped equal in size or the inner tubercle larger; articulations and tips of ambulatory legs not red. Pagurus granosimanus page 23
- 9b. Ventral outer edge of small chela angled; two tubercles on ventral surface of merus of large cheliped not equal but with the outer tubercle larger; articulations and tips of ambulatory legs red. Pagurus beringanus page 18

- 10a. Distal end of merus with distinct band of white.  
Pagurus dalli page 17
- 10b. Distal end of merus without distinct band of white.  
Pagurus brandti page 15
- 11a. Ambulatory legs hairy; four longitudinal red stripes  
on top, bottom, and both sides of dactyls. Pagurus  
hirsutiusculus page 22
- 11b. Ambulatory legs not hairy and dactyls without four  
longitudinal red stripes..... 12
- 12a. Sulcus present on dorsal surface of dactyls of  
ambulatory legs. Pagurus aleuticus page 13
- 12b. No sulcus on dorsal surface of dactyls of ambula-  
tory legs. Pagurus alaskensis page 11

Pagurus alaskensis (Benedict)

Plate I, fig. 1

Eupagurus bernhardus var. B, granulata denticulata?

Brandt, Middendorff's Sibir. Reise. Zool.,  
p. 107, 1851.

Eupagurus bernhardus Stimpson, Jour. Bost. Soc. Nat.  
Hist., 6:483, 1857.

Eupagurus alaskensis Benedict, Proc. U. S. Nat. Mus.,  
15:2, 1892.

Pagurus alaskensis Holmes, Occas. Papers Calif.  
Acad. Sci., 7:135, 1900.

Description.--Carapace with anterior portion as

long as wide or slightly wider; three anterior teeth about equal in length and not acute. Antennal acicle exceeds the eye stalk by one fourth to more than one half its length. Eye stalks constricted in middle; half the length of anterior portion of carapace. Large cheliped tuberculate and spiny; merus trihedral; row of spines on inner edge of carpus of both chelipeds; hair fringing teeth of fingers. Ambulatory legs spiny dorsally; lateral surfaces smooth; dactyls spiny ventrally, twisted, slender and longer than propodi.

Color.--Red brown to wine; red brown on merus, wine on carpus and chela of chelipeds; red brown streaks on ambulatory legs; antennal acicles, chelipeds and ambulatory legs with overall opalescent golden sheen.

Dimensions.--Anterior portion of carapace 23 mm. long; large chela 43 mm. long.

Range.--Bering Sea to Oregon; low tide to 136 fathoms (Rathbun, 1904).

Specimens Collected.--Thirteen specimens collected and examined from Ship Harbor, Bellingham Channel, Padilla Bay and Guemes Channel; five to 20 fathoms; common.

Remarks.--Pagurus alaskensis is one of the largest local hermit crabs. The constriction in the eye stalk, the long antennal acicle, the opalescent and iridescent coloring and the absence of a dorsal sulcus on the dactyls of the ambulatory legs identify this crab.

Pagurus aleuticus (Benedict)

Plate I, fig. 2

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

Eupagurus aleuticus Benedict, Proc. U. S. Nat. Mus.,  
15:3, 1892.

Pagurus aleuticus Holmes, Occas. Papers Calif. Acad.  
Sci., 7:136, 1900.

Description.--Carapace with anterior portion slightly wider than long; median tooth acute and longer than spine-tipped lateral teeth. Antennal acicle stout but exceeds eye stalk by less than one fourth its length. Eye stalks stout, constricted in the middle and about half the length of the anterior portion of the carapace. Large cheliped with prominent spines; carpus of the small cheliped trihedral. Ambulatory legs with carpus and propodus spiny dorsally; dactyls thin and twisted; sulcus on dorsal surface of dactyls deep at base and becoming shallow toward end.

Color.--Chelipeds and ambulatory legs pink to violet but fading on chelae and dactyls; red markings above.

Dimensions.--Anterior portion of carapace 14 mm. long; large chela 22 mm. long (Stevens, 1925).

Range.--Bering Sea to Oregon; eight to 238 fathoms (Rathbun, 1904).

Specimens Collected.--None collected locally; not



common.

Comparisons.--Pagurus aleuticus is similar to Pagurus alaskensis but differs in the following points: The antennal acicle exceeds the eye by less than one fourth its length, the eye stalks are stouter, the spines on the chelipeds are more prominent and a sulcus is present on the dorsal edge of the dactyls of the ambulatory legs.

Pagurus ochotensis (Brandt)

Plate II, fig. 2

Pagurus (Eupagurus) bernhardus var. C, spinimana;

or sp. ochotensis Brandt, Middendorff's Sibir.

Reise. Zool., p. 108, 1851.

Bernhardus armatus Dana, U. S. Explor. Exped. Crust.,

1:482, 1852.

Eupagurus armatus Stimpson, Jour. Bost. Soc. Nat.

Hist., 6:484, 1857.

Pagurus ochotensis Holmes, Occas. Papers Calif.

Acad. Sci., 7:137, 1900.

Description.--Carapace with anterior portion slightly wider than long; median tooth slightly longer than lateral spine-tipped teeth. Antennal acicle exceeds eye stalk by nearly one half its length; inner edge of acicle rough but not spiny. Eye stalks stout, short and constricted in the middle. Large cheliped covered with slender spines; hair on chela not as long as spines but more numerous;

small cheliped spinous, hairy and with carpus four sided. Ambulatory legs with carpus and propodus spiny dorsally; dactyls almost equal to combined length of carpus and propodus.

Color.--Olive to orange with brown and violet markings.

Dimensions.--Anterior portion of carapace 12 mm. long; large chela 16 mm. long (Stevens, 1925).

Range.--Japan (Stimpson, 1907), Alaska to southern California (Rathbun, 1904); six to 80 fathoms (Rathbun, 1904).

Specimens Collected.--None collected locally; not common.

Comparisons.--Pagurus ochotensis may be distinguished from Pagurus alaskensis and Pagurus aleuticus by the sharp spines on the dorsal surface of the chela and carpus of the large cheliped. Violet color is also more prevalent.

Pagurus brandti (Benedict)

Plate I, fig. 4

Eupagurus brandti Benedict, Proc. U. S. Nat. Mus.,  
15:9, 1892.

Pagurus brandti Holmes, Occas. Papers Calif. Acad.  
Sci., 7:139, 1900.

Description.--Carapace with anterior portion convex and slightly longer than wide; median tooth and lateral

spine-tipped teeth about equal in length. Antennal acicle extends slightly beyond the eye stalk. Eye stalks stout and little more than half the length of the anterior portion of the carapace. Large cheliped stout and with small sharp spines dorsally; carpus nearly twice as long as wide; chelae swollen and about twice as long as wide. Ambulatory legs slender and practically without spines except on the upper and lower surfaces of the dactyls which are wide, curved and twisted.

Color.--Pink to tan; brown at the articulations and a white band through middle of segments of ambulatory legs.

Dimensions.--Anterior portion of carapace 12 mm. long; large chela 15 mm. long (Stevens, 1925).

Range.--Bering Sea to Oregon; nine to 121 fathoms (Rathbun, 1904).

Specimens Collected.--None collected locally; often occupy sponges instead of shells; not common.

Comparisons.--Pagurus brandti has the carpus of the chelipeds twice as long as wide which separates it from other crabs with which it might be confused except Pagurus dalli. P. dalli has a band of white on the distal end of the meri which P. brandti lacks.

Pagurus dalli (Benedict)

Plate I, fig. 3

Eupagurus dalli Benedict, Proc. U. S. Nat. Mus.,  
15:9, 1892.

Pagurus dalli Holmes, Occas. Papers Calif. Acad.  
Sci., 7:139, 1900.

Description.--Carapace with anterior portion convex and nearly equal in width and length; median tooth somewhat longer than lateral spine-tipped teeth. Antennal acicle slightly exceeds the eye stalk in length. Eye stalks about half as long as anterior part of carapace. Large cheliped armed with spines; carpus about one and one half times as long as wide; chela swollen and about same width as carpus. Ambulatory legs slender and the dactyls not twisted.

Color.--Pink to tan; brown on the articulations; white band across middle of segments of ambulatory legs; a sharply defined band of white on distal end of meri.

Dimensions.--Anterior portion of carapace 11 mm. long; large chela 17 mm. long.

Range.--Bering Sea to Oregon; low tide to 151 fathoms (Rathbun, 1904).

Specimens Collected.--None found locally; may occupy sponges instead of shells; not common.

Comparisons.--Pagurus dalli has the carpus of the cheliped approximately one and one half times longer

than wide. The dactyls are not twisted and there are distinct bands of white distally on the meri which set it apart from Pagurus brandti with which it might be confused.

Pagurus beringanus (Benedict)

Plate II, fig. 1

Eupagurus beringanus Benedict, Proc. U. S. Nat. Mus.,  
15:17, 1892.

Eupagurus newcombei Benedict, Proc. U. S. Nat. Mus.,  
15:17, 1892.

Pagurus beringanus Rathbun, Harriman Alaska Exped.,  
10:159, 1904.

Description.--Carapace with anterior portion longer than wide; median tooth blunt and obtuse; lateral teeth not prominent. Antennal acicle about equal in length to eye stalk; antennal peduncle exceeds eye stalk by less than one fourth the length of second segment of the peduncle. Eye stalks slender and swollen at base. Large cheliped hairy and with tubercles and spines; spines prominent along inner edge of carpus of little cheliped; two large orange tubercles on ventral surface of merus of large cheliped. Ambulatory legs hairy and with spines along dorsal edge.

Color.--Usually predominantly red; occasionally chelipeds are tan or olive; distal end of propodi and proximal and distal ends of dactyls of ambulatory legs banded with red; spines often bright red.

Dimensions.--Anterior portion of carapace 12 mm. long; large chela 15 mm. long.

Range.--Bering Sea to Monterey, California (Rathbun, 1904); low tide to 45 fathoms (Stevens, 1925).

Specimens Collected.--Seventy nine specimens collected and examined from Ship Harbor, Shannon Pt., Burrows Bay, Alexander Beach, Rosario Beach, Tosi Pt., and Guemes Channel; prefers a rocky shore; often found in tide pools; common.

Comparisons.--Pagurus beringanus is most likely to be confused with Pagurus granosimanus but the orange tubercles with the outer one larger, the rounded outer lower edge of the small chela and the absence of granules on the under surface of the chelae distinguish it from P. granosimanus.

Pagurus kennerlyi (Stimpson)

Plate II, fig. 3

Eupagurus kennerlyi Stimpson, Proc. Acad. Nat. Sci. Phila., p. 153, 1894.

Pagurus kennerlyi Holmes, Occas. Papers Calif. Acad. Sci., 7:143, 1900.

Description.--Carapace with anterior portion slightly longer than wide; median tooth triangular, not acute; lateral teeth armed with a sharp spine. Antennal acicle about equal in length to eye stalk. Antennae longer than

chelipeds; peduncle exceeds eye by less than one fourth the length of the last segment of peduncle. Eye stalks slender. Large cheliped with long hairs; carpus smooth except for row of spines on inner edge; chela covered with long spines; chelipeds unequal. Ambulatory legs with long hairs.

Color.--Light brown to pink; antennae with markings of red brown; chelipeds marked with darker red or brown.

Dimensions.--Anterior portion of carapace 10.5 mm. long; large chela 15 mm. long.

Range.--Aleutian Islands to Washington; nine to 97 fathoms (Rathbun, 1904).

Specimens Collected.--Ten specimens collected and examined from Rosario Strait and Guemes Channel; common.

Comparisons.--Pagurus kennerlyi, Pagurus setosus and Pagurus ochotensis have long slender sharp spines on the chelipeds but P. kennerlyi has much hair on the chelipeds which eliminates P. ochotensis and the antennal acicle is no longer than the eye stalk which eliminates P. setosus.

Pagurus setosus (Benedict)

Plate II, fig. 4

Eupagurus setosus Benedict, Proc. U. S. Nat. Mus.,  
15:19, 1892.

Pagurus setosus Rathbun, Harriman Alaska Exped.,

10:159, 1904.

Description.--Carapace with anterior portion a little longer than wide; median tooth rounded and longer than lateral teeth. Antennal acicle exceeds eye stalk by about one fourth its length. Eye stalks half the length of the anterior part of the carapace. Large cheliped spiny and thickly set with long hairs much longer than the spines; merus and carpus of small cheliped compressed; two rows of dorsal spines on carpus. Ambulatory legs stout and hairy.

Color.--Pink buff; brown spots and bands on carapace and legs except on chela and dactyls; brown hair becoming lighter toward ends.

Dimensions.--Anterior portion of carapace 11.5 mm. long; large chela 21 mm. long.

Range.--Alaska to southern California; four (Stevens, 1925) to 266 fathoms (Rathbun, 1904).

Specimens Collected.--Two specimens collected and examined from Guemes Channel at 12 fathoms; not common.

Comparisons.--Pagurus setosus is similar to Pagurus kennerlyi but may be told from P. kennerlyi by the antennal acicles which are longer than the eye stalks and the brown hair on the chelae which is much longer than the spines.



Pagurus hirsutiusculus (Dana)

Plate III, fig. 1

Bernhardus hirsutiusculus Dana, Proc. Acad. Nat. Sci.  
Phila., 5:70, 1851.

Eupagurus hirsutiusculus Stimpson, Jour. Bost. Soc.  
Nat. Hist., 6:484, 1857.

Pagurus hirsutiusculus Holmes, Occas. Papers Calif.  
Acad. Sci., 7:143, 1900.

Description.--Carapace with anterior portion wider than long; median tooth distinct and acute; lateral teeth lacking or inconspicuous. Antennal acicle exceeds eye stalk in length; peduncle of antenna exceeds eye stalk by at least one half the length of the last segment of the peduncle. Eye stalks short and stout. Large chelipeds hairy; without spines but granulate; palm and carpus about equal length; small chela not as flat as large chela. Ambulatory legs hairy; dactyls about same length as propodi and not twisted; ventral spines on dactyls.

Color.--Generally gray or tan because of hair or dirt; actual color olive or brown; dactyls usually blue with longitudinal red stripes, two on either side, one on dorsal edge and one on ventral edge.

Dimensions.--Anterior portion of carapace 7.5 mm. long; large chela 15 mm. long.

Range.--Japan (Stimpson, 1907), Siberia (Rathbun, 1904), Aleutian Islands to southern California (Holmes,

1900); mid tide to 17 fathoms (Rathbun, 1904).

Specimens Collected.--Sixty three specimens collected and examined from Ship Harbor, Shannon Pt., Green Pt., Anico Beach, Langley Bay, Rosario Beach, Tosi Pt. and Guemes Channel; hermit crab of tide pools and rock beaches; common.

Remarks.--Pagurus hirsutiusculus is rather easily distinguished by the acute median tooth, carapace with anterior part wider than long and the four red longitudinal stripes laterally, dorsally and ventrally on the dactyls of the ambulatory legs. The entire crab is hairy.

Pagurus granosimanus (Stimpson)

Plate III, fig. 2

Eupagurus granosimanus Stimpson, Ann. Lyc. Nat. Hist. N. Y., 7:90, 1859 (1860).

Pagurus granosimanus Holmes, Occas. Papers Calif. Acad. Sci., 7:146, 1900.

Description.--Carapace with anterior portion a little longer than wide; median tooth blunt and lateral teeth rounded. Antennal acicle shorter than eye stalk; antennal peduncle very little longer than eye stalk. Eye stalks of moderate length and stoutness. Large cheliped granulate; granules along lateral edges tending toward spines; granulate on both upper and lower surfaces of large chela; outer lower angle of small chela rounded and not angled;

two large tubercles on ventral surface of merus of large cheliped equal or with the inner tubercle the larger. Ambulatory legs somewhat hairy; little if any longer than chelipeds.

Color.--Tan or olive brown; granules white but tending to be bluish toward distal end of cheliped; spots of white or bluish on ambulatory legs with tufts of hair arising just in front of each spot.

Dimensions.--Anterior portion of carapace 6 mm. long; large chela 9 mm. long.

Range.--Unalaska to Lower California; low tide to 15 fathoms (Rathbun, 1904).

Specimens Collected.--Ten specimens collected and examined from Ship Harbor, Shannon Pt., Alexander Beach and Langley Bay; along rocky shores and in tide pools; common.

Comparisons.--Pagurus granosimanus and Pagurus beringanus are similar and may prove difficult to differentiate. P. granosimanus may be separated from P. beringanus by the following points: Granules are present both above and below on chelae, two tubercles on ventral surface of merus of cheliped are about same size or inner one larger and outer lower edge of small chela is rounded.

Pagurus tenuimanus (Dana)

Plate III, fig. 3

Bernhardus tenuimanus Dana, Proc. Acad. Nat. Sci.  
Phila., p. 269, 1851.

Eupagurus tenuimanus Stimpson, Jour. Bost. Soc. Nat.  
Hist., 6:483, 1857.

Pagurus tenuimanus Holmes, Occas. Papers Calif. Acad.  
Sci., 7:148, 1900.

Description.--Carapace with anterior portion as long as wide; median tooth acute; lateral teeth terminating in a spine and nearly as long as median tooth. Antennal acicle longer than eye stalk; peduncle longer than eye stalk by approximately one half the length of the last segment of the peduncle. Eye stalks stout; about half the length of the anterior portion of the carapace. Large cheliped with wide flattened chela the lateral margins of which are attenuated into thin plates; chela approximately as broad as long; small chela with lateral edges turned upward. Ambulatory legs not hairy or only slightly hairy; carpus and propodus spiny on dorsal edge; dactyls with a longitudinal groove on each side.

Color.--Brown or red brown; merus of both chelipeds blue on dorsal surface; ambulatory legs striped and dotted with bright red.

Dimensions.--Anterior portion of carapace 18 mm. long; large chela 25 mm. long.

Range.--Aleutian Islands to Puget Sound; low tide to 123 fathoms (Rathbun, 1904).

Specimens Collected.--Twelve specimens collected and examined from Shannon Pt., Burrows Bay and Guemes Channel; six to 15 fathoms; common.

Remarks.--Pagurus tenuimanus has a characteristic broad, flat, large chela which is much wider than the carpus. The upturned edges of the small chela are also characteristic.

Pagurus gilli (Benedict)

Plate III, fig. 4

Eupagurus gilli Benedict, Proc. U. S. Nat. Mus.,  
15:20, 1892.

Pagurus gilli Rathbun, Harriman Alaska Exped.,  
10:161, 1904.

Description.--Carapace with anterior portion smooth and nearly as wide as long; median and lateral teeth about equal in length. Antennal acicle not exceeding the eye stalk in length. Eye stalks slender and about half as long as anterior portion of carapace. Large cheliped with merus short; carpus wider than long and lateral edges produced into thin plates; chela twice as long as wide and much narrower than carpus; both carpus and chela smooth; small cheliped with flattened elongated carpus; the chela much flattened; chelipeds unequal. Ambulatory

legs with wide dactyls and inner surface concave and spinulose.

Color.--Orange to red; fingers and margins of large chela white; small white pits on small chela and on first three segments of ambulatory legs.

Dimensions.--Anterior portion of carapace 16 mm. long; large chela 22 mm. long (Stevens, 1925).

Range.--Bering Sea to Puget Sound; low water to 60 fathoms (Rathbun, 1904).

Specimens Collected.--None collected locally; not common.

Remarks.--Pagurus gilli is distinctive because the carpus of the large cheliped is much wider than the chela. Both chela and carpus are smooth. The small chela is flattened. The young lack the flattened edges of the carpus of the large cheliped and the chela may be wider than the carpus. The small chela, however, is always characteristic.

Pagurus splendescens (Owen)

Plate IV, fig. 1

Pagurus splendescens Owen, Zool. Beechey's Voy.,  
p. 81-82, 1839.

Eupagurus splendescens Calman, Ann. N. Y. Acad. Sci.,  
(13), 9:260, 1898.

Pagurus splendescens Rathbun, Harriman Alaska Exped.,

10:161, 1904.

Description.--Carapace with anterior portion rough, hard and broader than long; median tooth large and reaching almost to middle of eye stalks; antero-lateral edges of anterior portion of carapace spiny. Antennal acicle longer than eye stalk by one fourth to one half its length. Eye stalks stout and about half as long as anterior portion of carapace. Large cheliped slender and spiny; small cheliped long and slender and fingers curved down and much longer than palm. Ambulatory legs long and slender; the dactyls, propodi and meri all about equal in length.

Color.--Wine to red brown; tubercles dark; metallic iridescence on chelipeds and ambulatory legs.

Dimensions.--Anterior portion of carapace 7 mm. long; large chela 11 mm. long.

Range.--Arctic Alaska to Washington; below low water to 225 fathoms (Rathbun, 1904).

Specimens Collected.--Three specimens collected and examined from between Lummi Island and Eliza Island and in East Sound, Orcas Island; 20 fathoms; not common.

Remarks.--Pagurus splendescens is an unusual hermit crab because of the large median tooth, hard anterior portion of carapace, long slender chelipeds and ambulatory legs and long fingers on the small chela.

Genus Paguristes DanaPaguristes turgidus (Stimpson)

Plate IV, fig. 2

Eupagurus turgidus Stimpson, Jour. Bost. Soc. Nat.

Hist., 6:484, 1857.

Clibanarius turgidus Stimpson, Jour. Bost. Soc. Nat.

Hist., 6:86, 1857.

Paguristes turgidus Stimpson, Proc. Acad. Nat. Sci.

Phila., p. 236, 1858.

Description.--Carapace with anterior portion longer than wide; median and lateral teeth subequal and somewhat prominent. Antennae short. Eye stalks slender and about half as long as anterior portion of carapace. Chelipeds equal or left one slightly longer; hairy and spiny; fingers toothed. Ambulatory legs hairy; dactyls slightly longer than propodi.

Color.--Pink buff to brown; eye stalks, antennules and antennae streaked longitudinally with brown.

Dimensions.--Anterior portion of carapace 17 mm. long; large chela 11 mm. long (Stevens, 1925).

Range.--British Columbia to southern California (Rathbun, 1904); 14 (Stevens, 1925) to 254 fathoms (Schmitt, 1921).

Specimens Collected.--None collected locally; not common.



Remarks.--Paguristes turgidus is immediately distinguished from other hermit crabs by the equal chelipeds and the antennae shorter than the chelipeds.

Genus Orthopagurus Stevens

Orthopagurus schmitti (Stevens)

Plate IV, fig. 3

Pylopagurus schmitti Stevens, Pub. Puget Sound Biol. Sta., 3:297-299, 1925.

Orthopagurus schmitti Stevens, Pub. Puget Sound Biol. Sta., 5:245-252, 1927.

Description.--Carapace with anterior portion slightly longer than wide; a prominent acute median tooth. Antennal acicle not as long as eye stalk; Eye stalks swollen at base. Large cheliped hairy; merus compressed; carpus widening distally; carpus and palm with spines on inner surfaces or margins; chela quite flattened. Ambulatory legs hairy, compressed and slender; dactyls curved and about same length as propodi. Abdomen uncoiled.

Color.--Pink to white and with irregular spots and bands of orange cinnamon; fingers tipped with orange.

Dimensions.--Total length 34 mm.

Range.--Puget Sound; three to 89 fathoms (Stevens, 1927).

Specimens Collected.--None collected locally; lives in tubes of tube worms; not common.

Remarks.--Orthopagurus schmitti has an unusual habitat in the tubes of tube worms and this habitat results in an uncoiled abdomen.

Family Lithodidae

Carapace all hard or firm; first pair of legs chelate; second, third and fourth pairs alike; fifth pair rudimentary and folded under carapace; abdomen all or partly hard, all or partly segmented and folded under thorax; uropods and tail-fan absent.

Genus Hapalogaster Brandt

Hapalogaster mertensii Brandt

Plate V, fig. 1

Hapalogaster mertensii Brandt, Bull. Phys. Math. Acad.

Imp. Sci. St. Petersb. Vol. 7, 1849.

Description.--Carapace triangular or heart shaped if anterior end is facing toward observer; covered with tufts of stiff bristles; lateral teeth becoming larger toward anterior end. Rostrum consists of one sharp spine not quite as long as eye stalks. Antennae longer than the length of the carapace; alternating dark and light bands on antennae and setae arising from the light bands. Eye stalks long and nearly covered with bristles dorsally; smooth ventrally. Chelipeds covered with long spines and a long tuft of bristles arising from each spine; inner and

lower surfaces smooth and with few hairs; chelae long and covered with spines and bristles except the inner and lower surfaces; fingers with bristles but with the bristles gradually disappearing toward the ends; pollex with row of teeth along outer edge and continuing around end of pollex to inner edge to somewhat resemble the lower jaw of an ungulate. Ambulatory legs with spines and bristles; corneous tips on dactyls strongly falcate. Abdomen soft and sac-like.

Color.--Dorsal surface tan due to color of numerous bristles and hairs but true color of crab as seen on under surface of chelipeds and body ranges from red to red brown.

Dimensions.--Carapace 25 mm. long and 26 mm. wide.

Range.--Aleutian Islands to Puget Sound; low tide to 19 fathoms (Rathbun, 1904).

Specimens Collected.--Seven specimens collected and examined from Shannon Pt. and Reef Pt.; under rocks and boulders; not common.

Remarks.--Hapalogaster mertensii has tufts of hair on the carapace and arising from large spines on the ambulatory legs and chelipeds; rostrum styliform.

Genus Oedignathus Benedict

Oedignathus inermis (Stimpson)

Plate V, fig. 2

Hapalogaster inermis Stimpson, Ann. Lyc. Nat. Hist.

N. Y., 7:243, 1860 (1862).

Hapalogaster Brandti Schalfeew, Mel. Biol., 13:330,  
of the Bull. Acad. Imp. Sci. St. Petersb.,  
35:336, 1892.

Oedignathus gilli Benedict, Proc. U. S. Nat. Mus.,  
17:487, 1894.

Oedignathus inermis Holmes, Occas. Papers Calif. Acad.  
Sci., 7:119, 1900.

Oedignathus brandti Holmes, Occas. Papers Calif. Acad.  
Sci., 7:118, 1900.

Oedignathus inermis Rathbun, Harriman Alaska Exped.,  
10:163, 1904.

Dermaturus inermis Balss, Abh. der k. Bayer. Akad.  
Wiss., II, Math.-phys. Klasse, Suppl., 9 Abh.,  
p. 71, 1913.

Oedignathus inermis Schmitt, Univ. Calif. Pub. Zoo.,  
23:151, 1921.

Description.---Carapace covered with scales the anterior edges of which bear setose spines; two blunt postorbital teeth; triangular notch in posterior edge. Rostrum consists of one stout median spine. Antennae no longer than length of carapace; antennal acicle arcuate, blunt and spiny. Eye stalks protruding obliquely and setose. Chelipeds unequal. Large cheliped rough and granulate; large blunt spines on anterior angle of merus and carpus; small cheliped not so rough and more setose. Fingers

excavated on inner edge and corneous tipped. Ambulatory legs rough and setose; dactyls shorter than propodi or carpi; corneous tips of dactyls strongly falcate. Abdomen round and sac-like.

Color.--Red to brown; granules and fingers of large chela lighter colored.

Dimensions.--Carapace 25 mm. long and 23 mm. wide.

Range.--Unalaska to Pacific Grove, California (Rathbun, 1904); low tide.

Specimens Collected.--One found in dead barnacle on rocks near entrance to Alert Bay, Lopez Island; rare.

Remarks.--Oedignathus inermis has very unequal chelipeds; setose scales on the carapace, large spines on the anterior edge of merus and carpus of large cheliped and one blunt spine for a rostrum.

Genus Acantholithodes Holmes

Acantholithodes hispidus (Stimpson)

Plate VI, fig. 1

Dermaturus hispidus Stimpson, Ann. Lyc. Nat. Hist.  
N. Y., 7:242, 1860.

Acantholithodes hispidus Holmes, Proc. Calif. Acad.  
Sci., (2), 4:575, 1895.

Description.--Carapace flattened and covered with setose spines; spines becoming larger toward margins; anterior portion of carapace divided from posterior by

transverse groove. Rostrum terminating in three spines with a fourth one above the median spine. Antennae not as long as the length of the carapace; basal segment with opposing spines; second segment modified into a long pointed projection with spines along the outer margin; acicle long, slender and armed with spines. Eye stalks with bristles. Chelipeds unequal; two or three large spines on anterior edge of merus and carpus; fingers shorter than palm. Ambulatory legs spiny; dactyls not as long as propodi. Abdomen broad and soft.

Color.--Light brown or tan.

Dimensions.--Carapace 58 mm. long and 58 mm. wide.

(Holmes, 1900).

Range.--British Columbia to Monterey, California (Rathbun, 1904); to depth of 73 fathoms (Schmitt, 1921).

Specimens Collected.--None collected locally; rare.

Remarks.--Acantholithodes hispidus has slender setose spines on carapace, rostrum three pronged, second segment of antenna modified into long spiny process, large spines on anterior edge of merus and carpus of chelipeds, unequal chelipeds and soft abdomen which identify it.

Genus Phyllolithodes Brandt

Phyllolithodes papillosus Brandt

Plate VI, fig. 2

Phyllolithodes papillosus Brandt, Bull. Phys. Math.

Acad. Imp. Sci. St. Petersburg., 7:175, 1849.

Description.--Carapace triangular, uneven; two large deep pits on dorsal surface; antero-lateral and postero-lateral margins of carapace with slender and blunt spines. Rostrum consisting of two blunt diverging horns; two lobed crest on upper surface of rostrum; down curved spiny projection on under surface of rostrum. Antennal acicles with three plate-like processes. Chelipeds unequal and covered with long blunt flattened spines; spines becoming smaller toward upper and lower edges of chela. Ambulatory legs also covered with spines similar to those on chelipeds.

Dimensions.--Carapace 52 mm. long and 51 mm. wide (Way, 1917).

Range.--Unalaska to Monterey, California; low tide (Way, 1917) to 16 fathoms (Rathbun, 1904).

Specimens Collected.--None found locally; rocky shores and bottoms; rare.

Remarks.--Phyllolithodes papillosus is distinctive because of the triangular shape of the carapace, the large deep pits on the carapace, the long flattened spines on the ambulatory legs and the bilobed rostrum with a crest.

Genus Cryptolithodes Brandt

1a. Rostrum widening distally. Cryptolithodes sitchensis

page 38

lb. Rostrum not widening distally. Cryptolithodes typicus  
page 37

Cryptolithodes typicus Brandt

Plate VII, fig. 1

Cryptolithodes typicus Brandt, Bull. Phys. Math.

Acad. Imp. Sci. St. Petersb., 7:185, 1849;

11:254, 1853.

Description.--Carapace uneven and often serrated on lateral edge; lateral edge extended out beyond the body and covering the legs. Rostrum broad, square and turned down; lateral sides parallel; median ridge arising at base of rostrum and continuing toward the posterior of the carapace. Antennae short and the acicles very broad and leaf-like. Eye stalks long and turned upward. Chelipeds stout; chelae roughened and with carina on palm and dactyl. Ambulatory legs rough; the last pair folded into branchial chamber.

Color.--Red brown dorsally and lighter ventrally.

Dimensions.--Carapace 43 mm. long and 52 mm. wide (Way, 1917).

Range.--Alaska to Monterey, California (Rathbun, 1904); low tide to seven fathoms (Way, 1917).

Specimens Collected.--One specimen collected and examined from Rosario Beach; rock or sand habitat; uncommon.

Comparisons.--Cryptolithodes typicus is definitely



unmistakable for any other crab except Cryptolithodes sitchensis but may be separated from it by the fact that the rostrum does not widen distally.

Cryptolithodes sitchensis Brandt

Plate VII, fig. 2

Cryptolithodes sitchensis Brandt, Bull. Phys. Math.

Acad. Imp. Sci. St. Petersburg., 11:254, 1853.

Description.--Carapace oval and uneven, extending out beyond and covering the legs; blunt tubercles along antero-lateral margin. Rostrum widening distally and with small median tooth; median ridge arising on rostrum and continuing toward posterior region of carapace. Antennae short and with large leaf-like antennal acicles. Eye stalks small, curved upward and swollen at the bases. Chelipeds smooth; chelae smooth but with one low longitudinal ridge near middle of outer surface; carina on dorsal edge of palm and dactyl. Ambulatory legs ridged.

Color.--Usually red; lower surface of carapace and body light red or tan.

Dimensions.--Carapace 64 mm. long and 108 mm. wide.

Range.--Sitka, Alaska, to Pacific Grove, California (Rathbun, 1904); low tide (Queen, 1930).

Specimens Collected.--One specimen collected and examined from Watmough Bight, Lopez Island; coarse gravel or rock habitat; low tide; rare.

Comparisons.--Cryptolithodes sitchensis can be confused with only Cryptolithodes typicus. The distally widening rostrum and the smooth chelae serve to distinguish it from C. typicus.

Genus Lopholithodes Brandt

- 1a. Foramen between the merus of cheliped and first ambulatory leg when cheliped and first ambulatory leg are held against body. Lopholithodes foraminatus page 40
- 1b. No foramen between merus of cheliped and first ambulatory leg. Lopholithodes mandtii page 39

Lopholithodes mandtii Brandt

Plate VIII, fig. 1

Lopholithodes mandtii Brandt, Bull. Phys. Math.

Acad. Imp. Sci. St. Petersb., 7:174, 1849.

Echinocerus cibarius White, Proc. Zool. Soc. London, p. 47, 1848.

Lopholithodes mandtii Holmes, Occas. Papers Calif.

Acad. Sci., 7:128, 1900.

Description.--Carapace wider than long; very rough and covered with tubercles and large bumps. Rostrum consists of one large spine with several smaller spines above at its base. Antennae short. Eye stalks with spines. Chelipeds short and stout; merus and carpus with inward pointing projections; chelae with stout spines dorsally.

Ambulatory legs armed with heavy projections dorsally; the fifth ambulatory leg rudimentary and folded in the branchial chamber.

Color.--Bright red to orange; spines tipped with orange or purple.

Dimensions.--Carapace 220 mm. long and 260 mm. wide (Way, 1917).

Range.--Sitka, Alaska, to Monterey, California (Rathbun, 1904); low tide to nine fathoms (Way, 1917).

Specimens Collected.--None found locally; rare.

Comparisons.--Lopholithodes mandtii is not likely to be confused with any other crab except Lopholithodes foraminatus but is different from L. foraminatus by the lack of the foramen when the chelipeds and first ambulatory legs are folded next to the body.

Lopholithodes foraminatus (Stimpson)

Plate VIII, fig. 2

Echinocerus foraminatus Stimpson, Ann. Lyc. Nat. Hist. N. Y., 7:79, 1859 (1862).

Lopholithodes foraminatus Holmes, Occas. Papers Calif. Acad. Sci., 7:130, 1900.

Description.--Carapace roughly oval, tuberculate and uneven; spines along all margins of carapace. Rostrum a short median spine with a cluster of spines above at its base. Antennae short. Chelipeds tuberculate; chelae

with heavy tubercles dorsally; carpus with large circular depression on outer edge. Ambulatory legs short, stout; carpus of first ambulatory leg with circular depression which when adjacent to the carpus of cheliped forms a foramen.

Color.--Red with patches of purple and orange.

Dimensions.--Carapace approximately 215 mm. long and 132 mm. wide (Schmitt, 1921).

Range.--Vancouver Island, British Columbia, to southern California; low tide to 299 fathoms (Schmitt, 1921).

Specimens Collected.--None found locally; rocks or sand; rare.

Remarks.--Lopholithodes foraminatus is so called because of the large opening or foramen that is formed when the chelipeds and first ambulatory legs are folded together and against the body. Semicircular depressions on the carpus of the cheliped and first ambulatory leg match to form the opening.

Genus Rhinolithodes Brandt

Rhinolithodes wosnessenskii Brandt

Plate IX, fig. 1

Rhinolithodes wosnesenskii [sic] Brandt, Bull. Phys.

Math. Acad. Imp. Sci. St. Petersburg., 7:174, 1849.

Rhinolithodes wosnessenskii Newcombe, Bull. Nat. Hist.

Soc. Brit. Col., p. 28, 1893.

Description.--Carapace triangular and rough; very large horseshoe-shaped groove in posterior portion of carapace. Rostrum short and blunt. Antennal acicle spurred; antennae long. Eye stalks also spurred on dorsal surface. Chelipeds stout and strong and covered with reddish hair; merus with a pair of spines diverging distally; carpus with one strong spine; dactyls hooked.

Color.--Gray or tan; orange on posterior region of carapace and abdomen.

Dimensions.--Carapace 42.4 mm. long and 48.7 mm. wide (Schmitt, 1921).

Range.--Kodiak, Alaska, to Monterey, California (Rathbun, 1904); rock or shell bottoms to a depth of 40 fathoms (Way, 1917).

Specimens Collected.--None collected locally; rare.

Remarks.--Rhinolithodes wosnessenskii is a distinctive crab. The triangular body with the very deep semicircular sulcus in the posterior half of the carapace makes it impossible to mistake it for any other crab. The ambulatory legs are covered with coarse spines and hair.

## Family Galatheididae

First pair of legs chelate, greatly elongated and slender; second, third and fourth pairs of legs alike; fifth pair rudimentary; antennae long and the peduncle four jointed; abdomen bent but not folded against thorax; tail-fan well developed and adapted for swimming. The over-all appearance is shrimp-like.

Genus Munida LeachMunida quadrispina Benedict

Plate IV, fig. 4

Munida quadrispina Benedict, Proc. U. S. Nat. Mus.,  
26:269, 1902.

Description.--Carapace oval, wrinkled, convex and set with rows of thick short hairs; lateral margins spiny. Rostrum a long slender needle-like spine. Antennae long but no longer than chelipeds. Eye stalks dilated distally and large; supraorbital spines at base of rostrum united to rostrum for nearly half their length. Chelipeds long, rough and spiny; very slender; fingers long. Ambulatory legs not as long as chelipeds; propodi longer than dactyls. Abdomen not folded under thorax; telson and uropods well developed.

Dimensions.--Total length 42 mm.

Range.--Sitka, Alaska, to Lower California; 40

(Way, 1917) to 638 fathoms (Schmitt, 1921).

Specimens Collected.--None collected locally; shells and coarse gravel bottoms; not common.

Remarks.--Munida quadrispina cannot be confused with any other crab because of its unflexed abdomen, well developed tail-fan, styliform rostrum and long slender chelipeds.

#### Family Porcellanidae

Carapace oval; antennae long; first pair of legs stoutly chelate; second, third and fourth pairs alike; fifth pair rudimentary and folded over carapace; abdomen folded under thorax; tail-fan well developed.

#### Genus Petrolisthes Stimpson

#### Petrolisthes eriomerus Stimpson

Plate IX, fig. 2

Petrolisthes eriomerus Stimpson, Ann. Lyc. Nat. Hist. N. Y., 10:119, 1871.

Description.--Carapace flattened and somewhat smooth; a little longer than broad. Rostrum triangular and the apex bent slightly downward and with a shallow median groove. Antennae equal to or exceeding the length of the chelipeds; without setae; finely annulated with darker color. Eye stalks stout. Chelipeds large, rough and flattened dorsally; carpus twice as long as wide; chelae

rough, flattened and large; fingers hooked on the ends; fine hair growing ventrally around base of fingers. Ambulatory legs hairy; last pair rudimentary and folded over carapace.

Color.--Usually red brown to blue; two bluish or white spots on the branchial region of the carapace; antennules often bright blue; walking legs banded with gray.

Dimensions.--Carapace 14 mm. long and 14 mm. wide.

Range.--British Columbia to Lower California (Schmitt, 1921); low tide to 25 fathoms (Way, 1917).

Specimens Collected.--Thirty one specimens collected and examined from Shannon Pt., Anico Beach, Rosario Beach and most areas where rocks are lying in sand and broken shells; common.

Remarks.--Petrolisthes eriomerus has the following notable characteristics: flattened carapace and chelae, large chelipeds, carpus of cheliped twice as long as wide and rudimentary fifth legs folded over carapace.

Genus Pachycheles Stimpson

Pachycheles rudis Stimpson

Plate IX, fig. 3

Pachycheles rudis Stimpson, Ann. Lyc. Nat. Hist.

N. Y., 7:76, 1859 (1860).

Description.--Carapace convex longitudinally, smooth



and slightly broader than long. Rostrum short and blunt. Antennae long but tapering to a fine end. Eye stalks short and stout. Chelipeds massive, unequal; the dorsal surface covered with rough tubercles and not flattened. Ambulatory legs short and covered with long light-colored hair.

Color.--Brown but finely streaked with white on the carapace.

Dimensions.--Carapace 10.9 mm. long and 11.7 mm. wide (Schmitt, 1921).

Range.--British Columbia (Rathbun, 1904) to Lower California (Lockington, 1878); low tide.

Specimens Collected.--None found locally; in and under rocks; rare.

Comparisons.--Pachycheles rudis is somewhat like Petrolisthes eriomerus but has more massive chelipeds and the carpus of the cheliped is not twice as long as broad. The cheliped is also much roughened with tubercles. Long hair is present on the ambulatory legs.

#### Family Majidae

Carapace often roughly triangular in shape; basal antennal segment enlarged, usually fused with the epistome and often with the front; orbits usually incomplete; chelipeds often no larger than other legs; ambulatory legs slender.

Genus Oregonia DanaOregonia gracilis Dana

Plate X, fig. 1

Oregonia gracilis Dana, Amer. Jour. Sci., (2), 11:  
270, 1851.

Description.--Female; carapace triangular, uneven and with hooked setae; one prominent slender postorbital spine. Rostrum long and consisting of two undivided spines except in old specimens; spine projecting downward from base of rostrum between antennules. Antennae arising just in front of eye orbit twice or more times the length of the rostrum. Eye stalks slender and extending laterally from rostrum. Chelipeds hairy and slender; merus and chelae long. Ambulatory legs hairy and slender; dactyl and carpus about equal in length; propodus longer than dactyl. Male; males differ from females by longer more slender legs, narrower body and longer rostrum.

Color.--Light brown or tan; usually covered with algae, bryozoa and mud.

Dimensions.--Carapace 44 mm. long and 24 mm. wide.

Range.--Bering Sea to Monterey Bay, California; low tide to 212 fathoms (Rathbun, 1925).

Specimens Collected.--Seventy nine specimens collected and examined from Shannon Pt., Burrows Bay, Rosario Beach, Anacortes pilings and Guemes Channel; rocky beaches and

muddy bottoms; five to 20 fathoms; common.

Remarks.--Oregonia gracilis is distinguished by the long adherent rostral horns, the long slender postorbital spines, the absence of spines or tubercles on the carapace and the sharp spine between the antennules on the ventral surface of the rostrum.

Genus Pugettia Dana

- 1a. Carapace smooth. Pugettia producta page 48  
 1b. Carapace not smooth..... 2  
 2a. Posterior edge of postorbital lateral extension nearly transverse; merus of cheliped without dorsal carina. Pugettia richii page 51  
 2b. Posterior edge of postorbital lateral extension nearly longitudinal; merus of cheliped with dorsal carina. Pugettia gracilis page 49

Pugettia producta (Randall)

Plate X, fig. 2

Epialtus productus Randall, Jour. Acad. Nat. Sci. Phila., 8:110, 1839.

Pugettia producta Rathbun, Bull. U. S. Nat. Mus., 129:167, 1925.

Description.--Carapace smooth and shield-shaped; three spines including the postorbital on lateral margins. Rostrum about as long as wide and bifid. Antennae very short, hardly longer than the rostral prongs. Eyes

extended laterally and produced little beyond edge of rostrum. Chelipeds slender and not as long as first pair of walking legs; chelae slender and compressed; fingers slender and finely toothed in all except old males. Ambulatory legs smooth and not hairy; dactyls not as long as the propodi.

Color.--Light tan to rich red brown.

Dimensions.--Carapace 81 mm. long and 62 mm. wide.

Range.--British Columbia to Lower California (Rathbun, 1925); low tide to 40 fathoms (Way, 1917).

Specimens Collected.--Fifteen specimens collected and examined from Ship Harbor, Green Pt., Anico Beach, Alexander Beach, Langley Bay and Rosario Beach; eel grass and algae; common.

Comparisons.--Pugettia producta cannot be confused with any other local crabs except Pugettia gracilis and Pugettia richii but the smooth shield-shaped carapace and the converging outer edges of the rostrum differentiate it from these two.

Pugettia gracilis Dana

Plate X, fig. 3

Pugettia gracilis Dana, Amer. Jour. Sci., (2), 11:  
268, 1851.

Description.--Carapace with uneven surface; hooked setae on hepatic region of carapace; three teeth including

the postorbital tooth on lateral margins; the first two teeth joined and the second tooth much the larger. Rostrum with hooked setae on rostral horns; rostral horns with outer edge parallel and inner edge diverging. Preorbital spines pointed upward, forward and outward. Antennae little longer than rostrum and consisting mostly of peduncle. Eyes small and extended laterally little beyond edge of rostrum. Chelipeds slender but powerful; merus rough and ridged; chelae slender and compressed; fingers toothed. Ambulatory legs slender and smooth; stiff hairs on under surface of dactyls.

Color.--Tan or brown; often bright red color on the chelipeds.

Dimensions.--Carapace 47 mm. long and 34 mm. wide.

Range.--Aleutian Islands to central California; low tide to 40 fathoms (Rathbun, 1925).

Specimens Collected.--Ninety four specimens collected and examined from Ship Harbor, Shannon Pt., Green Pt., Burrows Bay, Anico Beach, Alexander Beach, Langley Bay, Rosario Beach and Guemes Channel; eel grass and sea weeds; low tide to 40 fathoms; common.

Comparisons.--Pugettia gracilis is the common kelp crab and much more numerous than the other local species of Pugettia. The dorsal carina on the merus of the cheliped and the almost parallel posterior edges of the second postorbital spines separate it from Pugettia richii. The

diverging rostral horns separate it from Hyas lyratus.

Pugettia richii Dana

Plate XI, fig. 1

Pugettia richii Dana, Amer. Jour. Sci., (2), 11:268,  
1851.

Description.--Carapace oval and tuberculate; two rows of hooked setae on anterior part of carapace. Rostrum of two diverging horns; hair between the horns; two rows of hooked setae on rostral horns. Antennae little longer than rostral horns. Eye stalks short; preorbital and post-orbital spines present. Chelipeds large in males and slender and short in females; merus with a few tubercles on dorsal edge; chelae compressed. Ambulatory legs with falcate dactyls.

Color.--Pink to red brown.

Dimensions.--Carapace 48.7 mm. long and 36 mm. wide (Schmitt, 1921).

Range.--British Columbia to southern California (Rathbun, 1925); low tide to 50 fathoms (Rathbun, 1925).

Specimens Collected.--Pugettia richii has not been collected locally; unprotected outer coast; not common.

Comparisons.--Pugettia richii is very similar to Pugettia gracilis but may be distinguished from P. gracilis by the following characteristics: the second postorbital teeth more distinct and posterior edges more nearly

transverse, the carina on the merus of the chelipeds mostly absent and without grooved external maxilliped.

Genus Chorilia Dana

Chorilia longipes Dana

Plate XI, fig. 2

Chorilia longipes Dana, Amer. Jour. Sci., (2), 11: 269, 1851.

Hyastenus longipes Rathbun, Proc. U. S. Nat. Mus., 16:85, 1893.

Hyastenus (Chorilia) longipes Holmes, Occas. Papers Calif. Acad. Sci., 7:33, 1900.

Chorilia longipes Rathbun, Harriman Alaska Exped., 10:174, 1904.

Description.--Carapace triangular and covered with spines and hairs; postorbital and preorbital spines present. Rostrum of two long divergent horns. Antenna with a slender spine on the basal segment. Eyes protruding laterally and slender; a few minute spinules at base of eye stalks. Cheliped with tubercles on merus and on outer side of carpus; chelae slender and compressed; fingers slender. Ambulatory legs slender and dactyls long and straight.

Dimensions.--Carapace 40.2 mm. long and 21.2 mm. wide (Schmitt, 1921).

Range.--Kodiak, Alaska, to Monterey Bay, California;

18 to 650 fathoms (Rathbun, 1925).

Specimens Collected.--None collected locally; rare.

Comparisons.--Chorilia longipes and Oregonia gracilis are similar in shape and outline but the diverging rostral horns and the spines and tubercles on the carapace of C. longipes quickly separate it from O. gracilis.

Genus Chionoecetes Kroyer

Chionoecetes bairdi Rathbun

Plate XI, fig. 3

Chionoecetes opilio Rathbun, Proc. U. S. Nat. Mus.,  
16:74, 1893. (part)

Chionoecetes tanneri Way, Pub. Puget Sound Biol. Sta.,  
(30), 1:372, 1917. (Not C. tanneri Rathbun, 1893)

Chionoecetes bairdi Rathbun, Bull. U. S. Nat. Mus.,  
129: 235, 1925.

Description.--Carapace suboval, tuberculate; lateral margins spiny. Rostrum short, bifid. Antennae very short, projecting slightly beyond rostrum. Eyes large, protected by large postorbital spine. Chelipeds rough and with row of spines on inner edge of merus; chelae slender and tuberculate; fingers twice as long as carpus; curved downward and inward. Ambulatory legs long and becoming flattened distally; antero-ventral edge of merus spiny.

Color.--Dark gray with red tubercles on carapace and legs.



Dimensions.--Carapace 35 mm. long and 40 mm. wide.

Range.--Bering Sea to Puget Sound; nine fathoms to 259 fathoms (Rathbun, 1925).

Specimens Collected.--Three specimens collected and examined from East Sound, Orcas Island; nine fathoms; not common.

Remarks.--Chionoecetes bairdi has longer fingers in comparison to the size of the chela than any other local brachyuran and this along with the long slender ambulatory legs and nearly oval body sets it apart from other crabs. This crab has long been mistaken for Chionoecetes tanneri. Previous records of C. tanneri in Puget Sound are undoubtedly incorrect and referable to C. bairdi.

Genus Hyas Leach

Hyas lyratus Dana

Plate XII, fig. 1

Hyas lyratus Dana, Amer. Jour. Sci., (2), 11:269, 1851.

Description.--Carapace tuberculate, uneven; two spines on antero-lateral margin back of eye united and forming flat expansion. Rostrum bifid and extreme tips of horns curved inward. Antennae little longer than rostral horns or as long. Eye stalks swollen at base. Calcareous knob on ventral rim of eye orbit. Chelipeds tuberculate and rough; merus four sided; chelae and fingers slender.

Ambulatory legs with fine hair.

Color.--Light brown to gray.

Dimensions.--Carapace 67 mm. long and 50 mm. wide.

Range.--Bering Sea to Puget Sound; five to 350 fathoms (Rathbun, 1925).

Specimens Collected.--Twenty six specimens collected and examined from Burrows Bay and Guemes Channel; mud or sand bottom; low tide to 20 fathoms; common.

Comparisons.--Hyas lyratus resembles crabs of the genus Pugettia in that it has lateral postorbital expansions but is different from them in the knob on the ventral rim of the orbit, convergent rostral horns and the rough tuberculate carapace.

Genus Scyra Dana

Scyra acutifrons Dana

Plate XII, fig. 2

Scyra acutifrons Dana, Amer. Jour. Sci., (2), 11: 269, 1851.

Description.--Carapace pyriform and surface very uneven and irregular; two slender patches of curved setae on anterior part of carapace. Rostrum bifid, flattened and with the points diverging. Antennae a little longer than rostral horns. Eyes small and extended laterally. Chelipeds slender; lower surface of merus flattened; chelae slender and compressed; fingers with fine

serrations and curved inward. Ambulatory legs hairy; dactyls shorter than propodi.

Color.--Brown to red; chelipeds and ambulatory legs usually red.

Dimensions.--Carapace 33 mm. long and 22 mm. wide.

Range.--Kodiak, Alaska, to San Diego, California; low tide to 45 fathoms (Rathbun, 1925).

Specimens Collected.--Seven specimens collected and examined from Shannon Pt., Bellingham Channel and Burrows Bay; rock, sand or shell bottoms; low tide to 20 fathoms; not common.

Remarks.--Scyra acutifrons has a pyriform body and an absence of postorbital expansions or spines. Posterior to the eye is a socket into which the eye fits; rostrum diverging.

#### Family Atelecyclidae

Carapace subcircular; front with several teeth and either a median tooth or a median notch; antennal flagella long and hairy, rudimentary or wanting; antennules folded longitudinally.

#### Genus Telmessus White

#### Telmessus cheiragonus (Tilesius)

Plate XII, fig. 3

Cancer cheiragonus Tilesius, Mém. Acad. Imp. Sci. St.

Petersb. 5:347, 1812 (1815).

Telmessus serratus White, Ann. Nat. Hist., 17:497,  
1846.

Platycorystes ambiguus Brandt, Bull. Phys. Math. Acad.  
Imp. Sci. St. Petersb. 7:179, 1848.

Platycorystes cheiragonus Brandt, Middendorff's  
Sibir. Reise, pt. 1, 2:85, 1851.

Cheiragonus hippocarcinoides Brandt, Middendorff's  
Sibir. Reise, pt. 1, 2:147, 1851, substi-  
tuted for Platycorystes cheiragonus.

Telmessus cheiragonus Benedict, Proc. U. S. Nat. Mus.,  
15:224, 1892.

Cheiragonus cheiragonus Ortmann, Zool. Jahrb., Syst.,  
7:420, 1894.

Telmessus cheiragonus Holmes, Occas. Papers Calif.  
Acad. Sci., 7:69, 1900.

Description.--Carapace diamond-shaped; six large teeth on each lateral margin; large teeth in turn toothed with smaller teeth; surface of carapace uneven and covered with rows of stiff hair. Rostrum slight; four subequal teeth between antennae divided into two groups by a deep notch. Antennae a little more than half the width of the carapace in the orbital region; laterally opposed rows of orbital teeth large. Chelipeds hairy and rough; large anterior pointing spine on the inner edge of the carpus; chelae with six rows of spines on the dorsal surface; fingers strongly

toothed and ridged. Ambulatory legs with strongly grooved dactyls.

Color.--Usually light brown or tan; fingers with blue or dark color.

Dimensions.--Carapace 48 mm. long and 60 mm. wide.

Range.--Japan northward to the Bering Sea and southward to northern California; low tide to 60 fathoms (Rathbun, 1930).

Specimens Collected.--Nine specimens collected and examined from Ship Harbor, Shannon Pt., Burrows Bay, Alexander Beach, March Pt. and Weaverling Spit; rock or sand beach and in eel grass; low tide to nine fathoms; not rare.

Remarks.--Telmessus cheiragonus is not likely to be confused with any other crab because of the six large lateral teeth and the thick tufts of tan colored hair covering the entire crab.

#### Family Cancridae

Carapace broadly oval; front with several teeth one of which is median; antennules folded longitudinally; antennal flagella usually short and somewhat hairy; chelipeds large and powerful.

#### Genus Cancer Linnaeus

la. Hair on all segments of ambulatory legs. Cancer

oregonensis page 63

- 1b. Hair only on merus of ambulatory legs..... 2
- 2a. All five subequal teeth of rostrum produced beyond eyes. Cancer productus page 59
- 2b. Five unequal teeth of rostrum equal to or only slightly produced beyond eyes..... 3
- 3a. Carapace widest at the eighth or ninth antero-lateral tooth; dactyls of ambulatory legs not much flattened. Cancer gracilis page 61
- 3b. Carapace widest at the tenth antero-lateral tooth; dactyls of ambulatory legs flattened. Cancer magister page 62

Cancer productus (Randall)

Plate XIII, fig. 1

Cancer productus Randall, Jour. Acad. Nat. Sci. Phila., 8:116, 1839.

Platycarcinus productus Gibbes, Proc. Amer. Assoc. Adv. Sci., 3:177, 1850.

Cancer perlatus Stimpson, Proc. Calif. Acad. Nat. Sci., 1:88, 1856.

Cancer productus Rathbun, Bull. U. S. Nat. Mus., 152:203, 1930.

Description.--Carapace roughly fan-shaped; considerably broader than long; ten antero-lateral teeth on each side; short closed sulcus between each tooth. Rostrum

produced slightly; five interorbital teeth of nearly equal length. Antennae no longer than interorbital width. Eye stalks short and set in circular orbits. Chelipeds roughened dorsally; two rounded tubercles at dorsal hinge between chela and carpus; merus trihedral; chelae with several longitudinal lines on outer surface; fingers strongly toothed and distal half black or dark colored. Ambulatory legs not much flattened; dactyls grooved and with three rows of hairs; merus with a dorsal fringe of hair.

Color.--Reddish brown to bright red; young variable and sometimes stripped longitudinally.

Dimensions.--Carapace 97 mm. long and 157.5 mm. wide (Rathbun, 1930).

Range.--Kodiak, Alaska, to Laguna Beach, California; low tide to 43 fathoms (Rathbun, 1930).

Specimens Collected.--Twenty four specimens collected and examined from Ship Harbor, Shannon Pt., Burrows Bay, Anico Beach, Alexander Beach, Langley Bay, Tosi Pt. and Anacortes wharf pilings; eel grass, Ulva and under rocks in gravel or sand areas; low tide to ten fathoms; common.

Comparisons.--Cancer productus is different from any of the other members of the genus Cancer because it has nine antero-lateral teeth, is widest at the ninth tooth, has five subequal rostral teeth and has hair fringing the dorsal edge of the merus and the ventral edge of the

dactyl of the ambulatory legs.

Cancer gracilis Dana

Plate XIV, fig. 1

Cancer gracilis Dana, Proc. Acad. Nat. Sci. Phila.,  
6:73, 1852.

Description.--Carapace oval, convex and somewhat uneven; nine antero-lateral teeth; widest at the ninth tooth. Rostrum absent; interorbital region with five teeth, the middle three grouped together and the center tooth the longest. Antennae no longer than the interorbital width. Eyes set in strong orbits. Chelipeds strong; merus trihedral; carpus with two sharp spines on distal end; chelae compressed; fingers toothed; six line on outer surface of chelae; tips of fingers crossed. Ambulatory legs not much flattened; hair on dorsal edge of merus.

Color.--Carapace brown; legs tan or red brown.

Dimensions.--Carapace 44 mm. long and 65 mm. wide.

Range.--Alaska to Lower California; low tide to 56 fathoms (Rathbun, 1930).

Specimens Collected.--Four specimens collected and examined from Ship Harbor and Burrows Bay; mud, sand, eel grass habitat; not rare.

Comparisons.--Cancer gracilis may be mistaken for Cancer magister but differs from C. magister in that it



is widest at the ninth tooth and the dactyls of the last pair of ambulatory legs are not much flattened.

Cancer magister Dana

Plate XIII, fig. 2

Cancer irroratus Randall (not Say), Jour. Phila. Acad. Nat. Sci., 8:116, 1839.

Cancer magister Dana, Proc. Acad. Nat. Sci. Phila., 6:73, 1852.

Metacarcinus magister A. Milne Edwards, Nouv. Arch. Mus. Hist. Nat. Paris, 1:202, 1866.

Cancer magister Rathbun, Bull. U. S. Nat. Mus., 152:222, 1930.

Description.--Carapace oval and roughened with small granules; antero-lateral edges with ten teeth; carapace widest at the tenth tooth. Rostrum absent; interorbital region with five teeth; the three middle teeth small and farther forward than the outer two. Antennae no longer than the width of the rostrum. Eye stalks short; no longer than width of eye orbit. Chelipeds stout and strong; chelae with five longitudinal rows of small tubercles; fingers evenly toothed along inner margins. Ambulatory legs somewhat flattened; last pair markedly so.

Color.--Tan or gray and resembles the sand and mud bottoms.

Dimensions.--Carapace 126 mm. long and 198 mm. wide

(Rathbun, 1930).

Range.--Unalaska to Monterey Bay, California; low tide to 50 fathoms (Rathbun, 1930).

Specimens Collected.--Nine specimens collected and examined from Ship Harbor, Tosi Pt., March Pt. and Guemes Channel; sand, mud, eel grass bottoms; low tide to 30 fathoms; common.

Comparisons.--Cancer magister is widest at the tenth antero-lateral tooth and has three of the five median teeth produced. The dactyls of the last pair of ambulatory legs are much flattened. Cancer gracilis with which it might be confused is widest at the ninth antero-lateral tooth and the last pair of dactyls are not much flattened.

Cancer oregonensis (Dana)

Plate XIV, fig. 2

Trichocera oregonensis Dana, Proc. Acad. Nat. Sci. Phila., 6:86, 1852.

Platycarcinus recurvidens Bate, Proc. Zool. Soc. London, p. 663, 1864.

Trichocarcinus oregonensis Miers, Proc. Zool. Soc. London, p. 34, 1879.

Trichocarcinus recurvidens Walker, Trans. Liverpool Biol. Soc., 12:271, 1898.

Trichocarcinus walkeri Holmes, Occas. Papers Calif. Acad. Sci., 7:53, 1900.

Cancer oregonensis Rathbun, Proc. U. S. Nat. Mus.,  
21:581, 1898.

Description.--Carapace oval in shape and rough; 11 to 13 antero-lateral teeth; widest at the seventh or eighth tooth; no angle where antero-lateral and postero-lateral margins meet. Rostrum slight. Antennae slightly longer than interorbital width; opposing setae on basal segments of antennae overlapping. Eye stalks stout; orbits oval and large. Chelipeds stout and powerful; carpus with tubercles on distal end of dorsal surface; row of long hairs on dorsal angle of trihedral merus; chelae with about six lines of small granules on outer surface; dorsal edge with irregular tubercles. Ambulatory legs small and short; row of long hairs fringing the dorsal edge of the merus and the dorsal and ventral edges of the propodus and dactyl. Abdomen fringed with hair.

Color.--Usually red or red brown; dactyls of chelipeds black.

Dimensions.--Carapace 36.5 mm. long and 47 mm. wide (Rathbun, 1930).

Range.--Pribilof and Rat Islands, Alaska, to Santa Barbara, California; low tide to 238 fathoms (Rathbun, 1930).

Specimens Collected.--Eighty seven specimens collected and examined from Ship Harbor, Shannon Pt., Green Pt., Burrows Bay, Anico Beach, Alexander Beach, Langley Bay,

Rosario Beach, Tosi Pt., Anacortes and Guemes Channel;  
mud or sand and under rocks; low tide to 40 fathoms;  
common.

Comparisons.--Cancer oregonensis may be distinguished from the other local species of Cancer by the following characteristics: 11 to 13 antero-lateral teeth, uneven and rough carapace and hairy ambulatory legs.

#### Family Xanthidae

Carapace transversely oval or transversely subquadrate; broader than long; front never produced into a narrow rostrum; antero-lateral margins usually armed with teeth, lobes or spines; antennules folded transversely or obliquely; antennal flagella short and slender.

#### Genus Lophopanopeus Rathbun

#### Lophopanopeus bellus (Stimpson)

Plate XIV, fig. 3

Xantho bella Stimpson, Ann. Lyc. Nat. Hist. N. Y.,  
7:204, 1860. (part)

Xanthodes hemphillii Lockington, Proc. Calif. Acad.  
Sci., 7:32, 1876 (1877).

Xantho hemphilliana Lockington, Proc. Calif. Acad.  
Sci., 7:100, 1876 (1877).

Lophoxanthus bellus A. Milne Edwards, Crust. Rég.  
Mex., p. 257, 1879.

Lophozozymus (Lophoxanthus) bellus Miers, Challenger  
Rept., Zool., 17:115, 1886.

Lophopanopeus bellus Rathbun, Bull. Lab. Nat. Hist.  
State Univ. Iowa, 4:272, 1898.

Description.--Carapace rectangular and uneven; median groove between eyes; three teeth on the antero-lateral angle of the carapace. Rostrum brief. Antennae short. Eyes set in circular orbits. Chelipeds massive and powerful; blunt spine on inner margin of carpus; chelae smooth; fingers black and irregularly toothed. Ambulatory legs with propodi and dactyls hairy; dactyls with short corneous tips.

Color.--Carapace tan; cheliped red with black dactyl.

Dimensions.--Carapace 22.5 mm. long and 32.5 mm. wide.

Range.--Alaska to Monterey, California; low tide to 40 fathoms (Rathbun, 1930).

Specimens Collected.--Thirty four specimens collected and examined from Shannon Pt., Anico Beach, Rosario Beach and Tosi Pt.; under rocks in sand, mud areas; common.

Comparisons.--Lophopanopeus bellus may be confused with the two species of Hemigrapsus. The distally widening carapace and the black claws identify it immediately.

#### Family Pinnotheridae

Carapace rectangular or rounded; usually membranous; orbits, eyes and antennae usually small or rudimentary;

antero-lateral margins of carapace entire; antennules folded obliquely; commensal or symbiotic with molluscs, tunicates, corals, echinoderms, crustaceans or tube worms.

Genus Pinnotheres Latreille

Pinnotheres pugettensis Holmes

Plate XIV, figs. 4, 5

Pinnotheres pugettensis Holmes, Occas. Papers Calif. Acad. Sci., 7:86, 1900.

Description.--Female; carapace membranous and widest anteriorly. Rostrum absent. Antennae inconspicuous. Eyes set in circular orbits. Chelipeds with stout chelae widening distally; fingers with tips incurved; pollex with tooth near middle of inner margin. Ambulatory legs slender and with order of length four, three, two, one. Male; the male is unknown.

Color.--Red brown with tinge of purple.

Dimensions.--Carapace 10 mm. long and 10.5 mm. wide (Wells, 1928).

Range.--Departure Bay, British Columbia; Puget Sound (Rathbun, 1918).

Specimens Collected.--None collected locally; lives in tunicates; rare.

Remarks.--Pinnotheres pugettensis is nearly round; has low median tooth on pollex, straight dactyls and order of length of ambulatory legs four, three, two, one.

Genus Fabia DanaFabia subquadrata Dana

Plate XVII, figs. 4, 5, 6, 7

Female

Fabia subquadrata Dana, Proc. Acad. Nat. Sci. Phila.,  
5:253, 1851.

Raphonotus subquadratus Rathbun, Harriman Alaska  
Exped., 10:186, 1904.

Fabia subquadrata Rathbun, Bull. U. S. Nat. Mus.,  
97:102, 1918.

Male

Cryptophrys concharum Rathbun, Proc. U. S. Nat. Mus.,  
16:250, 1893.

Pinnotheres concharum Rathbun, Bull. U. S. Nat. Mus.,  
97:36, 1918.

Fabia subquadrata Wells, Pub. Puget Sound Biol. Sta.,  
6:286-289, 1928.

Description.--Female; carapace smooth, convex and nearly round; longitudinal sulcus extending back from each orbit and enclosing median area. Rostrum absent. Antennae minute and inconspicuous. Eyes small and close together. Chelipeds weak; two rows of hair on under surface of palm, one row extending out to end of pollex; dactyl with prominent tooth about midway on inner surface. Ambulatory legs weak and slender; hairy ventrally; dactyls

falcate; order of length two, three, one, four. Male; carapace smooth, convex and nearly round; longitudinal sulcus extending back from each orbit and enclosing a median area. Rostrum a hard swelling between the eyes. Antennae minute and inconspicuous. Eyes close together. Chelipeds with dorsal and ventral rows of hair; pollex toothed; dactyl with a prominent tooth about midway on inner surface. Ambulatory legs with rows of hair dorsally and ventrally; dactyls with corneous tips strongly falcate; order of length two, three, one, four.

Color.--Carapace red brown; legs light gray.

Dimensions.--Female; carapace 9.5 mm. long and 10.5 mm. wide. Male; carapace between 7 mm. and 8 mm. for both length and width; slightly wider than long.

Range.--Alaska to southern California (Rathbun, 1918); 20 to 122 fathoms (Wells, 1928).

Specimens Collected.--Fifteen specimens collected and examined from Modiolus modiolus dredged from Burrows Bay and between James Island and Decatur Island; 20 fathoms; common.

Remarks.--Fabia subquadrata is nearly round and has a prominent tooth on dactyl of chela. Its rather specific habitat in Modiolus modiolus also helps to identify it. Males may be free swimming.



Genus Pinnixa (Dana)

- 1a. Dactyls of ambulatory legs falcate..... 2
- 1b. Dactyls of ambulatory legs not falcate..... 3
- 2a. Fingers of chelipeds forming large gap when closed  
and no tooth midway on inner edge of dactyl.  
Pinnixa littoralis page 72
- 2b. Fingers of chelipeds forming slight or no gap when  
closed and with tooth about midway on inner edge of  
dactyl. Pinnixa faba page 70
- 3a. Tooth near middle of inner edge of dactyl of  
cheliped..... 4
- 3b. No tooth on inner edge of dactyl of cheliped.  
Pinnixa eburna page 74
- 4a. Dactyls of third and fourth ambulatory legs much  
shorter than the dactyls of the first and second.  
Pinnixa tubicola page 76
- 4b. Dactyls of the third and fourth ambulatory legs  
approximately equal in length to the dactyls of  
the first and second. Pinnixa schmitti page 73

Pinnixa faba (Dana)

Plate XV, figs. 1, 2, 3, 4

Pinnothera faba Dana, Proc. Acad. Nat. Sci. Phila.,  
5:253, 1851.Pinnixa faba Stimpson, Jour. Bost. Soc. Nat. Hist.,  
6:470, 1857.

Pinnotheres faba Bate, Lord's Naturalist in Vancouver Id. and Brit. Col., 2:271, 1866.

Pinnixa faba Rathbun, Harriman Alaska Exped., 10:188, 1904.

Description.--Female; carapace oval, membranous, uneven and with anterior median groove. Rostrum inconspicuous. Antennae little longer than half the interorbital distance. Eyes small, close together and set in oval orbits. Chelipeds with large chelae; low tooth at base of dactyl; no gap when closed. Ambulatory legs with order of length three, two, one, four; dactyls short and falcate. Male; carapace oblong, hard and smooth; slight median groove. Rostrum inconspicuous. Antennae about as long as interorbital width. Eyes small, close together and set in oval orbits. Chelipeds with stout hands; dactyl with small tooth midway on inner edge; notch on end of pollex to receive tip of dactyl; small gap when closed. Ambulatory legs with order of length three, two, one, four; dactyls short and falcate.

Color.--Female; mostly tan; large orange patches on carapace and abdomen. Male; carapace brown or tan; ambulatory legs pale gray.

Dimensions.--Female; carapace 18 mm. long and 19 mm. wide. Male; carapace 7.5 mm. long and 14 mm. wide.

Range.--Alaska to Humboldt Bay, California (Rathbun, 1918).

Specimens Collected.--Twenty three specimens collected and examined from Schizothaerus nuttallii at Ship Harbor, Shannon Pt. and Tosi Pt.; commensal in bivalve molluscs; common.

Comparisons.--Pinnixa faba may be distinguished from Pinnixa littoralis by the following characteristics: orbits oval and without acute angle, little or no gap when fingers of chelipeds are closed and low tooth on inner margin of dactyl of cheliped.

Pinnixa littoralis Holmes

Plate XV, figs. 5, 6, 7, 8

Pinnixa littoralis Holmes, Proc. Calif. Acad. Sci.,  
(2), 4:571, 1894 (1895).

Description.--Female; carapace oval, membranous or semi-hard; smooth but somewhat uneven; median groove on anterior surface of carapace. Rostrum slight and protruding downward. Antennae about as long as interorbital width. Eyes small and set in oval orbits; outer edge of orbits with acute angle. Chelipeds with large chelae widening distally; dactyls strongly falcate; tip of dactyl fitting into notch on end of pollex; fingers forming gap when closed. Ambulatory legs with hair along anterior edge; order of length of legs three, two, one, four; dactyls strongly falcate. Male; males differ from females slightly in the following characteristics: carapace

harder, smoother and with less median groove, third ambulatory leg more noticeably larger than the rest.

Color.--Dull white; propodus sometimes light brown.

Dimensions.--Female; carapace 16 mm. long and 26 mm. wide. Male; carapace 8 mm. long and 15 mm. wide.

Range.--Sitka, Alaska, to San Diego, California (Rathbun, 1918).

Specimens Collected.--Seven specimens collected and examined from Ship Harbor, Shannon Pt. and Tosi Pt. in Cardium corbis and Schizothaerus nuttallii; commensal in clams and cockles; common.

Comparisons.--Pinnixa littoralis and Pinnixa faba are similar but P. littoralis has orbits with an angle on outer edge, fingers not toothed and a large gap when fingers are closed which distinguish it from P. faba.

Pinnixa schmitti Rathbun

Plate XVI, figs. 1, 2, 3

Pinnixa occidentalis Rathbun, Harriman Alaska Exped.,  
10:187, 1904.

Pinnixa schmitti Rathbun, Bull. U. S. Nat. Mus.,  
97:162, 1918.

Description.--Female; carapace oblong, hard, smooth and with antero-lateral ridge. Rostrum inconspicuous. Antennae about as long as interorbital width. Eyes small and close together. Chelipeds with large chelae; dactyls

with low tooth about midway on inner edge and not gaping when closed. Ambulatory legs with order of length three, two, one, four; dactyls straight. Male; males differ from females slightly in that the carapace is wider in proportion to the length, a gap is present when fingers of chelipeds are closed and the dactyl is more strongly falcate.

Color.--Tan or light gray.

Dimensions.--Female; carapace 5 mm. long and 8 mm. wide (Wells, 1928). Male; carapace 5 mm. long and 9.2 mm. wide (Wells, 1928).

Range.--Alaska to San Francisco, California; low tide to 238 fathoms (Rathbun, 1918).

Specimens Collected.--Two specimens collected and examined from Shannon Pt. and Sunset Beach; generally in burrows of Upogebia; not common.

Comparisons.--Pinnixa schmitti has a low median tooth on both pollex and dactyl and no gap when closed. The dactyls of the ambulatory legs are straight. No other local species of Pinnixa has the combination of these characteristics.

Pinnixa eburna Wells

Plate XVI, figs. 4, 5, 6

Pinnixa eburna Wells, Pub. Puget Sound Biol. Sta.,

6:298, 1928.

Description.--Carapace flat, hard and smooth; oblong in shape and margined with coarse setae; posterior margin broad; gastric and cardiac regions separated by deep curved depression; smooth antero-lateral ridge becoming more prominent toward anterior and stopping just behind outer edge of eye orbit. Rostrum absent. Antennae equal in length to interorbital width. Eye stalks filling orbits and stout. Chelipeds with swollen chelae; pollex stout and with a row of coarse short setae laterally; dactyl longer than pollex and curved strongly downward; tips of fingers crossed; no gap when closed. Ambulatory legs with order of length three, two, one, four; dactyls almost straight; dactyl of second leg longest; coarse plumose hair lining legs most noticeable on last two pairs.

Color.--Pale white to orange.

Dimensions.--Female; carapace 3.5 mm. long and 8 mm. wide. Male; carapace 3.5 mm. long and 6.5 mm. wide (Wells, 1928).

Range.--Puget Sound.

Specimens Collected.--None found locally; lives in tubes of Arenicola (Wells, 1928); not common.

Comparisons.--Pinnixa eburna is different from other local species of Pinnixa by the combination of the following characteristics: antero-lateral ridge on carapace, straight ambulatory dactyls, second ambulatory dactyl longest and last two pairs of ambulatory legs hairy.

Pinnixa tubicola Holmes

Plate XVI, figs. 7, 8, 9

Pinnixa tubicola Holmes, Proc. Calif. Acad. Sci.,  
(2), 4:569, 1894 (1895).

Description.--Carapace much wider than long, hard and smooth; slight antero-lateral ridge. Rostrum absent. Antennae inconspicuous. Eyes small and close together. Chelipeds small; chelae smooth; fingers short and with low tooth on inner margin of both dactyls; tips of dactyls crossed when closed. Ambulatory legs large and with order of length three, two, one, four; fourth leg very small and hardly reaching past massive merus of third leg; dactyls of third and fourth legs small and all dactyls slightly falcate.

Color.--Red to yellow.

Dimensions.--Female; carapace 4 mm. long and 10 mm. wide. Male; carapace 3.2 mm. long and 6.8 mm. wide.

Range.--Puget Sound to San Diego, California (Rathbun, 1918).

Specimens Collected.--Seven specimens collected and examined from March Pt.; commensal in tubes of annelids; not common.

Remarks.--Pinnixa tubicola is distinguished by its short fifth leg, massive fourth leg, small fourth and fifth dactyls and no gap when fingers of chelipeds closed.

Genus Scleroplax RathbunScleroplax granulata Rathbun

Plate XVII, figs. 1, 2, 3

Scleroplax granulata Rathbun, Proc. U. S. Nat. Mus.,  
16:251, 1893.

Pinnixa (Scleroplax) granulata Holmes, Occas. Papers  
Calif. Acad. Sci., 7:94, 1900.

Scleroplax granulata Rathbun, Harriman Alaska Exped.,  
10:188, 1904.

Description.--Female; carapace slightly wider than long; hard, convex and smooth. Rostrum slight but produced to match general curve of anterior margin. Antennae about equal to interorbital width. Eyes small and close together. Chelipeds with swollen chelae; inner edges of fingers nearly straight and no gap when closed. Ambulatory legs slender and with order of length three, two, one, four; dactyls about equal to propodi in length and almost straight. Male; chelae more powerful; dactyls of chela strongly falcate and pollex very short.

Color.--Yellow or tan to olive brown.

Dimensions.--Carapace 5.8 mm. long and 3.2 mm. wide.

Range.--British Columbia to Lower California (Rathbun, 1918).

Specimens Collected.--Nine specimens collected and examined from Upogebia burrows in Ship Harbor; common.



Remarks.--Scleroplax granulata has almost straight ambulatory dactyls, swollen chelae and hard convex carapace not much wider than long.

Family Grapsidae

Carapace quadrate and flattened; lateral margins nearly straight and parallel; antero-lateral margins usually toothed; front never narrow; rostrum small; antennules folded transversely or obliquely.

Genus Hemigrapsus Dana

- la. Hair on ambulatory legs. Hemigrapsus oregonensis  
page 80
- lb. No hair on ambulatory legs. Hemigrapsus nudus  
page 78

Hemigrapsus nudus (Dana)

Plate XVIII, fig. 1

Cyclograpsus marmoratus White (not Cancer marmoratus  
Fabricius), List. Crust. Brit. Mus., p. 41,  
1847.

Pseudograpsus nudus Dana, Proc. Acad. Nat. Sci.  
Phila., 5:249, 1851.

Heterograpsus marmoratus Milne Edwards, Ann. Sci.  
Nat., ser. 3, Zool., 20:193, 1853.

Heterograpsus nudus Stimpson, Proc. Acad. Nat. Sci.

Phila., 10:104, 1858.

Heterograpsus sanguineus Kingsley (not de Haan),

Proc. Acad. Nat. Sci. Phila., p. 208, 1880.

Brachynotus nudus Holmes, Occas. Papers Calif. Acad.

Sci., 7:81, 1900.

Hemigrapsus nudus Rathbun, Harriman Alaska Exped.,

10:189, 1904.

Description.--Carapace rectangular and smooth; three antero-lateral teeth. Rostrum only slightly produced. Antennae inconspicuous; not as long as eye stalk. Eyes widely separated and set in circular orbits. Chelipeds powerful; a rounded projection ventrally and distally on merus and on the inner edge of the carpus; chelae smooth; tuft of fine hair growing at base of pollex on inner edge; fingers with teeth on inner edge. Ambulatory legs not hairy.

Color.--Variable; ranging from purple to yellow or buff; purple spots on chelipeds usually constant.

Dimensions.--Carapace 31 mm. long and 36 mm. wide.

Variation.--Hemigrapsus nudus has been noted in sand habitats which is solid yellow to brown in color and lacks the usual purple spotting on the chelipeds.

Range.--Alaska to Lower California.

Specimens Collected.--Sixty six specimens collected and examined; found in all rocky areas from high tide to mid tide; common.

Comparisons.--Hemigrapsus nudus closely resembles Hemigrapsus oregonensis but the lack of hair on the ambulatory legs, the purple spots on the chela and the pre-dominately purple color distinguish it from H. oregonensis which is usually green or gray in color.

Hemigrapsus oregonensis (Dana)

Plate XVIII, fig. 2

Pseudograpsus oregonensis Dana, Proc. Acad. Nat.

Sci. Phila., 5:248, 1851 (1852).

Brachynotus oregonensis Holmes, Occas. Papers Calif.

Acad. Sci., 7:82, 1900.

Hemigrapsus oregonensis Rathbun, Amer. Nat., 34:

587, 1900.

Description.--Carapace rectangular and smooth; three postorbital teeth. Rostrum very brief and with median groove. Antennae inconspicuous; little longer than eye stalks. Eyes widely separated and set in circular orbits. Chelipeds powerful; rounded projection ventrally and distally on merus and laterally on inner edge of carpus; row of hair on dorsal edge of merus; chelae smooth and tuft of fine hair on inner surface of palm; fingers not distinctly toothed but with horny tips. Ambulatory legs hairy; dactyls grooved.

Color.--Usually an over-all gray or green; legs spotted with small brown or purple spots; chelipeds not

spotted.

Dimensions.--Carapace 28.4 mm. long and 34.7 mm. wide.

Range.--Alaska to Lower California.

Specimens Collected.--Seventy two specimens collected and examined from Ship Harbor, Shannon Pt., Green Pt., Burrows Bay, Anico Beach, Langley Bay, Rosario Beach, Tosi Pt. and March Pt.; mud or sand beaches; common.

Comparisons.--Hemigrapsus oregonensis is different from Hemigrapsus nudus because of the hairy ambulatory legs and the lack of spots on the chelae.

## GLOSSARY

- Abdomen-- The part of the body that is most posterior and usually folded under the thorax.
- Acicle-- A scale attached to the base of the antenna.
- Acute-- Coming to a point with an angle of less than ninety degrees.
- Ambulatory legs-- Walking legs.
- Antenna-- The feeler of an arthropod; usually attached to the head near the eyes.
- Antennule-- Small feeler that is usually situated below or between the eyes or antennae.
- Anterior-- Pertaining to the front.
- Arcuate-- Curved like a sickle.
- Articulation-- The place where two segments are hinged together.
- Attenuated-- Gradually coming to a point.
- Basal-- Pertaining to the base.
- Bifid-- Divided into two.
- Branchial-- The postero-lateral portion of the body or carapace.
- Bristles-- Stiff hairs.
- Calcareous-- Hard and bony.
- Carapace-- The hard covering over the top of the body of a crab.
- Cardiac-- The back middle portion of the body; the

- heart region.
- Carina-- A crest or ridge.
- Carpus-- The segment next to the hand on the cheliped or the third segment from the end on the ambulatory legs.
- Chela-- The hand or pincer of the cheliped.
- Cheliped-- The enlarged pincer leg.
- Commensal-- Living with or in another animal but not parasitic.
- Compressed-- Flattened.
- Concave-- Rounded inward as in a depression.
- Constant-- Consistent or always the same.
- Constricted-- Suddenly narrowed.
- Convex-- Rounded outward as an overturned plate.
- Dilated-- Enlarged or swollen.
- Distal-- Pertaining to the farthest removed or most distant part.
- Diverging-- Separating or going apart.
- Dorsal-- Pertaining to the top.
- Elongate-- Long or extended.
- Entire-- Smooth and uninterrupted; usually pertaining to an edge or margin.
- Epistome-- The region between the mouth and the antennules.
- Falcate-- Curved.
- Fathom-- A six foot unit of measurement for depth.
- Fingers-- As used in this paper, refers collectively to the pollex and dactyl of the cheliped.

- Flagella-- Long slender hairs.
- Foramen-- A hole or opening.
- Frontal-- Pertaining to the front.
- Gap-- A space between the fingers of the chelipeds when the fingers are closed.
- Gastric-- The portion of the body or carapace just posterior to the middle.
- Granulate-- With granules or fine bumps.
- Granules-- Rounded bumps on the legs or body.
- Hepatic-- The upper right and left hand portions of the carapace or body.
- Horns-- Extensions or prongs usually on the rostrum.
- Interantennal-- Between the antennae.
- Interorbital-- Between the eye orbits.
- Lateral-- Pertaining to the sides.
- Median-- The center or middle.
- Membranous-- Thin and soft.
- Merus-- The fourth segment from the end of a decapod leg.
- Obliquely-- Midway between horizontal and vertical; slanting.
- Obtuse-- Blunt and with an angle of more than 90 degrees.
- Opalescent-- Reflecting a milky iridescent light or color.
- Opposing-- Opposite.
- Orbit-- The socket in which the eye stalk is set.
- Oval-- Egg shaped.

- Palm-- The hand of the cheliped with fingers not included.
- Peduncle-- The enlarged basal segments of the antennae  
of a decapod.
- Plumose-- Covered with long fine hairs; feather-like.
- Pollex-- The fixed finger on the hand of the cheliped.
- Posterior-- Pertaining to the back or hind part.
- Postorbital-- Behind the eye sockets.
- Preorbital-- In front of or before the eye sockets.
- Produced-- Protruding or extended out.
- Propodus-- The second segment from the end of a decapod  
leg.
- Proximal-- Pertaining to the nearest or closest part.
- Pyriform-- Pear shaped.
- Rostral-- Pertaining to the rostrum.
- Rostrum-- The portion of the carapace protruding between  
the eyes.
- Rudimentary-- Undeveloped or small.
- Segment-- A section or joint on the leg or antennae.
- Serrated-- Notched or toothed like a saw.
- Serrations-- With teeth or notches.
- Setae-- Short stiff hairs.
- Setose-- Having short stiff hairs.
- Spine-- A sharp hard projection.
- Spinulose-- With small spines.
- Spurred-- With a sharp spine or projection.
- Subequal-- Almost equal.



- Suboval-- Almost oval.
- Subquadrate-- Roughly four sided.
- Sulcus-- A groove.
- Supraorbital-- Above the eye socket.
- Symbiotic-- Living together to the mutual advantage of both.
- Telson-- The last segment of the abdomen of a decapod and attached to the end.
- Thorax-- The part of the body to which the legs are attached.
- Transverse-- Across the width.
- Trigonal-- Three angled.
- Trihedral-- Three sided.
- Tubercle-- A blunt bump or knob.
- Tuberculate-- Having tubercles.
- Tunicate-- A simple chordate commonly called a sea squirt.
- Ulva-- A species of green alga; sea lettuce.
- Ungulate-- Hoofed and cud chewing mammals such as the cow, deer, moose etc.
- Uropod-- Generally the last flattened appendage on the abdomen of a decapod.
- Ventral-- Pertaining to the bottom.

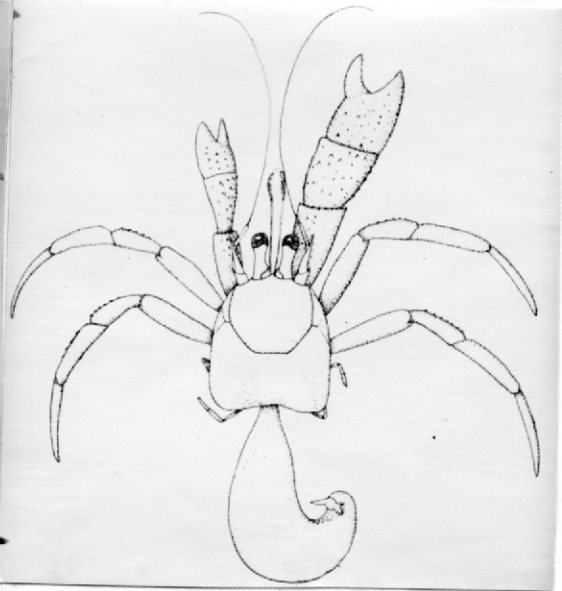
## LITERATURE CITED

- Calman, W. T.  
1898. On a collection of Crustacea from Puget Sound. New York, Annals of the New York Academy of Sciences, No. 13, 9:259-292.
- Holmes, S. J.  
1900. Synopsis of the California stalk-eyed Crustacea. Occasional Papers California Academy of Sciences, 7:1-262. Pls. 1-4.
- Queen, John.  
1930. Additional Brachyura and crab-like Anomura from Friday Harbor, Washington. Seattle, University of Washington press, 7:393-400, Dec. (Publication of the Puget Sound Biological Station.)
- Rathbun, Mary J.  
1900. The cyclometopous or cancroid crabs of North America. The American Naturalist, No. 398, 34:131-143, Feb.
- 
1900. The oxyrhynchous and oxystomatous crabs of North America. The American Naturalist, No. 402, 34:503-520, June.
- 
1900. The catometopous or grapsoid crabs of North America. The American Naturalist, No. 403, 34:583-592, July.
- 
1904. Decapod crustaceans of the northwest coast of North America. Washington, Smithsonian Institution, p. 3-211. (Harriman Alaska Expedition Vol. 10.)
- 
1918. The grapsoid crabs of America. Washington, Government printing office, 461 p. (United States National Museum bulletin 97.)
- 
1925. The spider crabs of America. Washington, Government printing office. (United States National Museum bulletin 129.)

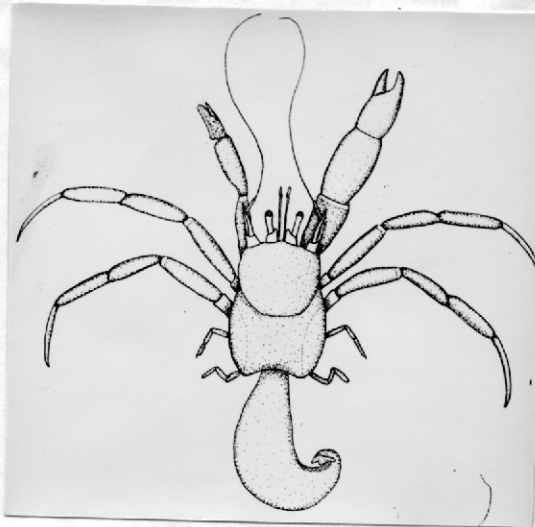
- 
1930. The Cancroid crabs of America of the families Euryalidae, Portunidae, Atelecyclidae, Cancridae and Xanthidae. Washington, Government printing office, 609 p. (United States National Museum bulletin 152.)
- 
1937. The oxystomatous and allied crabs of America. Washington, Government printing office, 278 p. (United States National Museum bulletin 166.)
- Schmitt, Waldo L.  
1921. The marine decapod Crustacea of California. Berkeley, University of California press, 23:1-470. Pls. 1-50, 160 figs. (University of California Pub. in Zoo.)
- Stevens, Belle A.  
1925. Hermit crabs of Friday Harbor, Washington. Seattle, University of Washington press, No. 68, 3:273-309, Feb. (Publication of the Puget Sound Biological Station.)
- 
1927. Orthopagurus, a new genus of Paguridae from the Pacific coast. Seattle, University of Washington press, 5:245-256, Dec. (Publication of the Puget Sound Biological Station.)
- Stimpson, W.  
1907. Report on the Crustacea (Brachyura and Anomura) collected by the North Pacific Exploring Expedition, 1853-1856. Smithsonian Misc. Coll., 49:1-240. Pls. 1-26. Edited and annotated by Mary J. Rathbun.
- Way, Evelyn.  
1917. Brachyura and crab-like Anomura of Friday Harbor, Washington. Seattle, University of Washington press, No. 30, 1:349-382, Dec. (Publication of the Puget Sound Marine Station.)
- Wells, Wayne W.  
1928. Pinnotheridae of Puget Sound. Seattle, University of Washington press, 6:382-414, Dec. (Publication of the Puget Sound Biological Station.)
- Weymouth, Frank Walter.  
1910. Synopsis of the true crabs (Brachyura) of Monterey Bay, California. Leland Stanford Jr. Univ. Pub., p. 1-64. Pls. 1-14, 9 figs. (Univ. Ser., No. 4.)



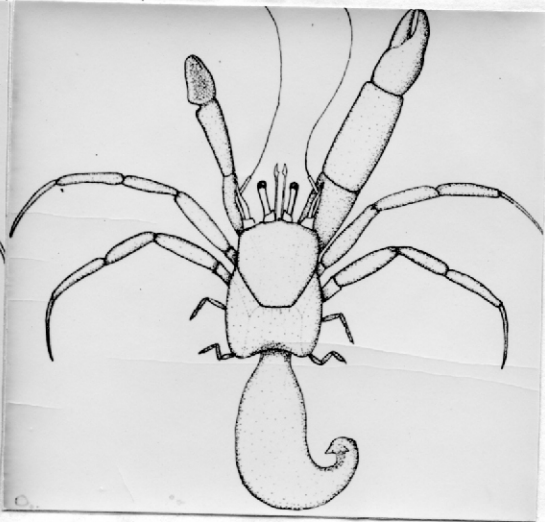
1



2



3



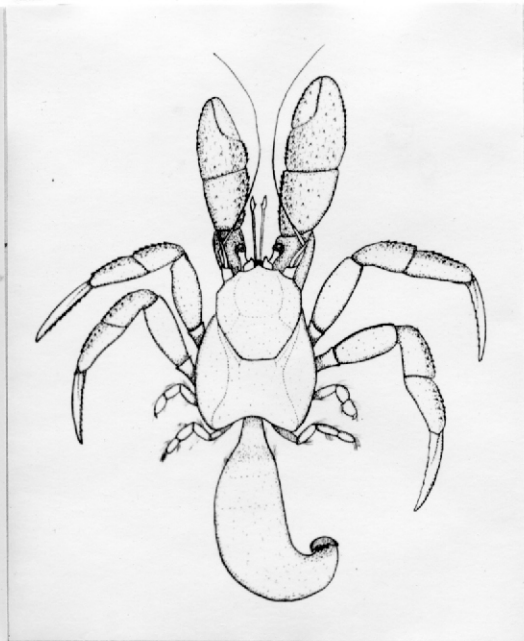
4

(after Schmidt,

1. Pagurus alaskensis, X  $\frac{3}{4}$  (after Schmidt, 1925)
2. Pagurus aleuticus, X  $\frac{3}{4}$  (after Stevens, 1925)
3. Pagurus dalli, X  $\frac{1}{2}$  (after Stevens, 1925)
4. Pagurus brandti, X  $\frac{3}{4}$  (after Stevens, 1925)



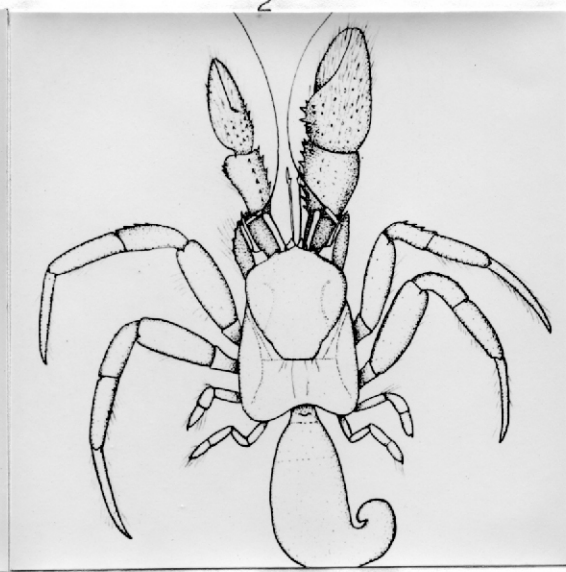
1



2

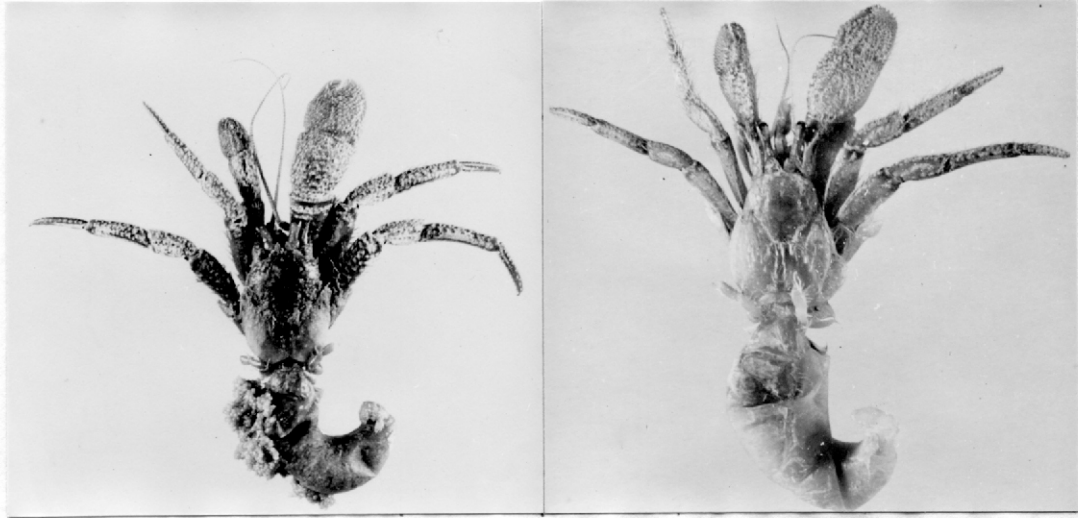


3



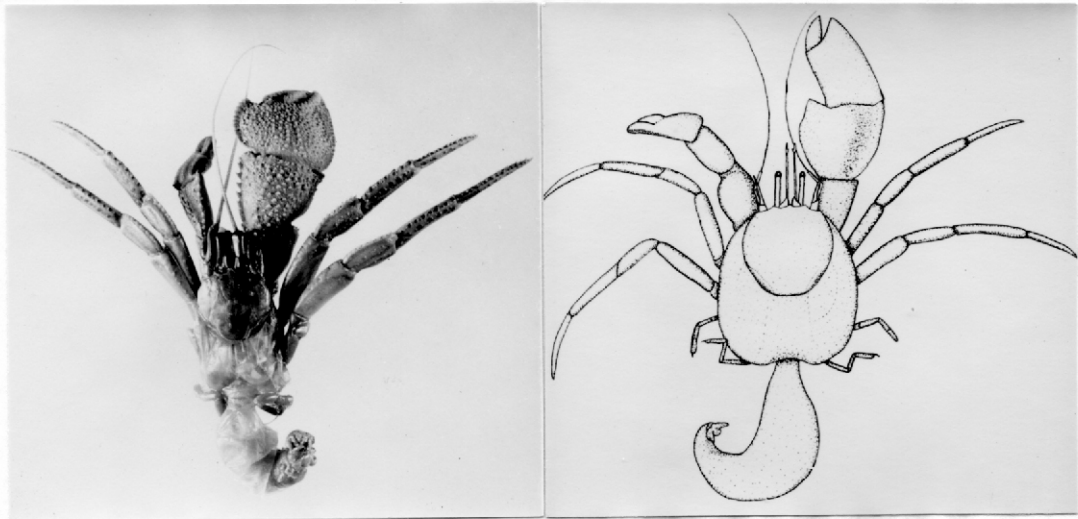
4

1. Pagurus beringanus, X 1
2. Pagurus ochotensis, X 1 (after Schmidt, 1921)
3. Pagurus kennerlyi, X  $1\frac{1}{2}$
4. Pagurus setosus, X  $1\frac{1}{2}$  (after Schmidt, 1921)



1

2



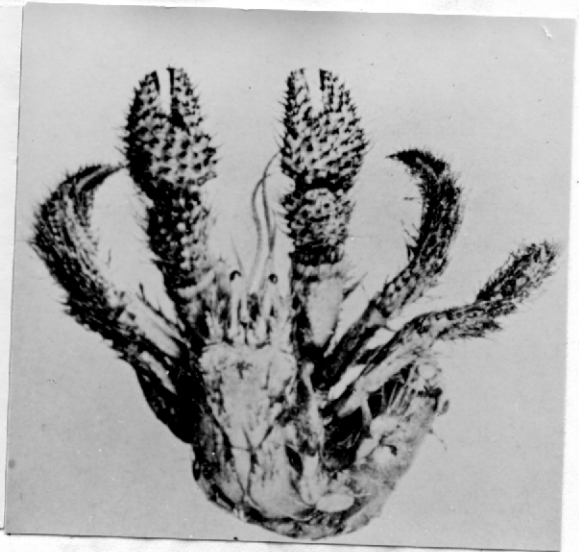
3

4

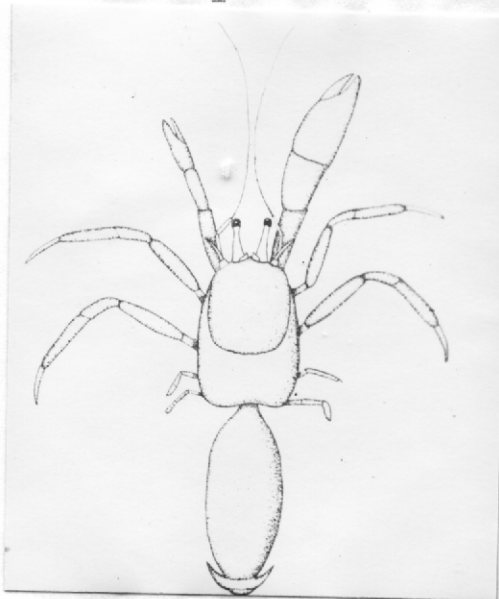
- Pagurus hirsutiusculus, X  $1\frac{1}{2}$
- Pagurus granosimanus, X  $1\frac{1}{2}$
- Pagurus tenuimanus, X 1
- Pagurus gilli, X  $1\frac{1}{2}$  (after Stevens, 1925)



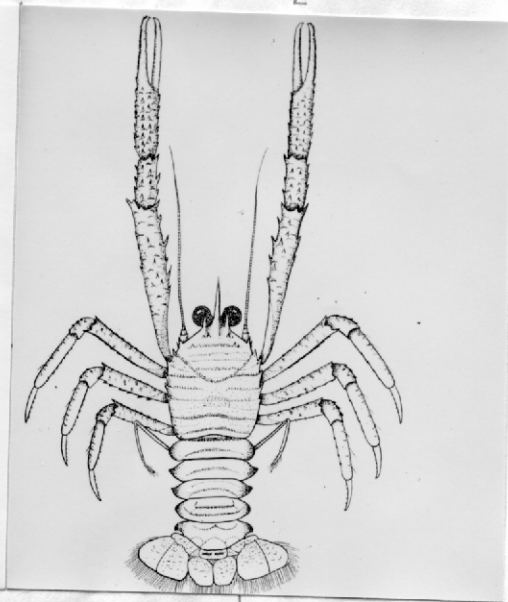
1



2



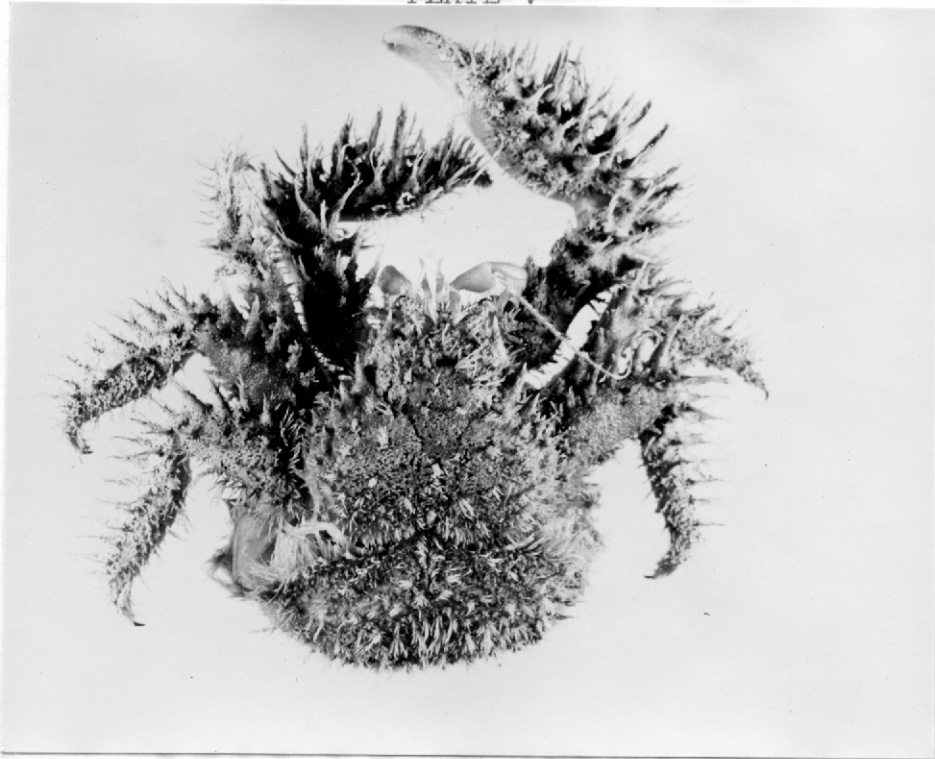
3



4

1. Pagurus splendescens, X  $1\frac{1}{2}$
2. Paguristes turgidus, X 1 (from Schmidt, 1921)
3. Orthopagurus schmitti, X 2 (after Stevens, 1927)
4. Munida quadrispina, X 2 (after Schmidt, 1921)





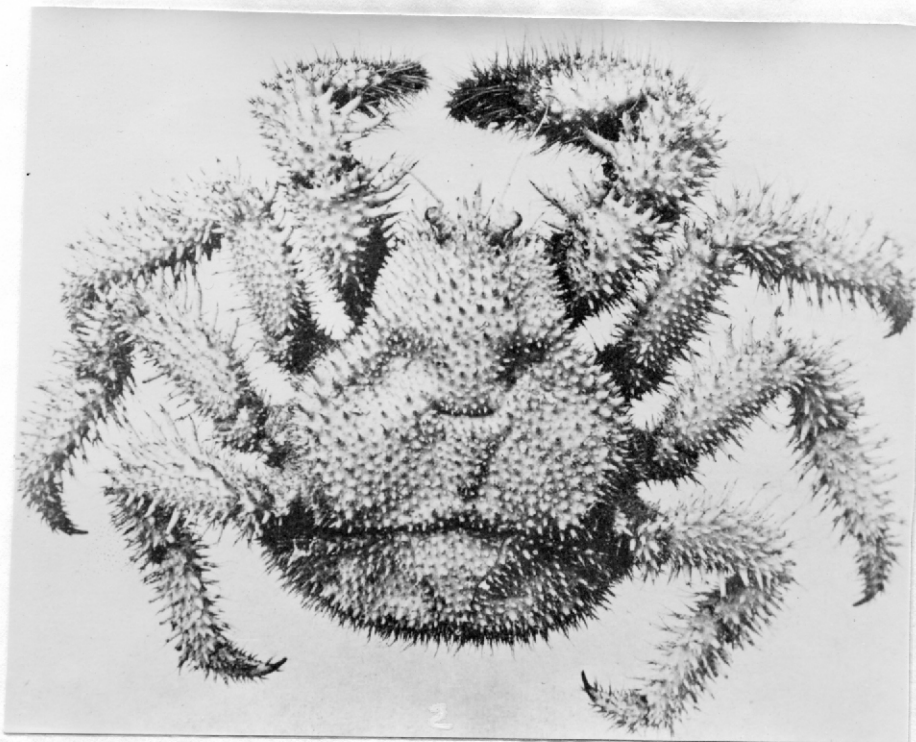
1



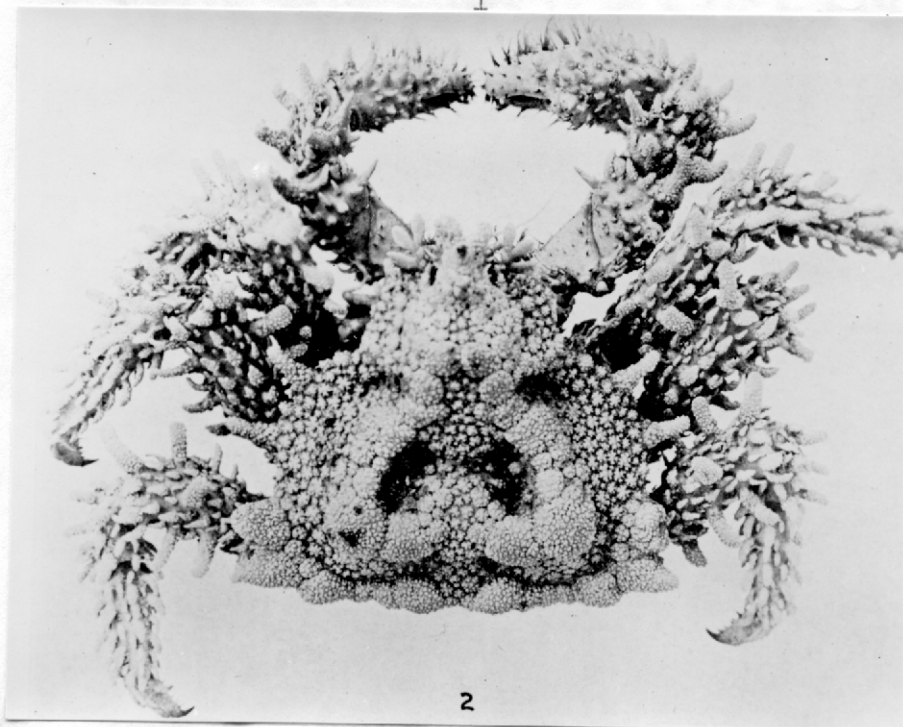
2

1. Hapalogaster mertensii, X  $1\frac{1}{4}$   
 2. Oedignathus inermis, X  $1\frac{1}{4}$





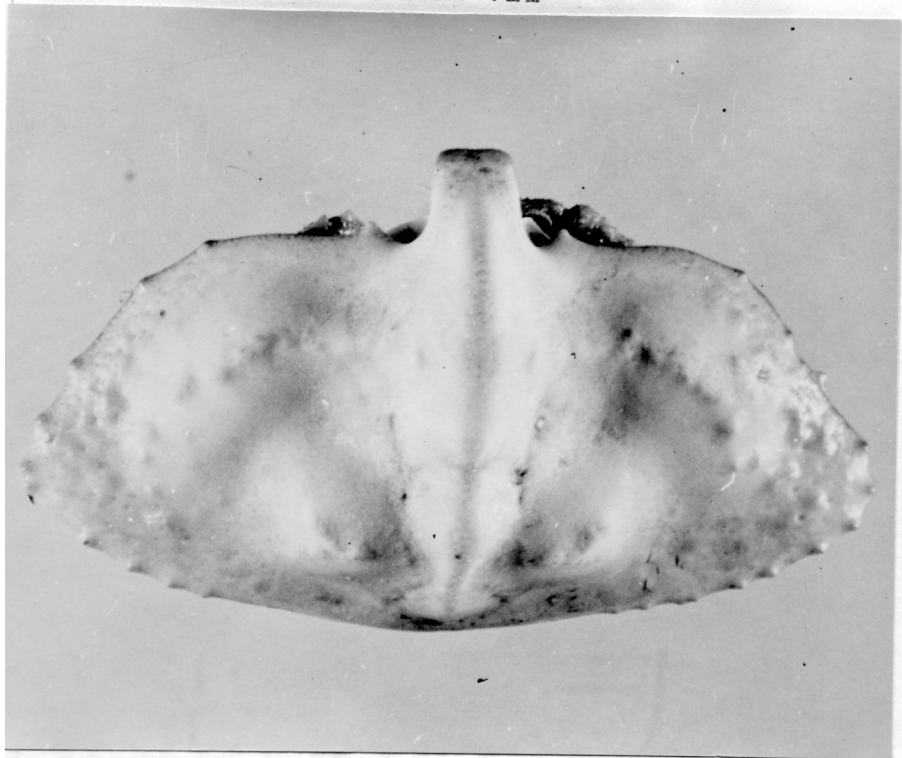
1



2

2

1. Acantholithodes hispidus, X 1 (from Schmidt, 1921)  
2. Phyllolithodes papillosus, X 1 (from Schmidt, 1921)

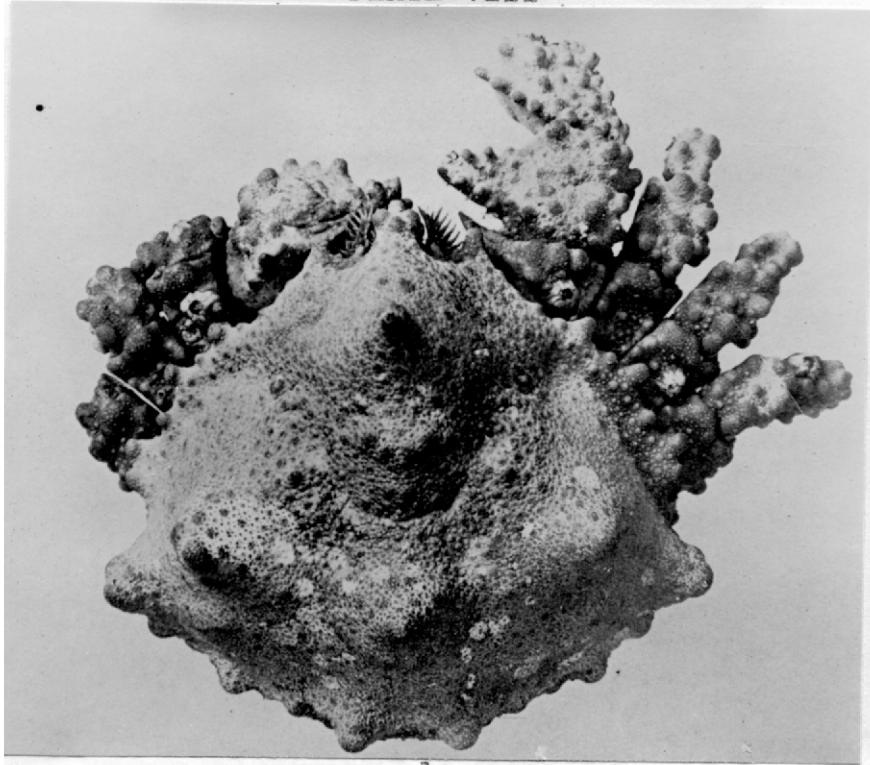


1

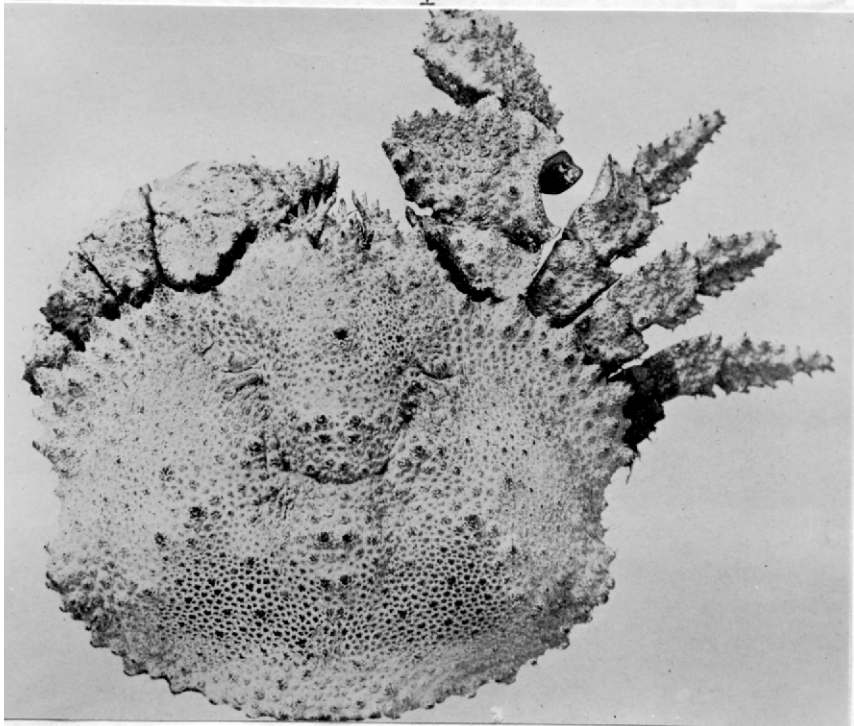


2

1. Cryptolithodes typicus, X 2
2. Cryptolithodes sitchensis, X 1

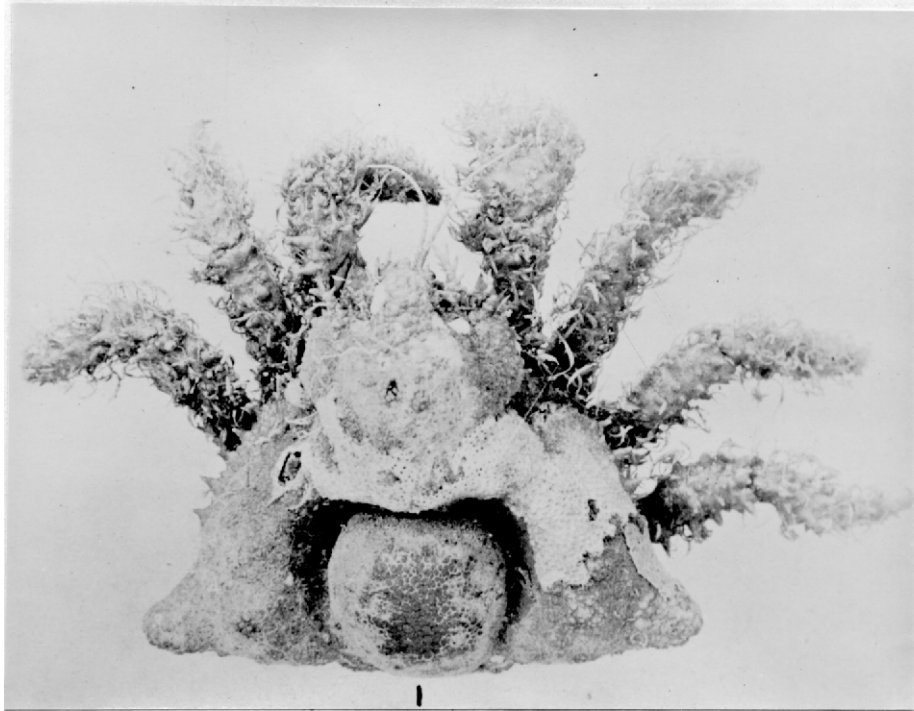


1



2

1. Lopholithodes mandtii, X  $\frac{1}{2}$  (from Schmidt, 1921)
2. Lopholithodes foraminatus, X  $\frac{1}{2}$  (from Schmidt, 1921)



1

1



2



3

1. Rhinolithodes wosnessenskii, X 2 (from Schmidt, 1921)
2. Petrolisthes eriomerus, X  $1\frac{1}{2}$
3. Pachycheles rudis, X  $2\frac{1}{2}$  (from Schmidt, 1921)





1

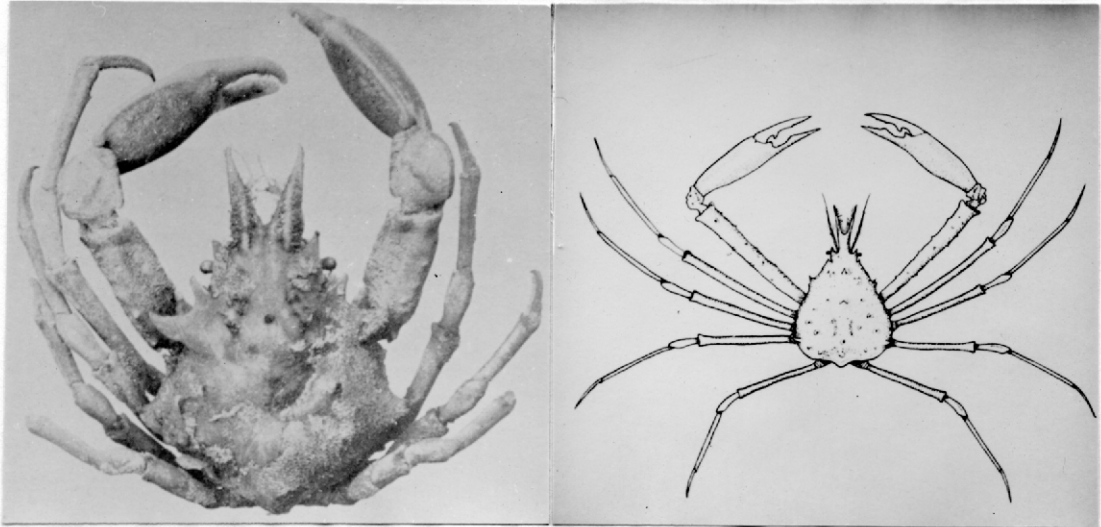


2



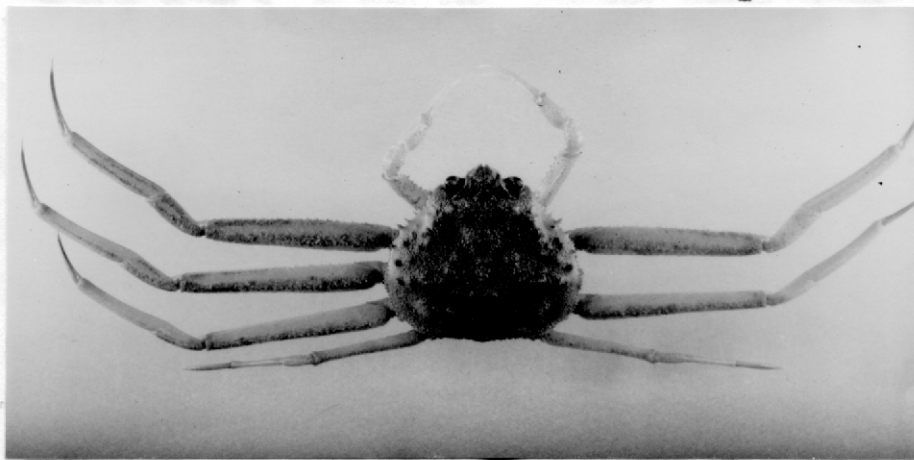
3

1. Oregonia gracilis, X 1
2. Pugettia producta, X  $\frac{1}{2}$
3. Pugettia gracilis, X 1



1

2



3

1. Pugettia richii, X 1 (from Schmidt, 1921)
2. Chorilia longipes, X  $\frac{1}{2}$  (after Schmidt, 1921)
3. Chionoecetes bairdi, X  $\frac{2}{3}$



1



2



3

1. Hyas lyratus, X 1/3
2. Scyra acutifrons, X 1
3. Telmessus cheiragonus, X 1



1



2

1. Cancer productus, X 1
2. Cancer magister, X  $\frac{1}{2}$





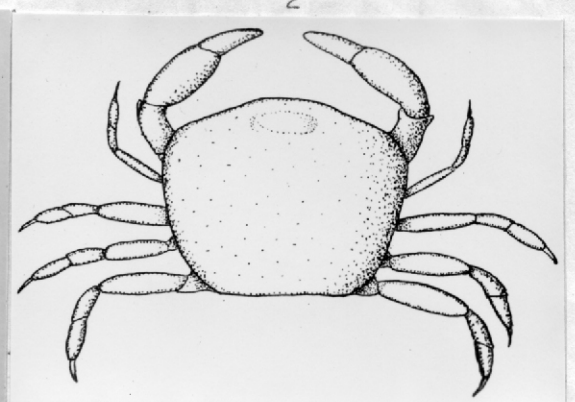
1



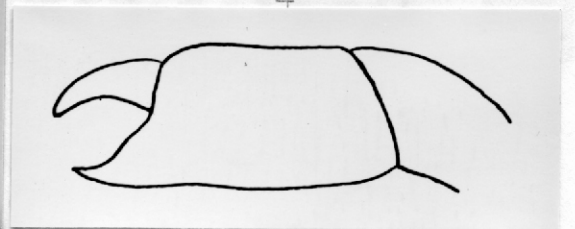
2



3

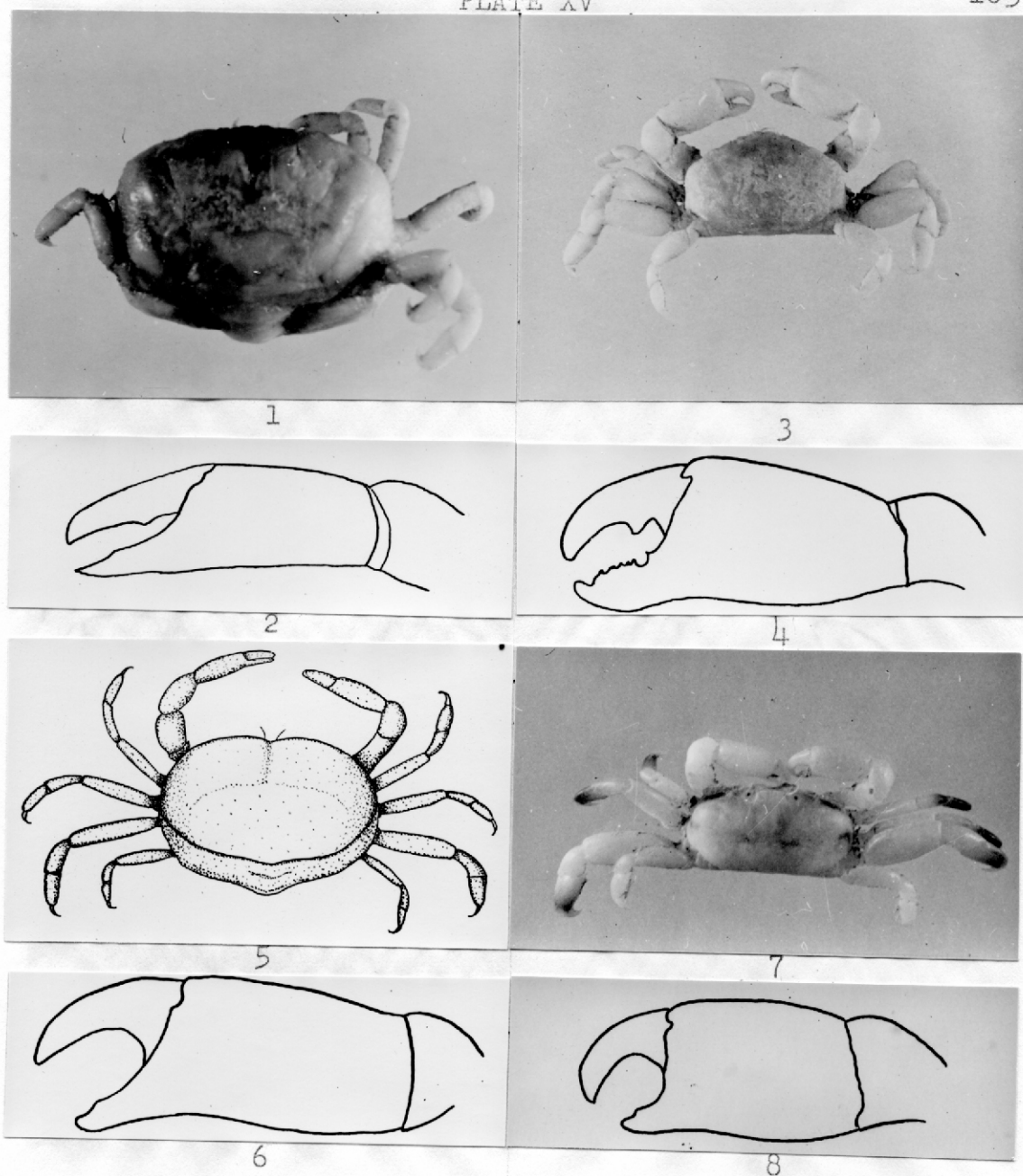


4

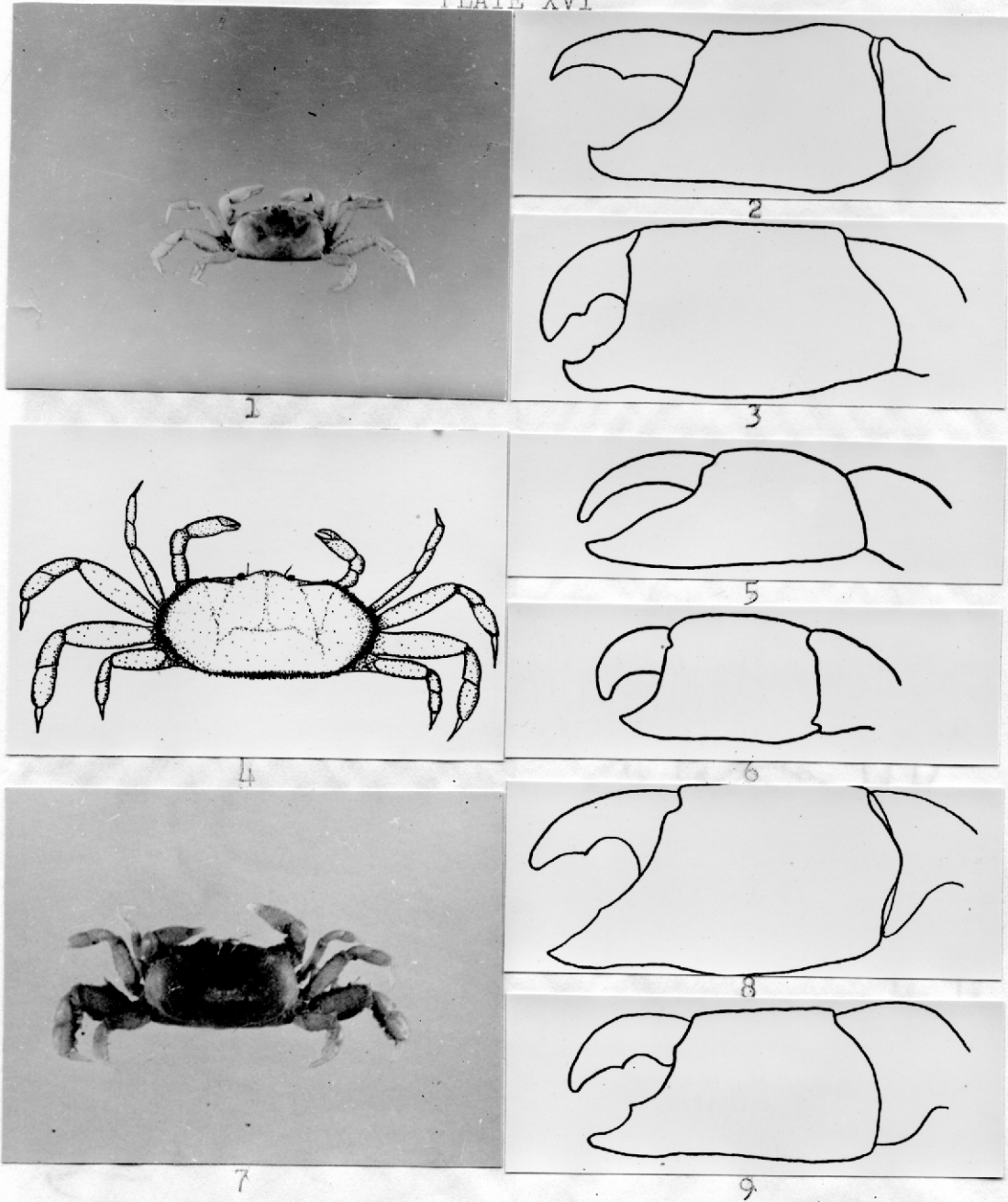


5

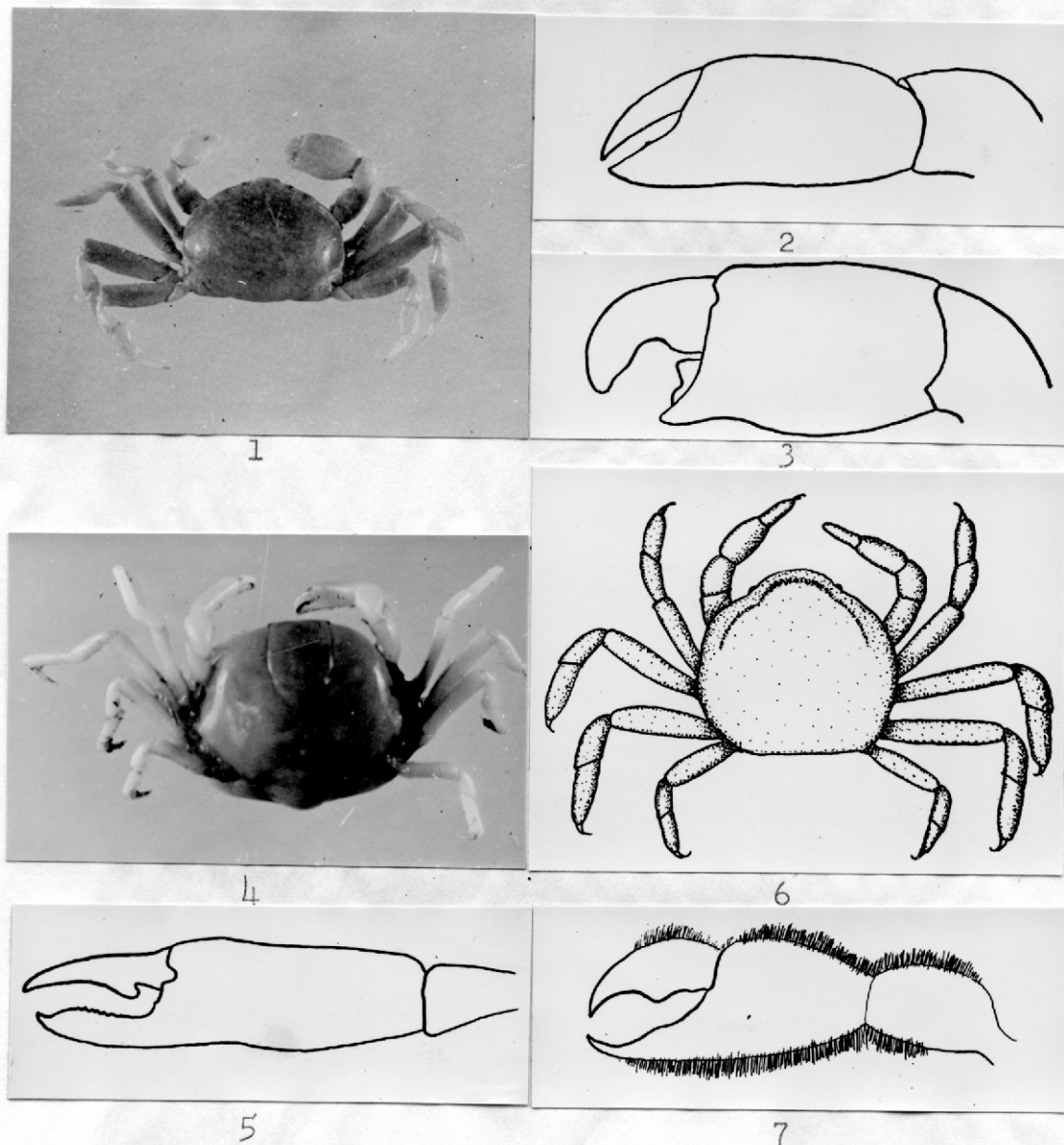
1. Cancer gracilis, X 3/4
2. Cancer oregonensis, X 1
3. Lophopanopeus bellus, X 1
4. Pinnotheres pugettensis, female, X 3 (after Wells, 1928)
5. Cheliped of female Pinnotheres pugettensis, X 7 (Ibid.)



1. *Pinnixa faba*, female, X 2
2. *P. faba*, female cheliped, X 15 (after Wells, 1928)
3. *P. faba*, male, X 2
4. *P. faba*, male cheliped, X 15 (after Wells, 1928)
5. *Pinnixa littoralis*, female, X  $1\frac{1}{2}$  (after Wells, 1928)
6. *P. littoralis*, female cheliped, X 12 (after Wells, 1928)
7. *P. littoralis*, male, X  $1\frac{1}{2}$
8. *P. littoralis*, male cheliped, X 12 (after Wells, 1928)



1. Pinnixa schmitti, X 3
2. Cheliped of P. schmitti, female, X 18 (after Wells, 1928)
3. Cheliped of P. schmitti, male, X 18 (after Wells, 1928)
4. Pinnixa eburna, X 4 (after Wells, 1928)
5. Cheliped of P. eburna, female, X 20 (after Wells, 1928)
6. Cheliped of P. eburna, male, X 20 (after Wells, 1928)
7. Pinnixa tubicola, X 3
8. Cheliped of P. tubicola, female, X 15 (after Wells, 1928)
9. Cheliped of P. tubicola, male, X 15 (after Wells, 1928)



1. *Scleroplax granulata*, male, X 3
2. *S. granulata*, female cheliped, X 20 (after Wells, 1928)
3. *S. granulata*, male cheliped, X 15 (after Wells, 1928)
4. *Fabia subquadrata*, female, X 3
5. *F. subquadrata*, female cheliped, X 20 (after Wells, 1928)
6. *F. subquadrata*, male, X 3 (after Wells, 1928)
7. *F. subquadrata*, male cheliped, X 20 (after Wells, 1928)





1



2

1. Hemigrapsus nudus, X  $1\frac{1}{2}$
2. Hemigrapsus oregonensis, X  $1\frac{1}{2}$