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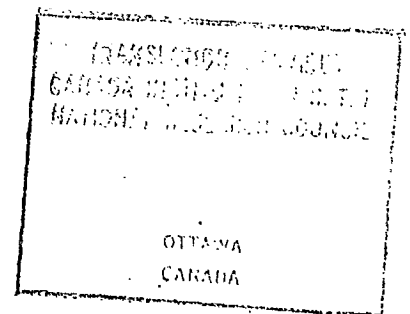
Decapod crustaceans of the Sea of Okhotsk

by L. G. Vinogradov

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DECAPOD CRUSTACEANS OF THE OKHOTSK SEA.

L.G. VINOGRADOV.

In 1946 when studying the geographic range of the king crab (*Paralithodes*. Tr.) I suggested as a development of the ideas of the work by Andriyashev (1939) to set up the following areas in the Okhotsk Sea: The Glacio-Okhotsk Sea (cold water) area, the South-eastern-Sakhalin (temperate) area and the Western-Kamchataka (temperate) area. The shallows of the Kuril Islands and the Okhotsk coastal area of Hokkaido island were investigated by me. The zonation or zoning of the Okhotsk Sea by me was based upon the lists of the decapod crustaceans which inhabit the areas set up. These lists were compiled on the strength of original data and of data occurring in literature summarized in this article.

The publication of the systematic work on the decapod crustaceans of the Okhotsk Sea in the "Izvestiya" of the applied institute, after the zoning, based on it, was found to be of essential practical significance, is therefore absolutely necessary. Furthermore, a complete scientific development of methods for crab-exploration, first stated by me in a brochure in 1945, required exact zoogeographic descriptions of the indicator-organisms of ecological zones. The following proved to be such indicators under field conditions: Cod, flounders and large crabs; however for a theoretical establishment of

(Translator's Note: The Russian term "Usik" has been translated up to p. 75- as "cirrus". The proper term is "antenna.")

ecological zones these animals failed to provide us with a full complement of indicator-forms and it became necessary to take as indicators any group, well examined ^{in the} systematic respect, possessing good specific distinguishing features, a group regarded as classic on the basis of the use of it by zoogeographers. Of four groups used by the classics of zoogeography- echinoderms, molluscs, decapod crustaceans and fish- the composition of the first two had been investigated altogether insufficiently in relation to the Okhotsk Sea. The fish, by reason of their large size, were collected less thoroughly during Okhotsk Sea expeditions than the crustaceans and the identification of many species and subspecies of fish is much more difficult than the identification of related forms of shrimps or crabs.

The decapod crustaceans are one of the few groups of animals of the Okhotsk Sea, which were studied thoroughly. The total number of the works dealing with the Decapoda of the Okhotsk Sea is insignificant, but among them occur several good summaries.

The Middendorf collections from the Shantar islands and the observations of Voznesenski in the Ayan area, on Paramushir island and on Shimushu island carried out during the first half of the past century constituted the material used by Brandt for two preliminary articles and for compiling the first summary on the decapod crustaceans of the northern part of the Pacific Ocean (Brandt, 1849, 1850 and 1851). The collections of 1896 of an American expedition aboard the ship "Albatros", which operated in the southern part of the Okhotsk Sea, were used by ~~WALTER~~ Rathbun in a large summary on the decapod crustaceans of the northern part of the Pacific Ocean. The collections of true crabs of the same expedition in 1906

were used by her in the works of 1925, 1930 and 1932. The collections of Brazhnikov of 1899-1902 and of P.Yu. Schmidt of 1901 were processed by Brazhnikov, who in 1907 published a book on the decapod crustaceans of the Tatarskiy Proliv (Tartar Strait. Tr.), of the Okhotsk Sea coast of Sakhalin island, of the Shantar islands and of the SE-coast of Kamchatka. The collections of Ushakov, P.Yu. Schmidt and Polutov of 1930-1932, which covered almost the entire Okhotsk Sea (with the exception of former Japanese territorial waters and of Shelekhov bay) were used by Aobyakova for a revision and a description of new species of the genus *Pandalopsis* (1936), for a zoogeographic survey (1936) and a systematic summary (1937) on the decapod crustaceans of the Okhotsk and the Japan seas. All the just enumerated collections of Russian researchers and the collections of expeditions aboard ~~xx~~ the cruisers "Admiral Bering" and "Leutenant Dydymov" and aboard the hydrographic ship "Okhotsk" in 1907-1918 were used by Makarov for his work in 1937 and also the volumes on Anomura in the series "The fauna of the USSR" (1938). Finally, in 1936-1939 there appeared in four editions the summary by Sakai on the true crabs of Japan in which besides the material on the waters of Japan proper and of its former southern possessions use was ~~xxx~~ made of data in literature on the true crabs of the former Japanese territorial waters of the Okhotsk Sea.

At present the systematic position has been cleared up and the synonymy of decapod crustaceans ever discovered in the Okhotsk Sea has been unravelled. The remaining vaguenesses are of secondary importance with regard to our aims. The species of the genus *Spirontocaris sensulato* are in need of revision. This genus was divided into several clearly distinguishable genera by a number of authors and the most convincing system for a division was suggested by Brazhnikov and supplemented by Makarov. However these Russian authors did not investigate many American

species of *Spirontocaris* in connection with which the Brazhnikov-Makarov system of the genera cannot be fully applied in a practical sense. The types of some Okhotsk Sea species of *Spirontocaris* should be compared with specimens of rare species of shrimps described from collections made on the Atlantic coast of Canada. The descriptions of certain species of this genus of decapod crustaceans, which were established on the basis of specimens of one sex need verification. Further, the Atlantic and North Pacific representatives of the species *Crangon septempinosus* and the Japanese representatives of the species *C. affinis* are in need of comparison on mass-material by means of the variant-statistical methods. Finally, the following should be compared by means of variant-statistical methods: The typical form of *Chionoecetes opillio* with the Japan Sea subspecies (*C. opillio elongatus*) of this crab and with the Okhotsk Sea representatives of *C. opillio*; it is not yet ascertained where it belongs as a subspecies. These three assignments definitely go beyond the framework of this summary and cannot be solved by means of our material.

The total number of the forms of Decapoda in the Okhotsk Sea, according to the summaries by Kobyakova, amounts to 82; the following should be added to them: Three freshwater species from the Amur lagoon (*Leander modestus*, *Cambaroides schrenckii* and *Cambaroides dauricus*), one estuarine species from the estuaries of Sakhalin island (*Leander paucidens*) the discovery of which was reported by Brazhnikov (1907), Derzhavin (1930) and Birstein and Vinogradov (1934) and five marine forms, one of which (*Trachycarcinus balssi*) was pointed out by Rathbun already in 1932 and another (*Hemigrapsus sanguineus*) is adduced by Sakai (1939); three forms (*Spirontocaris pusiola*, *Nectocrangon ovifer* and *Paralomis verrilli*) were first discovered in the Okhotsk Sea.

The published works throw light upon the fauna of the decapod crustaceans of all the areas of the Okhotsk Sea with the exception of the waters that lave the Kuril islands and the north coast of Hokkaido island on which there exist fragmentary data and, with the exception of Shelekhov bay, which ~~has~~ ^{has} not been explored in the carcinological sense.

In order to undergird the survey of the range of the decapod crustaceans over the areas of the Okhotsk Sea and of the zones inhabited by them we were compelled to adduce all the cases of the discovery of decapod crustaceans within the sea, which were established by the efforts of the Pacific Institute and also those known from literature. The descriptions of some forms could be supplemented by a study of their distinguishing features and of drawings. For some genera it was possible to compile keys, more convenient and more accurate than those existing in literature.

We adduce synonyms only in those cases where the names adopted by us differ from the names adopted in the latest summaries (Kobyakova, 1937; Makarov, 1941, and Sakai, 1939). The names of four forms - *Spirontocaris spina intermedia* Makarov, *Spirontocaris makarovi* Volk, *Spirontocaris brashnikov* Volk, *Spirontocaris fasciata* Makarov - were first published by Kobyakova (1936 and 1937), who placed them in keys and accompanied their mention with systematic notes referring to the manuscripts of the authors that first established their existence. The manuscript of Makarov cited by Kobyakova saw the light of day five years after reference had been made to it in the last work by Kobyakova. The fate of the Volk manuscript is not known to me; at any rate, it has not yet been published. On the basis of the priority right the enumerated forms should today be mentioned together with the name of Kobyakova.

Name of the joints of the walking legs (pereiopoda).

Counting joints from the cephalo- thorax.	Common Latin names	Suggested Russian names	Commercial names used in crab-canning industry.
First joint	Coxa	Lyazhka	Rozochka
Second "	Basis	Osnovnoy chlenik	-
Third "	Ischium	Sedalishchny chlenik	-
Fourth "	Merus	Bedro	Tolsty chlenik
Fifth " on leg with claw	Carpus	Zapyastye	Sheyka
" " on leg with- out claw	Carpus	Kolentse	Kolentse
	Chela	Kleshnya	Kleshnya
Sixth " on leg with claw	Propodus	Golen	Tonkiy chlenik
" on leg with- out claw	Dactylus	Podvizhnoy palets	Podvizhnoy palets
Seventh " on leg with claw	Dactylus	Palets.	Kogot'
" on leg with- out claw			

The development of a Soviet crab-canning industry has already led to the formation of Russian names for the joints of the walking legs of decapod crustaceans for which until only Latin names were used in scientific literature. In connection with this we are making an attempt to establish a Russian scientific terminology using in those cases, where analogies are admissible, established etymological terms (see table 1).

We use the following accepted abbreviations in the occurrence-lists:

An asterisk indicates the forms, which occur in the collections of the Pacific Institute of Fisheries and Oceanography from the Okhotsk Sea and examined by the author.

An asterisk in brackets indicates the forms which occur in the collections of the Pacific Institute taken from bodies of

water adjoining the Okhotsk Sea and that were examined by the author.

Two asterisks indicate forms assigned for the first time to the Okhotsk Sea.

Brackets enclose those places of occurrence which cannot be used in discussing the habitat-zone of the species. Brackets enclose approximate occurrences or stations at which only young specimens of the species were collected.

Quotation marks enclose the names of vessels used for expeditions. We usually only adduce the names of the vessels and the years of the voyages instead of the full names of the expeditions.

Launch. Launch-collections and littoral collections kept in the museum of the Pacific Institute are united in a separate list which is adduced at the end of the article.

Following the field determinations occur references to co-workers of the institute who recorded these determinations; following the literary indications occur the references to the authors of the published works and the years of publications.

Of the total number of Okhotsk Sea forms of decapod crustaceans the number of which is 91 we had 70 forms at our disposal; 3 of these were registered for the first time for the Okhotsk Sea and we were compelled to study ten forms by means of the material gathered from bodies of water adjoining the Okhotsk Sea.

The family of Penaeidae Bate.

Genus *Gennadas* Bate

1. *Gennadas borealis* Rathbun.

Literary indications: "Zoo", 1932, st.No.26/1 (Kobyakova, 1937).

A bathypelagic form; it belongs to the genus which ranges from Newfoundland to Pernambuco and from the Bering Sea to New Guinea and the Arabian Sea; all the known species of the genus

- 8 -

in the adult stage occur mostly at depths of more than 1000 m, far from the bottom.

Our species was found in the Bering Sea south of the 60° northern latitude and down to Lower California. It was caught in the Okhotsk Sea in the area between Jonah island and Elisaveta Cape at a station with a depth of 542 m. It occurs at depths of 320 to 765 m.

The family of Pasiphaeidae Smith

Genus *Pasiphaea* Savigny

2. *Pasiphaea pacifica* Rathbun

Literary indications: "Gagara", 1932, st. No. 214 (Kobyakova, 1937).

It is a bathypelagic form, belongs to a genus ranging from Norway and Greenland to Patagonia and from the Bering Sea to Magellan Strait; the species of this genus were encountered from the surface down to 2592 m.

Our species was encountered from Unalyashki to the gulf of California and in the central part of the Okhotsk Sea, at depths from 95 to 1076 m (the catch was made at a station with a depth of 1076 m - in the Okhotsk Sea).

The family of Hoplophoridae Faxon

Genus of *Hymenodora* Sars

3. *Hymenodora glacialis* (Buchholz).

Literary indications: "Ara", 1932, st. No 26/1; "Gagara", 1932, st. No 206 (Kobyakova, 1937).

A bathypelagic form found in many place of the globe from the Laptev Sea to Liberia and from the Bering Sea to Ecuador and the Indian Ocean at depths from 247 to 5308 m. It was encountered in the Okhotsk Sea at stations with depths of 542 and 3000 m. Eckmann (1935) presents a review or survey of its range and places it among the cold-water *max* cosmopolitans. Birstein (1936) reports the latest places of occurrence. The range of the genus in the northern hemisphere coincides with

the range of the species, but in the southern hemisphere it reaches the 62° of southern latitude (south of Australia).

4. *Hymenodora frontalis* Rathbun

Literary indications: "Ara", 1932, st. No 26/1; "Gagara", 1932, st. No. 208, 215; 250; 251 (Kobyakova, 1937).

This form was encountered in the Bering Sea south of the 60-10th parallel to California and in the Okhotsk Sea - in its southern half and south and south-east from Jonas Island, at depths from 515 to 3350 m.

The family of Pandalidae Bate

Genus *Pandalus* Leach

(*) 5. *Pandalus latirostris* Rathbun

(1878). *Pandalus kessleri* Czerniavski nom. nudum

Literary indications: "Storozh", shallow waters at Korsakov (Cape Terpenye ?) (Brazhnikov, 1907).

A coastal form; it ranges from the gulf of Terpenye (perhaps from the gulf of Aniv; Brazhnikov who points out the gulf of Terpenye is not certain of the accuracy of the label), from the Due area (near Aleksandrovsk) (on Sakhalin Island. Tr.) and Soviet-skaya Gavan (Soviet harbor. Tr.) to Tokyo bay, Nagasaki and Chemulpo at depths from 1 to 30 m.

* 6. *Pandalus hipsinotus* Brandt

Collection of the Pacific Institute: "Plastun", 1933, st. No 121; "Lebed", 1934, ichthyolog. st. No 59; "Lebed", 1938-39, st. No 613 (launch-station No 64- fry).

Field determinations: "Lebed", 1937, St. No No: 262; 263; 264; 265; 371 (Volk, Vinogradov); "Lebed", 1938-39, st. No No 96; 98 (Gordeyeva).

Literary indications: "Albatros", 1896, st. No 3653 (Rathbun, 1904); (at the west coast of Kamchatka and near Ayan) (Kobyakova, 1937).

A semi-bathypelagic form which comes out on to the shelf;

It was encountered on the west coast of America from the gulf of Norton to Fuca Strait, on the coast of Asia- from Cape Olyutorskiy to Nagasaki. For the Okhotsk Sea it is known from the collections made at Iturup island (Rathbun), in the Ryuu area and on the West Kamchatka shelf and slope at depths from 27 (adults and from 17 - fry) to 428 m. It is mentioned for depths from 5 to 460 m; however, according to material by Dragulin and Shekhpakina (1937) on the gulf of Piotr Velikiy (Russian: Zaliv Petra Velikogo. Tr.) and our material on the West Kamchatka coast, it is rare at depths of less than 100 m.

(1) 7. *Pandalus meridionalis* (Balss)

Literary indications: "Gagara", 1932, st. No 203 (Kobyakova, 1937).

It is a coastal or littoral form which descends into the upper part of the sublittoral; it ranges from the gulf of Aniv (Kobyakova, 1937, p. 96) and from Cape Olympiada (Primoye) (Maritime area. Tr.) to the coast of the province of Nemuro (Hokkaido Island) and Nagasaki, at depths from $\frac{1}{2}$ to 80 m; in the gulf of Aniv (Russian: Zaliv Aniva. Tr.) this form was encountered at a depth of 56 m.

8. *Pandalus goniurus* Stimpson.

Collections of the Pacific Institute: "Plastun", 1932 st. No 24; "Plastun", 1933, st. No No (11- fry); 29; 59; 131; "Lebed", 1934, st. No No: (47- fry) 51; ichthyolog. st No 57; "Lebed", 1935, st. No No; 1; 4; 5; 6; 9; 17; (21- fry); 28; 30; 32; "Lebed", 1938-39; st. No No: 39; 177; 305; 354; 377; 414; 498; 499; 598; launch-station No No: (5- in the stomach of cod); 27; (65- fry).

Literary indications: "Albatros", 1896, st. No No: 3646; 3647; 3649; 3650 (Rathbun, 1904); "Storozh", st. No No: 1; 17; 26; 27; 44; 48 (Brazhnikov, 1907); (along the west coast of Kamchatka, in the northern and northwestern region of the sea including the gulf of Sakhalin and the Shantar area) (Kobyakova, 1937).

It is a shelf-form; in the southern limits of its range it descends into the bathyal region; a number of places of occurrence is known in the Chukchi Sea (the area of Cape Franklin, the area of Cape Lay, the area of Herald bank, the area of Cape Serdtse-Kamon); it goes as far south as Puget Sound and the "Zaliv Petra Velikogo". It was encountered at depths from 5 to 450 m, in the Okhotsk Sea from 25 to 440 m.

* 9. *Pandalus borealis eous* Makarov.

Collections of the Pacific Institute: "Plastun", 1933, st. NoNo: 14; 15; 16; 17; "Lebed", 1934, st. NoNo: (44-fry); (45-fry); 1938-39, st. NoNo: 36; 434; 435.

Literary indications: "Ara", 1932, 29/6; "Gagara", 1932, st. NoNo: 211; 232; 252; "Plastun", 1932, st. NoNo: 8; 14; 22; 161 (Kobyakova, 1937).

The specimens, which were at our disposal, no doubt, belong to the subspecies *P. borealis eous*: The length of the rostrum reached up to 1.85 of the length of the carapace (according to Makarov 1.6-1.7 in the form described by him and 1.4-1.5 in a typical one), the form of the anterior edge of the scaphocerite was always evenly rounded (the same as in the Makarov specimens), but in most of our specimens the spine of the scaphocerite did not extend to the edge of its laminar part, i.e. on the basis of this distinguishing feature the Okhotsk Sea specimens came close to the typical one - the Atlantic subspecies.

In part of the range it is a shelf-form (for instance, in Alaska), in part of the range it is a semi-bathypelagic form (at our coasts). Our subspecies ranges from the latitude of Cape Navarin (in the Bering Sea) to the area of the mouth of the Columbia river, the gulf of Toyama (Japan Sea coast of Honsu) and the "Zaliv Petra Velikogo, at depths from 39 to 1300 m (in Kobyakova's work - 1450 m - judging by the ship's logbook, it

is an evident error). The depth of their habitat varies greatly in various parts of their range: "Near Vancouver the adults are usually found in great numbers at depths of about 91 to 110 m, but farther north they are commonly fished in 46-55 m and are the most valuable pandalids". (Berkley, 1930). It was encountered in the Okhotsk Sea at depths from 42 to 1150 m, but, according to our material, it is rare at depths less than 200 m; in the gulf "Zaliv Petra Velikogo" it "occurs only at great depths" (Kobyakova, 1937). In the Okhotsk Sea it was encountered at depths of less than 200 m only on the west coast of Kamchatka.

It is a typical form; *Pandalus borealis borealis* Kroyer ranges in the northern European seas from Northumberland to the Dogger Bank (Crieg, 1926) to the Kara Sea. The collections of the Pacific Institute contain 1 defective juvenile specimen from the collections of the hydrographic ship "Kamchadel" from the Laptev Sea.

It is not known to what subspecies *Pandalus borealis* which occurs on the west coast of Greenland (from 75° 35' of northern latitude southward) and on the Atlantic coast of North America (to Massachusetts Bay) belongs.

Genus *Pandalopsis* Bate

* 10. *Pandalopsis lamelligera* (Brandt)

Collections of the Pacific Institute: "Plastun", 1933, st. No 26; 117; "Lebed", 1935, st. NoNo 21; 59; launch-station NoNo:22; (31-fry); 32;(64-fry).

Literary indications: (near Bear Island, the Uda bight) (Brandt, 1851); "Storozh", st. NoNo:44; 46; ~~48~~ 49; 50; 51 (Brazhnikov, 1907).

It is a coastal form known in Avacha bight, in the Shantar islands, the Sakhalin gulf, the northern part of Tartary Strait (Kobyakova, 1936, p.203). In the collections of the Pacific Institute it occurs in the collections from the following areas:

Cape Khariuzov, the mouth of the Moroshechnaya river, the mouth of the Icha river (west coast of Kamchatka), the Tauy bight. It ranges, on the basis of our and Brazhnikov's material, at depths from the lower ebb-line to depths of 37-55 m (st. 49 of the launch "Storozh").

11. *Pandalopsis punctatus* Kobjakova

Literary indications: "Ará", 1932, st. No 25/6; "Gagara", st. No 248 (Kobyakova, 1937).

It is a shelf-form. It was encountered only twice: at Jonas Island and in the area of Cape Enkan at a depth of 65 and 182 m.

12. *Pandalopsis aleutica glabra* Kobjakova.

Literary indications: "Gagara", 1932, st. NoNo: 214; 250 (Kobyakova, 1937).

It is a semi-bathypelagic form (the same as the typical subspecies), it is endemic to the sea and was found only twice: In the area between Cape Elizaveta and Jonas Island at a depth of 515 m at a temperature of $+1.4^{\circ}\text{C}$ and halfway between Cape Terpenye and Onekotan Island at a depth of 1076 m at a temperature of $+2.5^{\circ}\text{C}$. A typical subspecies was found at the Aleutian Islands and at Kodiak Island at a depth of 480-510 m (Rathbyn).

13. *Pandalopsis ochotensis* Kobjakova

Literary indications: "Gagara", 1932, st. NoNo 247; 255 (Kobyakova, 1937).

A semi-bathypelagic form, an endemic of the Okhotsk Sea, was found only twice: In the area between Cape Elizaveta and Jonas Island at a depth of 500 m and on the 500-meter median plateau of the northern half of the Okhotsk Sea at a depth of 504 m. Both finds were made at a water temperature of $+2^{\circ}\text{C}$ at the bottom.

Family of Hippolytidae Ortmann

Genus *Spirontocaris* Eate

In this work we look upon the genus *Spirontocaris* in the broad sense of the word- in the same sense as Ortmann and Rathbun. The system of dividing the genus *Spirontocaris* into six genera (*Spirontocaris* sensu stricto, *Hetairus* Eate, *Eualus* Thallwitz, *Spirontocarella* Brashnikov, *Heptacarpus* Holmes, *Eirulia* Brashnikov), suggested by Brashnikov (1907) and supplemented by Makarov (1941) does not yet require additions. At the moment two works (Rathbun, 1904, and Kobyakova, 1936) contain keys of the North Pacific species of the genus *Spirontocaris*. The table in the Rathbun work includes only American species. The keys in the Kobyakova work contain a number of errata and inaccuracies. For this reason we deem it possible to offer a new key of the species of the genus *Spirontocaris* sensu lato encountered in Soviet Far Eastern waters.

Key to the species of the genus *Spirontocaris* of the Soviet Far East.

1(48) On each side of the rostrum occur 1-4 super-orbital spines.

2(3) On each side of the rostrum occur 3 or 4 super-orbital spines. The anterior edge of the dents of the median crest of the carapace is usually armed with additional dents...

S. prionote.

3(2) On each side of the rostrum occur 1-2 super-orbital spines.
4; 21.

4(21) On each side of the rostrum occur 2 super-orbital spines
5; 14.

5(14) The posterior spine of the median crest of the cephalothoracic carapace occurs to the left of the middle of the cephalothoracic carapace. The dents of the median crest of the cephalothoracic carapace and of the upper edge of the rostrum of large specimens are armed on the upper edge with additional dents. The upper plate of the rostrum

is broader than the lower one or is of the same width. 6;7.

6(7) The pleurae 1-3 of its segments of the abdomen are pointed...
S. lamellicornis

7(6) The pleurae 1-3 of its segments of the abdomen are broadly rounded
8; 11.

8(11) The rachis or stem of the rostrum greatly protrudes beyond the spines of the lower plate of the rostrum. 9; 10.

9(10) The dents of the upper edge of the rostrum are small. The spine of the scaphocerite does not protrude beyond the edge of its lamellar part. The length of the dactylus of the walking leg of the 5-th pair "can be placed 2-2.5 times in the length" of the propodus of this leg. S. murdochii.

10(9) The dents of the upper edge of the rostrum are large. The spine of the scaphocerite protrudes beyond the anterior edge of its lamellar part. The length of the dactylus of the walking leg of the 5th pair fits 3.5-4 times into the length of the propodus of this leg.. S. brevidigitata.

11(8) The rachis of the rostrum does not protrude beyond the anterior spines of the lower edge of the rostrum..12; 13.

12(13) The dactylus of the walking legs of the 5th pair is short its length fits 3.5-4 times into the length of the propodus of this leg. The spines, which arm the lower edge of the dactylus are thick, noticeably curved...S. arcuata...

13(12) The dactylus of the walking legs of the 5th pair is long, its length fits from 2 to 3 times into the length of the propodus of this leg. The spines which arm the lower edge of the dactylus are thin, straight, pointing at an insignificant angle towards the edge of the dactylus....

S. spina.

14(5) The posterior spine of the median crest of the cephalo-thoracic carapace usually occurs in the middle or to the front of the middle of the carapace. The dents of the median crest

of the carapace and of the upper edge of the rostrum always have smooth edges without additional tiny dents. The upper plate of the rostrum is narrower than the lower one..15;16.

15(16) The end of the rostrum protrudes or almost reaches the anterior edge of the scaphocerites. The general shape of the rostrum resembles an isosceles triangle, drawn out along the base, with a vertex pointing downward to the posterior dent of the lower plate of the rostrum. The posterior spine of the median crest of the cephalothoracic carapace occurs to the fore of the middle of the carapace..S.brashnikov...

16(15) The end of the rostrum is far from reaching the anterior edge of the scaphocerites. The shape of the rostrum is different. The posterior spine of the ~~the~~ median crest of the cephalothoracic carapace occurs approximately in the middle of the carapace or aft of the middle of the carapace.. 17;18.

17(18) The rostrum is of a narrow-triangular form, with a very poorly developed upper plate. The maximum height of the rostrum almost equals the diameter of the eye. The end of the rostrum is monodontal. The dents of the median crest of the carapace and of the upper edge of the rostrum gradually become smaller from the middle of the carapace towards the end of the rostrum. The front or anterior dent of the carapace is slightly larger than the posterior dent of the rostrum. The interval between these dents is the same as between the other adjacent dents of the carapace and of the rostrum...

S. phippisii...

18(17) The general shape of the rostrum is broadly triangular (almost equilateral). The upper plate of the rostrum is well developed. The maximum height of the rostrum exceeds the diameter of the eye almost 1.5 times. The end of the rostrum is bidentate or tridentate... 19;20.

19(20) The end of the rostrum protrudes beyond the anterior

edge of the palps or stalk of the cirri of the 1st pair for a distance which equals the length of the last joint of these cirri. The dents of the upper and lower plates of the rostrum have almost straight outer edges. The front dent of the carapace is noticeably larger than the posterior dent of the rostrum and is separated from it by a considerable interval.

S. ochotensis.

20(19) The end of the rostrum is almost on the same level with the anterior edge of the palps of the cirri of the 1st pair. The dents of the upper and lower plates of the rostrum have uniformly convex outer edges. There is no noticeable difference in the size of the posterior tooth or dent of the upper edge of the rostrum and the anterior dent of the carapace...

S. makarovi.

21(4) On each side of the rostrum occurs one super-orbital spine..

22; 23.

22(23) The super-orbital process is of a broadly triangular shape with a broad base and a rounded apex. The dorsal surface of the cephalothoracic carapace has no spines along its middle line and is equipped with a sharp transverse groove. The dorsal side of the telson is without spines....

S. sachalinensis..

23(22) The super-orbital spine is of the usual shape. The dorsal surface of the cephalothoracic carapace, along its middle line, is usually equipped with dents and is always without a transverse groove. The dorsal surface of the telson has 4-9 pairs of lateral spines. ...

24;25.

24(25) The pleurae of the 1st segment of the abdomen are ~~only~~ equipped along the lower edge with 2 large dents. The posterior spine of the median crest of the carapace occurs almost at the posterior edge of the carapace. Adult animals attain a length of 10 cm and more... *S. groenlandica*....

- 25(24) The pleurae of the 1st segment of the abdomen have a rounded lower edge,.. 26;29.
- 26(29) The rostrum is very short. The end of the rostrum does not protrude beyond the edge of the 1st joint of the palma of the cirri of the 1st pair. 27;28.
- 27(28) The lower edge of the rostrum is equipped with 1-2 spines. The first joint of the palma of the cirri of the 1st pair is equipped with 3-4 spines. *S. schrencki*..
- 28(27) The lower edge of the rostrum is without spines; the 1st joint of the palma of the cirri of the 1st pair is equipped with 1 spine... *S. spinirostris*....
- 29(26) The end of the rostrum always protrudes beyond the anterior edge of the 1st of the palma of the cirri of the 1st pair..... 30; 37.
- 30(37) The end of the rostrum does not reach or hardly protrudes beyond the end of the palma of the cirri of the 1st pair... 31;34.
- 31(33) The upper edge of the rostrum is equipped with 1-2 or 3 dents.... 32; 33.
- 32(33) The rostrum is of a "demiplate (senilamellar? Tr.) form, almost lacking an upper plate and with a well developed lower plate. The end of the telson bears 7-9 ciliate spines. The length of the chela of the legs of the 1st pair comprises not less than 60% of the length of the cephalothoracic carapace.... *S. grandimana*...
- 33(32) The rostrum is of a spiniform^{shape} with a thick straight rachis and is almost devoid of the lower and upper plates. The end of the telson bears 4 ciliate spines. The length of the chela of the legs of the 1st pair comprises about 50% of the length of the cephalothorax.. *S. brandt*..
- 34(31) The upper edge of the rostrum is equipped with 5-7 dents..... 35;36.

- 35(36) The walking legs of the 3rd pair reach with their ends the end of the maxillipeds of the 3rd pair. The distance between the base of the rostrum and the posterior dent of the median carina of the carapace comprises about $\frac{1}{4}$ of the length of the carapace. The spine of the scaphocerite protrudes noticeably beyond its lamellar part. In life the animal has a characteristic transverse striped colour. *S. fasciata*.
- 36(35) The anterior ends of the walking legs of the 3rd pair almost reach the anterior end of the scaphocerites. The distance between the base of the rostrum and the posterior dent of the median carina of the carapace comprises about $\frac{1}{3}$ of the length of the carapace. The lamellar part of the scaphocerite protrudes slightly beyond its spine... *S. uschakovi*...
- 37(30) The end of the rostrum protrudes considerably beyond the end of the pelma of the cirri of the 1st pair* ... 38;39.
- 38(39) The end of the rostrum does not reach to the anterior edge of the scaphocerites... *S. heterochaeta*...
- 39(38) The end of the rostrum protrudes beyond or almost reaches the anterior edge of the scaphocerite... 40;41.
- 40(41) The pleura of the 4th segment of the abdomen is without a spine. The pleura of the 5th segment is equipped with a spine on its posterior lower angle (perhaps-corner.Tr.). The upper edge of the rostrum from its base to the end of the rostrum bears 5-6 dents... *S. Jongidactyla*.....
- 41(40) The pleurae of the 4th and 5th segments of the abdomen are equipped with a spine in the posterior lower corner(?). The upper edge of the rostrum from its base to the end of the rostrum bears from 0 to 4 dents.** 42;45.
- 42(45) The upper plate is practically lacking in the rostrum, but it has a well developed sabre-shaped-convex lower plate in the anterior half of the rostrum. The end of the rostrum

* Only in the males of *S. longipes* the end of the rostrum reaches only the end of the second joint of the cirri of the 1st pair.

** This number in specimens of *S. polaris* from the Kara Sea or the Laptev Sea can be too large...

is monodontal. The number of dents on the middle line of the carapace of Far Eastern specimens usually does not exceed 2, at times there is a 3rd dent, located above the base of the rostrum.... 43;44.

43(44) The length of the rostrum comprises 80-110% of the length of the cephalothoracic carapace. The rostrum is straight and the upper edge is usually horizontal or slightly bent upward or downward. The general shape of the rostrum is knife-like... S. polars(polaris)....

44(44) The length of the rostrum 115-125% of the length of the cephalothoracic carapace. The rostrum of our representatives is sabre-shaped curved. The end of the rostrum rises above the straight line, drawn from the middle of the posterior end or edge of the ~~axpx~~ carapace through the base of the rostrum, by $1/7-1/5$ of the length of the rostrum...S.unalaskens

45(42) The rostrum has very narrow upper and lower plates. The end of the rostrum is monodontal or bidentate. There are 3 dents on the middle line of the carapace; at times a 3rd dent occurs near the base of the rostrum, but in that case the end of the rostrum is usually bidentate... 46; 47.

46(47) The median carina of the cephalothoracic carapace begins at the posterior end of the carapace and is equipped with 3 dents, which occur in the anterior third of the carapace. The upper edge of the rostrum is equipped with 2 spines which occur in the posterior half of the rostrum; the anterior half of the rostrum has a smooth upper edge. Each side of the telson has 4-5 spines... S.longips(longipes).

47(46) The median carina of the cephalothoracic carapace begins slightly beyond the middle of the carapace and is equipped with 3 dents situated in the anterior $1/2$ half of the carapace. The upper edge of the rostrum is equipped with 3 dents, the anterior one of which is located in the anterior half of the rostrum. Each side of the telson has 6-9 spines. S.brevipe..

- 48(1) There are no super-orbital spines... 49; 56.
- 49(56) The rostrum is short; its tip does not protrude beyond anterior edge of the pelma of the cirri of the 1st pair... 50; 53.
- 50(53) The dactyli of the walking legs of the 3-5 pairs have spines on the lower edge... 51; 52.
- 51(52) The rostrum is shorter than the eyes; its end does not protrude beyond the anterior edge of the eye. The lower edge of the rostrum is without spines... *S. pusiola*...
- 52(51) The rostrum is considerably longer than the eyes. The lower edge of the rostrum has 2-4 small dents. *S. rectirostris*..
- 53(50) The lower edges of the dactyli of the walking legs of the 3-5 pairs are without spines. 54; 55.
- 54(55) The end of the rostrum protrudes beyond the anterior edge of the 1st joint of the pelma of the cirri of the 1st pair; the upper plate of the rostrum is broad and convex..
S. macilenta...
- 55(54) The end of the rostrum reaches or does not reach the anterior edge of the 1st joint of the pelma of the cirri of the 1st pair; the upper plate of the rostrum is heavily bent upward above the base of the rostrum; the anterior part of the upper edge of the rostrum is almost straight. *S. avina*...
- 56(49) The end of rostrum protrudes beyond the anterior edge of the pelma of the cirri of the 1st pair.. 57; 64.
- 57(64) The dorsal surface of the 3rd segment of the abdomen bears on its middle line a distinct carina, as if made by a claw, which at times passes into a hook-shaped process or into a conical hump... 58; 61.
- 58(61) The anterior smooth, lacking dents, part of the upper edge of the rostrum is considerably less than $\frac{1}{3}$ of the entire length of the rostrum.. 59; 60.

- 59(60) The telson is long; its length equals the length of the 5th and 6th segments of the abdomen taken together. The anterior edge of the lacellar part of the scaphocerite is blunted and is on the same level with the end of the spine of the scaphocerite.... S.ratmanovi..
- 60(59) The length of the telson, measured from the posterior edge of the 6th segment of the abdomen, only reaches the middle of the 5th segment. The anterior edge of the scaphocerite is uniformly rounded and protrudes slightly beyond the spine of the scaphocerite. S.gaimardi....
- 61(58) The anterior smooth, lacking dents, part of the upper edge of the rostrum occupies more than $\frac{1}{2}$ of the entire length of the rostrum.... 62; 63.
- 62(63) The rostrum is almost spiniform; the upper plate is not at all developed, the lower one is very slightly developed. The upper edge of the rostrum is equipped with two small dents. The maxillipeds of the 3rd pair are without an epipodite, but have an exopodite S. middendorffi...
- 63(62) The rostrum is semilamellar (perhaps "demiplate.Tr."); the upper plate is poorly developed, the lower plate is well developed. The upper edge of the rostrum is equipped at times with 2, usually with 3 and at times with 4 small dents. The maxillipeds of the 3rd pair have an epipodite, but no exopodite.... S. Genuculata..
- 64(57) The dorsal surface of the 3rd segment of the abdomen is rounded, geniculate and slightly compressed from the sides, but always without a carina... 65; 74.
- 65(74) The anterior smooth, without dents, part of the upper edge of the rostrum is considerably less than $\frac{1}{2}$ of the entire length of the rostrum.... 66; 67.
- 66(67) The rostrum of adult specimens is long, its ends greatly protrude beyond the anterior edge of the scaphocerites (by about $\frac{1}{2}$ of the length of the rostrum); the length of the rostrum comprises $1\frac{1}{4}$ - $1\frac{3}{4}$ of the length of the carapace.

- The dactyli of the legs of the 3-5 pairs have very thin, closely adfering barely noticeable spines on the lower edge; the extreme one of them is long and forms, together with the terminal claw something resembling a chela... *S. biunguis*....
- 67(66) The end of the rostrum does not reach the anterior edge of the scaphocerites or protrudes slightly beyond them; the length of the rostrum does not exceed or slightly exceeds the length of the carapace. The dactyli of the legs of the 3-5 pairs have well developed lateral spines, which are not adnering closely; the extreme one of them does not form, together with the terminal claw, something resembling a chela... 68;69.
- 68(69) All the walking legs are without epipodites; the maxillipeds of the 3rd max pair have an epipodite...*S. cant Schatica*...
- 69(68) At least 1 pair of the walking legs has epipodites..70;71.
- 70(71) 1-3 pairs of walking legs with epipodites. The rostrum is straight .. *E. grebničkii*....
- 71(70) 1-2, at times only 1 pair of walking legs has epipodites, The rostrum is more or less curved.... 72;73.
- 72(73) The pleurae of the 4 and 5 segments of the abdomen terminate in a point. The rostrum is curved, demiplate; its lower plate is noticeably better developed than the upper one....
S. suckleyi..
- 73(72) The pleura of the 4th segment of the abdomen is rounded; the pleura of the 5th segment terminates in a point. The rostrum is slightly curved, almost spiniform, has very poorly developed upper and lower plates. .. *S. townsendi*...
- 74(65) The anterior smooth, lacking dents, part of the upper edge of the rostrum considerably exceeds $\frac{1}{2}$ of the entire length of the rostrum.
- 75(76) The lower edge of the rostrum is equipped with 2-3, seldom 4 dents. The walking legs of the 1st pair have epipodites, the legs of the 2-5 pairs are without epipodites.*S. fabricii*...

76(75) The lower edge of the rostrum is equipped with 4-7 dents. There are epipodites on the legs of the 1-2 or 1-3 pairs...

77; 78.

77(76) The lower plate of the rostrum is very poorly developed.

The rostrum is spiniform, slightly curved, horizontally directed (the upper edge of the rostrum is almost at the level of the middle line of the dorsum). The scaphocerites are considerably longer than the carapace; the lamellar part of the scaphocerite protrudes considerably beyond its spine. The walking legs of the 3rd pair are without epipodites.... *S. flexa*....

78(77) The lower plate of the rostrum is well expressed. The rostrum is semilamellar, ~~xxx~~ turned upwards. The scaphocerites are slightly shorter than the carapace; the anterior edge of the lamellar part of the scaphocerite is practically on the same level with its spine. The walking legs of the 3rd pair have epipodites..... *S. japonica*....

* 14. *Spirontocaris prionota* (Stimpson).

Collections of the Pacific Institute: "Lebed", 1934, st. No. 35. "Lebed", 1938-39, st. No. 69; 70; launch-station No. 6; 18; 65.

Literary indications: "Gagara", 1932, st. No. (203) (Kobyakova, 1937).

We had at our disposal two large specimens from Yakshina bay, two from the area of Cape Kambalny and six from the area of Cape Khariuzov; the distinguishing features of all the specimens agreed with the detailed description by Kobyakova and therefore there can be no doubt in regard to the wide range of *S. prionota* in the Okhotsk Sea....

It is a shelf-form. It ranges along the American coast from Unalashki to the Bay of Monterey (California). At our coasts it is known from the Bering island, Avacha bay, La Perouse Strait, from the "Primorye" (Maritime Territory. Tr.) (From Nelma bay to the gulf of "zaliv Petra Velikogo"). In Japan it

was found at Komori (area of the Sangar Bay). It was encountered at depths from 23 to 126 m, in the Okhotsk Sea- from 23 to 56 m.

* 15. *Spirontocaris arcuata* Rathbun.

Collections of the Pacific Institute: "Lebed", 1934, st. NoNo: 2; 3; 4; 16 (17-fry); 32; 35; 37; 43; 44; 45; 51; ichthyolog. st. No 59: "Lebed", 1935, st. NoNo: 4; 28; 29; 39; "Lebed", 1938-39, st. NoNo: 70; 71; 98; launch-station NoNo: 18; 65.

Field determinations: "Lebed", 1937, st. No 262 (Volk).

Literary indications: (NE of Sakhalin Bay in the Ryan area, in Nagayev Bay) (Kobyakova, 1937).

The males of *S. arcuata*, as correctly observed by Kobyakova and Makarov, resemble the males of *S. spina intermedia* very much. "Outwardly the male of *S. arcuata* resembles very much the males of *S. spina intermedia*; however, it can be easily distinguished from the latter by three long maxillary legs, by the spine of the pelma of the scaphocerite, which exceeds the lamellar section, by an almost complete lack of a process on the 3rd abdominal segment and by the structure of the dactyli of the last three pereopoda" (Makarov, 1941). When studying our own material we could not find a sound basis for an identification of small males of both species by means of the first three characteristics adduced by Makarov. In *S. arcuata* and also in *S. spina intermedia* we observed prominent spines of the scaphocerite and also spines that did not reach the edge of the lamellar part and also prominent ends of the external maxillipeds and also those that did not reach the edge of the scaphocerite. But the structure of the dactylus of the walking legs of the 5th pair was found to be an extraordinary constant and characteristic feature. For this reason we deemed it advisable to aduce drawings of the structure of the dactyli of these two species.

Ill. 1. (Left) dactyli of the right walking legs of the 4th pair: a-Spirontocaris arcuata Rathbun. "Lebed", 1939, st. 98, X 15; b-Spirontocaris spina intermedia Kobjakova, "Lebed", 1939, st. 586, X 15.

Ill. 2. (Right) cephalothoracic carapace of a female of Spirontocaris makarovi makarovi Kobjakova, launch-station 65, X 3.2 .

It is a shelf-form. There exist data on the fact that it was encountered in the Bay of Dolphin and Union (Rathbun, 1919). In the Chukchi Sea it penetrates as far north as Herald Bank. It moves as far south as the Fuca Strait and the "Yuzhnoye Primorye" (South Maritime Territory. Tr.). It was encountered at depths from 5 to 287 m (in the Okhotsk Sea from 23 to 287 m). It does not occur in the Atlantic.

* 16. Spirontocaris spina intermedia Kobjakova.

Collections of the Pacific Institute: "Plastun", 1933, st. No 59; "Lebed", 1934, st. NoNo: 2; 26; 32; 37; 44; 51; "Lebed", 1935, st. NoNo: 5; 21; 46; "Lebed", 1938-39, st. No 88; launch-station: No 66.

Field determinations: "Lebed", 1937, st. NoNo: 263; 264; "Omar", 1937, st. NoNo: 52; 53 (Volk).

Literary indications: "Storozh", st. No 49 (Brazhnikov, 1907); (entrance to Tauysk Bay); (area of the Shantar islands); (Sakhalin Bay); (near Cape Elizaveta) (Kobyakova, 1937).

It is a shelf-form, it ranges in the Chukchi Sea to the parallel of $70^{\circ} 30'$ northern latitude, in the Bering Sea, on the Pacific coast of America to Lituya Bay (Alaska), in the Okhotsk Sea in the areas of Cape Utkolokski, the Tauysk Bay, Cape Elizaveta at depths from 27 to 230 m. Reports that it was encountered in the area of Cape Khariuzov- Cape Utkolokski are adduced for the first time in connection with the collections of the expedition in 1934 and 1938 aboard the trawler

"Lebed". In the Sea of Japan it is replaced by the subspecies *S. spina laevidens* (Kobyakova, 1937), in the northern European seas - by the subspecies *S. spina spina* (Soverby). The species is lacking in the Laptev Sea and in the Eastern Siberian Sea. At the Arctic coast of Canada places of occurrence under most severe conditions ($70^{\circ} 13' N$; $140^{\circ} 50' W$ and in the Dolphin and Union Strait - Stephens, 1935) are reported without any subspecific determinations.

Brazhnikov (1907) writes that fully typical specimens were encountered by him only on the Pacific coast of Kamchatka and in Shantar Bay. On the Okhotsk Sea coast of Sakhalin he encountered "receding forms", which he did not venture to assign them to *S. spina*. It is very likely that these specimens were either males of *S. spina* or males of *S. arcuata*.

* 17. *Spirontocaris murdochi* Rathbun.

Collections of the Pacific Institute: "Plastun", 1933, st. NoNo: 11; 13; "Lebed" 1934, st. No 43; "Omar", st. No 64; "Lebed", 1938-39, st. NoNo: 176; 194; 323; 354; 377; 423; 502; 507; 698; 729.

Field determinations: "Omar", 1937, st. NoNo: 5; 41; 63; 67; (Volk, Vinogradov); "Lebed", 1937, st. NoNo: 342; 343 (Volk, Vinogradov).

Literary indications: "Albatros", 1896, st. 3650 (Rathbun, 1904); "Storozh", st. No 11 (Brazhnikov, 1907); (Sakhalin Bay); (NE shore of Sakhalin); (at Ayan); (Nagayevo Bay); (along the SW coast of Kamchatka) (Kobyakova, 1937).

It is a shelf-form; it was encountered at Cape Franklin (somewhat to the west of Cape Barrow), in the Bering Sea, in Avacha Bay, in the Okhotsk Sea, in the northern part of Tartary Strait at depths from 12 to 244 m (in the Okhotsk Sea - from 27 to 184 m). Judging by the collections of the Pacific Institute it is very common along the middle part of the West-Kamchatka coast....

18. *Spirontocaris phippsii* (Kröyer).

It is often adduced under the synonym of *S. turgida* (Kröyer).

Collections of the Pacific Institute: "Lebed", 1934, №№ st. NoNo:32; 41; "Lebed", 1935, st. No 1.

Literary indications: (Nagayevo Bay) (Kobyakova, 1937).

It is a circumpolar form, an inhabitant of the shelf; it ranges along the Arctic coasts of America and Asia (Stephenson, 1935, and Makarov, 1941); it ranges along the Pacific coast of America as far as Shumagin island, on the Asiatic coast as far as "Zaliv Petra Velikogo" Bay. It was encountered at depths from 10 to 142 m. In the Okhotsk Sea it is known from Nagayevo Bay and was discovered by us in the collections of the expedition aboard the trawler "Lebed" in the area of Cape Utkolokski and in the Shantar area at depths from 20 to 115 m.

* 19. *Spirontocaris makarovi makarovi* Kobyakova.

Collections of the Pacific Institute: "Lebed", 1934, st. No 35; "Lebed", 1938-39, st. No 68; launch-station NoNo:64;65.

Kobyakova supplied the first information on this form in 1936 and placed it together with the form *S. makarovi spatula* in a table to be used as a key. In 1937 Kobyakova published the most characteristic features of a second form - *S. makarovi spatula*, which occurs only in the Sea of Japan. In both cases Kobyakova refers to the unpublished manuscript of A.M. Volk. Judging by the remarks of Kobyakova the form which interests us has a short rostrum the apex of which does not protrude beyond the stalk or stem of the 1st pair, and the upper plate of which is not developed as well as the lower one and forms a deep depression above the eyes; the median carina of the cephalothoracic carapace is equipped with no more than 3 denticles. Kobyakova is of the opinion that this form is related to *S. ochotensis*..

The collection of the Pacific Institute contains specimens, which were determined by A.M.Volk himself, by means of which it was possible to identify the remaining specimens of this species at our disposal and ^(on the basis) by means of which it was possible to compile a more complete description of the species.

The rostrum, by its shape, resembles an equilateral spherical (with convex sides) triangle (in *S. ochotensis ochotensis* the shape of the rostrum is equilaterally triangular); the pelma of the rostrum rises uniformly or evenly toward the end or ~~the~~ tip of the rostrum (in *S. ochotensis ochotensis* the pelma is almost horizontal with an anterior part which is curved upward); the length of the rostrum comprises about 63% of the length of the cephalothoracic carapace, which was measured from the middle of the posterior edge of the carapace to the posterior edge of the orbit (in *S. ochotensis ochotensis* -58-70); the end of the rostrum is bidentate (in *S. ochotensis ochotensis* it is bidentate or tridentate) and (in situ) occurs on almost the same level with the anterior edge of the stalk of the cirri of the 1st pair (in *S. ochotensis ochotensis* it protrudes for a distance which equals the length of the ultimate joint of the stalk). The dents of the median crest of the carapace are broad uniformly bent forward, with apices overhanging the rising or ascending posterior edge of the spine occurring in front of it (in *S. ochotensis ochotensis* these dents are narrower, of a triangular shape with apices bent forward, overhanging the distinct intervals between the dents); the dents of the rostrum also have uniformly curved outer edges (in *S. ochotensis ochotensis* the outer edges of the dents are almost straight). The dents of the median crest of the carapace and of the upper end of the rostrum more or less gradually diminish in size toward the anterior end of the body of the animal (in *S. ochotensis ochotensis* the anterior dent of the carapace is considerably

larger than the posterior dent of the upper edge of the rostrum and is separated from it by a noticeable interval).

The formula of the equipment of the median crest of the carapace and of the rostrum of the females, the object of the description, is as follows:

$$4 + \frac{7}{4} + 2,$$

but in all the seven specimens at our disposal it fluctuates as follows:

$$3-4 + \frac{6-8}{2-4} + 2.$$

In *S. ochotensis ochotensis*, according to the data by Brazhnikov, it is as follows:

$$3-4 + \frac{7-11}{2-5} + 2-3$$

In regard to the remaining features it resembles *S. ochotensis ochotensis*, i.e. it has stylocerites and scaphocerites of a similar structure (the lamellar edge of the scaphocerite is on the same level or slightly exceeds the spine of the scaphocerite), the length of the chela from the legs of the 1st pair comprises less than one half of the length of the cephalothoracic carapace, the length of the dactyli of the legs of the 3-5 pairs is a little better than 3.5 smaller or shorter than the length of the propodus, the pleurae of the 4th and 5th segments of the abdomen are equipped with barely noticeable spines, the lateral edges of the telson bear 4 spines each and its posterior edge has 4 simple or plain and 2 ciliated spines. The same as also in all the species of the genus *Spirontocaris sensu stricto* there is an epipodite and an exopodite on the maxillipeds of the 3rd pair and epipodites occur on the walking legs of the 1-3 pairs. The anterior super-orbital spine is well developed. The female selected by us as an object for description has the following dimensions:

Length of cephalothoracic carapace	7.5 mm
Length of rostrum	4.7 mm
Diameter of eye	1.3 mm
Maximum height of rostrum	2.1 mm
Width of the base of the spines of the median crest of the cephalothoracic carapace	0.5-0.7 mm
Distance between the bases of these spines is	about 0.2 mm
Length of abdomen	21 mm
Length of the 6th segment of the abdomen	3.8 mm
Length of telson	5.8 mm
Length of pelma of the scaphocerite	4.2 mm
Length of chela of legs of the 1st pair	3.0 mm
Length of dactylus of legs of the 4th pair	(the 5th pair was lost) 1.05 mm
Length of the propodus of legs of the 4th pair	3.8 mm

This description shows, also ~~xxx~~ drawing 6 in the work by Makarov (1941), that the two shrimps found by him at Cape Olyutorka belong to our species.

All our specimens were obtained at Cape Khariuzov at a depth from 17 to 29 m.

A Sea of Japan subspecies was discovered in the "Zaliv Petra Velikogo" bay and in the southern part of the "Prmorye"¹ (Maritime Territory.Tr.) at depths from 1.5 to 15 m.

* 20. *Spirontocaris ochotensis ochotensis* (Brandt)

Collections of the Pacific Institute: Launch-station NoNo: 10;32:(the finding of this species at st. 10 was earlier reported by Zaks, 1929).

Literary indications:(Okhotsk Sea- Shantar area)(Brandt); "Storozh", st.NoNo: 13; 16; Lebyazhya Bay of Peoktist island Yakshin Bay on Bolshoy Shantar island..

It is a coastal form; it occurs in the following areas: Cape Olyutorka, Aragin'ski Island, Shantar bay, Terpenye and Hakkodate. It occurs in the collections of the Pacific Institute among the collections made in the Tuysk Strait. In the Okhotsk Sea it ranges from the ebb-line to 200 meters.

* 21. *Spirontocaris brazhnikovi* Kobjakova

Collections of the Pacific Institute: Launch-station No. 10; 12; 30; 39; (The finding of this species at st. 10 was reported earlier by Zaks (1929)).

Literary indications: "Storozh", st. No 13 (Brazhnikov, 1937); "Krasny Yakut", st. 158/43 (Kobyakova, 1937).

It is a coastal form. It is known to occur in Avacha Bay, Nagayevo bay, at Cape Terpenye and Petrov Island (southern Primorye). The collections of the Pacific Institute contain specimens gathered at Olski Island. The specimens collected by Zaks at Bolshoy Shantar Island, kept in the museum of the Pacific Institute, ~~were~~ belong, as rightly assumed by Kobjakova (1937), to this species. This form ranges in the Okhotsk Sea from the littoral to a depth of 15 meters.

* 22. *Spirontocaris groenlandica* (J.O. Fabricius)

1937. *Hetairus groenlandica* Kobjakova

Collections of the Pacific Institute: "Lebed", 1934, st. No 26; "Lebed", 1935, st. NoNo: 1; 4; 5; 21; 28; 30; 60; launch-station No (64-fry).

Literary indications: "Albatros", 1896, st. No 3645 (Rehder); "Storozh"; st. NoNo: 7; 10; 17; 19; 43; 44; 46 (Brazhnikov, 1937) (in the northern and northwestern part of the sea); (in the area of the mouth of the Icha river and north along the west coast of Kamchatka) (Kobyakova, 1937).

It is a shelf-form, occurring from Greenland to the coast of Massachusetts, at Grindel Land, in the Dolphin and Union

Strait and from the part of the Chukchi Sea that adjoins Lering Strait to Puget Sound (Washington) and the Noto (Honsu) Peninsula at depths from 11 to 216 m (there is one report that the form was found at a depth of 664 m); in the Okhotsk Sea to a depth of 150 m.

23. *Spirontocaris brandti* (Brashnikov)

1937. *Heterurus brandti* Kobjakova.

Literary indications: "Storozh", st. 13 (Brashnikov) 1907).

It is a coastal form. It was encountered at Cape Terpenye at a depth of 13 m and in the gulf "Zaliv Petra Velikogo" at depths from 10 to 55 m.

* 24. *Spirontocaris schrencki* Kobjakova

1937. *Heterurus schrencki* Kobjakova

Collections of the Pacific Institute: "Lebed", 1934, st. No 3; "Lebed", 1935, st. No 1.

Literary indications: "Storozh", st. No 17; 49 (Brashnikov, 1907); "Gagera", 1932, st. 203 (Kobyakova).

Brashnikov had three female specimens at his disposal; it seems that Kobyakova also had several females. We had one female from station 32 and a male from station 1. We will adduce the features which distinguish a male and females of this species.

Ill. 3. Cephalothoracic carapace of a male of *Spirontocaris schrencki* (Brashnikov) "Lebed", 1935, st. 1, K3.7...

The cephalothoracic carina begins at the posterior third of the carapace, but is equipped with spines only in the anterior fifth of the carapace. There are three slight furrows on the lateral surface. The end of the rostrum does not quite reach the anterior edge of the stalk of the cirri of the 1st pair. The equipment of the rostrum and of the median carina of the cephalothoracic carapace is as follows:

2 + ---²--- 1

The dent of the lower edge of the carina "sits" at ^{its} the very end, the remaining lower edge of the rostrum is smooth. The super-orbital dent (the basic distinguishing feature from a female) is very large, it has an upper edge, which runs parallel to the upper edge of the rostrum, that "covers" ^{it} for the entire extent of the dent; the end of the super-orbital dent protrudes (on the other hand) beyond or almost reaches the base of the posterior dent of the rostrum; the depression under the super-orbital dent is narrow and deep and has almost parallel edges. The 3rd segment of the abdomen is of the same construction as in the female. The pleurae of the 4th segment of the abdomen are rounded. The dorsal side of the telson has 5 pairs of lateral spines and its posterior edge has 6 spines of which the two middle ones are ciliated. The anterior edge of the 1st joint of the right hand cirrus of the 1st pair is equipped with 3 and that of the left- with 4 small spines. The stylocerites and the scaphocerites are of the ^{same} structure as in the female. The maxillipeas of the 3rd pair protrude beyond the anterior edge of the scaphocerites for $\frac{2}{3}$ of the length of their ultimate joint. The length of the chela of the walking legs of the 1st pair comprises 80% of the length of the cephalothoracic carapace. The dactylus of the legs of the 5th pair is very short, its length "fits" 7.5 times into the length of the propodus of this leg. The same as in a female the maxillipeds of the 3rd pair are equipped with an epipodite, but lack an exopodite; the walking legs of the 1-3 pairs have epipodites. The dimensions of the body of the described male are as follows:

Length of cephalothoracic carapace	6.9 mm
Length of rostrum	4.7 mm
Length of super-orbital spine from the posterior edge of the depression below to the point	1.45 mm
Diameter of eye	1.2 mm

Length of abdomen	18 mm
Length of 6th segment of abdomen	3.5 mm
Length of telson	4.5 mm
Length of pedicel of scaphocerite	4.4 mm
Length of maxillipeds of 3rd pair	14 mm
Length of chela of walking legs of 1st pair	5.5 mm
Length of dactylus of legs of the 5th pair	0.6 mm
Length of the propodus of the legs of the 5th pair	4.5 mm

It is a shelf-form. It is known to occur in the Bay of Shantar, in the area north of Cape Terpenye, in La Perouse Strait, in the area of Cape Solovyev (the northern part of Tartary Strait (Russian: Tatarskiy Proliv.Tr.) and in the area of Kruz Karamzin island ("Zaliv Petra Velikogo" bay); it was encountered at depths from 53 to 105 m (at one station at a depth of 37-55 m). The collection of the Pacific Institute contains one female from the area of Cape Utkolokski (west coast of Kamchatka) caught at a depth of 105 m at a temperature of +2.0°C and one male from the area of Cape Borisov (Shantar area), caught at a depth of 75 m and at a temperature of 0°C.

25. *Spirontocaris spinirostris* (Kobjakova)

1937. *Heterurus spinirostris* Kobjakova

Literary indications: "Gagara", 1932, st. No 248 (Kobyakova, 1937).

It was encountered only once at the Jonas Island at a depth of 182 m.

* 26. *Spirontocaris polaris* (Sabine)

1937. *Heterurus polaris* Kobjakova

Collections of the Pacific Institute: "Lebed", 1935, st.No.1; 4; Launch-station No.64.

Literary indications: "Albatros", st. No 3645 (Rathbun, 1904); "Storozh", st. No 6 7; 17 (Brazhnikov, 1907); "Krasny Yakut", 1930, st. No 167/52 (Kobyakova, 1937).

It is a circumpolar form, a shelf-dweller; it was found in all the Arctic seas which lave the shores of Europe, Asia and America. In Europe it moves south as far as the Skagerrak, along the Atlantic coast of America down to Cape Cod, on the Pacific coast down to Kodiak island, on the Asiatic coast- to the SE coast of Sakhalin Island, at depths from 3 to 390 m (in the Okhotsk Sea- from 17 to 90 m). In the Okhotsk Sea it is known to exist on the Sakhalin coast and in Nagayeyo Inlet. The collections of the Pacific Institute contain specimens obtained in the Shantar area and at Cape Khariuzov.

* 27. *Spirontocaris heterochaela* (Kobjakova)

1937. *Hetairus heterchaela* Kobjakova

Collections of the Pacific Institute: "Lebed", 1935, st. No. No 28; 30.

Literary indications: "Gagara", 1932, st. 248.

Five males and two females, one of which contained roe, that were at our disposal resembled in all respects the description by Kobyakova.

The range of this species is limited by the Glacial-Okhotsk area. So far it has been found at three stations:

248 st. "Gagara"	28 st. "Lebed"	30 st. "Lebed"
area of Jonah Isle	area of Jonah Isle	between Jonah Isle and Enkan Island
55°10' north. lat.	56°30' north. lat.	57°01' north. latitude
143°19' east. long.	143°30' east. long.	143°23' east. longit..
182 m	120 m	150 m
Pebbles & rocks	---	Pebbles
+ 0.51°C	----	- 0.5°C
S = 33.28%		S = 33.62%

28. *Spirontocaris grandimana* (Brazhnikov)1937. *Heterurus grandimana* KobjakovaLiterary indications: "Storozh", st. NoNo 1; III 11; 17; 19;
(Brazhnikov, 1907) "Gagara", 1932, st. No 248 (Kobyakova, 1937).

It is a shelf-form. It is known to exist in the areas of Bering Island, of Cape Kronotskiy (east coast of Kamchatka), of Jonah Island, on the SE coast of Sakhalin and in Sea of Japan from the northern part of Tatarskiy Proliv to "Zaliv Petra Valikogo" Bay. It was encountered at depths from 15 to 182 m (in the Okhotsk Sea from 27 to 182 m).

* 29. *Spirontocaris unalaskensis ochotensis* (Kobjakova)1937. *Heterurus unalaskensis ochotensis* KobjakovaCollections of the Pacific Institute: "Lebed", st. NoNo 15, 27.
Literary indications: "Krasny Yakut", 1930, st. No 134/19;
"Gagara", 1932, st. No 248; 252.

Five well preserved specimens that were at our disposal, possessed features which distinguished this subspecies from the typical form.

It is a semi-bathypelagic form, the same as also the other two subspecies: *S. unalaskensis unalaskensis* Rathbun and *S. unalaskensis japonica* (Kobjakova). The Okhotsk Sea subspecies was discovered five times: In the area of Jonah Island, between Jonah Island and Cape Elizaveta and on the 500-meter median plateau of the northern half of the Okhotsk Sea at depths from 182 to 380 m. A typical subspecies was found north of Unalyashki at a depth of 640 m, the Sea of Japan subspecies- in the "Tatarskiy Proliv" and in the southern part of the Sea of Japan at the coast of Yamaguchi province of Honsu Island at a depth of 391 to 669 m.

30. *Spirontocaris uschakovi* (Kobjakova)1937. *Heterurus* ~~sp~~ *uschakovi* Kobjakova

Literary indications: "Gagara", 1932, st. No 248 (Kobjakova, 1937)

It was found only on one occasion in the area of Jonah Island at a depth of 182 m.

31. *Spirontocaris fasciata* (Kobjakova)

1937. *Hetairus fasciata* Kobjakova--

Literary indications: "Krasny Yakut", 1930, st. No 158/43..

This species was described by Makarov in 1935 under the name of *Hetairus zebra*; later on Makarov decided to replace this name as a nomen preoccupatum with *H. fasciata*. This was reported by Kobyakova in the work of 1937.

The coastal form, encountered at Cape Olyutorski, at Karaginski Island, at Bering Island, in Avacha Inlet and in Nagayev Bay, from the ebb-line to a depth of 32 m (in the Okhotsk Sea- in the littoral).

The material of the Pacific Institute contains one very small and young specimen of a shrimp, which probably belongs to this species; it occurs in the Dulkeit collections gathered at Olski Island.

32. *Spirontocaris brevipes* (Kobjakova)

1937. *Hetairus brevipes* Kobjakova

Literary indications: "Gagara", 1932, st. No 252 (Kobyakova, 1937).

It is a semi-bathypelagic form, an endemic of the Okhotsk Sea; it was found on one occasion- on the 500-meter median plateau of the northern half of the Okhotsk Sea at a depth of 335 m at a temperature of +1.1°C.

33. *Spirontocaris longidactyla* (Kobjakova)

1937. *Hetairus longidactyla* Kobjakova

Literary indications: "Gagara", 1932, st. No 211; 255 (Kobyakova, 1937).

It is a semi-bathypelagic form, an endemic of the Okhotsk Sea, it was found on two occasions at Cape Terpenye and on the 500-meter plateau of the northern half of the Okhotsk Sea at a depth of 443 and 504 m.

* 34. *Spirontocaris camtschatica* (Stimpson)1937. *Eualus camtschatica* Kobjakova

Collections of the Pacific Institute: Launch-station NoNo 10, 30, 32, 64.

Literary indications: "Storozh", st. NoNo 11, 13 (Erazhnikov, 1907); "Krasny Yakut", 1930, st. No 144/29.

It is a shelf-form and is known to exist on the American coast of the Chukchi Sea (Cape Lisburne), in the Bering Sea (in Bering Strait and at St. Lawrence I., at the Pribyloff islands, at Bering Island), in the Sea of Japan (from Sovietskaya Gavan to "Zaliv Petra Velikogo" bay), on the Pacific coast of Japan (Tokyo Bay). It was encountered at depths from 0 to 108 m (in the Okhotsk Sea - up to 37 m). The collections of the Pacific Institute contain specimens caught in the area of Cape Khariuzov, at Olski Island and at Bolshoy Shantar Island...

35. *Spirontocaris suckleyi* (Stimpson)1937. *Eualus suckleyi* Kobjakova.

Collections of the Pacific Institute: "Lebed", 1934, st. NoNo 32, 37, 41, 51; "Lebed", 1935, st. NoNo 4, 5, 9, 39.

Literary indications (north of Cape Elizaveta) (Sakhalin Bay) (entrance to Tauyskaya Guba) (Tauysk Inlet; perhaps named after the Tauy river. Tr.) (Kobyakova, 1937).

It is a shelf-form; it was encountered on the Asiatic coast of the Chukchi Sea (at Cape Schmidt, west of Cape Vankarem), it ranges in the northern part of the Pacific Ocean from the Bering Sea south to Washington and Sakhalin Bay at depths from 10 to 297 m, in the Okhotsk Sea - from 49 (according to Kobyakova - from 27) to 189 m. It is known to exist in Tauyskaya Guba; our collections contain specimens from the area of Cape Khariuzov and from several stations scattered inside the triangle of Ayan Bay - Bolshoy Shantar Island - Cape Maria.

36. *Spirontocaris townsendi* Rathbun..

Eualus townsendi Kobjakova

Collections of the Pacific Institute: "Lebed", 1938-39, st.No 9.
Literary indications: "Gagara", 1932, st.NoNo 216, 248 (Kobyakova, 1937).

This form was encountered on the shelf and on the slope. It ranges on the west coast of America from the Pribyloff Islands to Puget Sound (Washington). It is known to exist in the Okhotsk Sea in the areas of Jonah Island and Alaid Island; the collections of the Pacific Institute contained specimens brought in from the area of Cape Khariuzov. It was encountered at the coast of Primorye south of the 48th parallel to "Zaliv Petra Velikogo" Bay. It was encountered at depths from 37 to 630 m, in the Sea of Okhotsk - from 123 to 591 m.

* 37. *Spirontocaris middendorffi* (Breshnikov)

1937. *Eualus middendorffi* Kobjakova

Collections of the Pacific Institute: Launch-station No 10
Literary indications: "Storozh", st. NoNo 1, 11, 12, 27 (Breshnikov), 1907), "Krasny Yakut", 1930, st. 134/19

It is a shelf-form. It is known to exist in the areas of Cape Elizaveta, of the Terpenye and Aniv bays, of the area of the Sea of Japan at the entrance into La Perouse Strait and of the Primorye from the northern part of Tatarskiy Proliv to "Zaliv Petra Velikogo" Bay. The collections of the Pacific Institute contain specimens gathered by Zaks at Bolshoy Shantar Island. It was encountered at depths from 6 to 133 m; in the Okhotsk Sea - from 6 to 37 m and 79 m; Kobyakova reported a depth of 287 m.

38. *Spirontocaris flexa* Rathbun

1937. *Eualus flexa* Kobjakova

Collections of the Pacific Institute: "Plastun", 1933, st. No 13; "Lebed", 1934, st. NoNo 26, 35; "Lebed", 1935, st. NoNo 1, 4, 21; launch-station NoNo 64, 65.

Literary indications: "Storozh", st. No 11 (Brazhnikov), 1937; "Krasny Yakut", 1930, st. NoNo 150/35; 174/59; "Ara", 1932, 1933; st. No 23/6 (Kobyakova, 1937).

It is a shelf-form, which ranges from Bering Strait to California and the Sea of Japan. It is known to exist on our coast, namely, the Bering Strait, Capè Chaplin, Cape Navarin, Cape Olyutorsk, the Commander Islands, the SE coast of Kamchatka, Nagayevo Inlet, Ayan, Sakhalin Bay, Terpenye Bay and in the Sea of Japan in the area adjoining the La Perouse Strait. It ranges at depths of 17 to 140 m (in the Okhotsk Sea - to 75 m). The collections of the Pacific Institute contain specimens originating from the area of Cape Khariuzov and the area of the mouth of the Ozernaya river (west coast of Kamchatka).

* 39. *Spirontocaris fabricii* (Kroyer)

1937. *Eualus fabricii* Kobjakova

Collections of the Pacific Institute: "Plastun", 1933, st. No 13; "Lebed", 1934, st. NoNo 35, 37, 47; "Lebed", 1935, st. NoNo 4, 21, 59; "Lebed", 1938-39, st. NoNo 69, 70, 71; launch-station NoNo 6, 10, 18, 63, 64, 65.

Literary indications: "Albatros", 1896, st. NoNo 3645, 3649 (Rathbun), 1904); "Storozh", st. NoNo 1, 2, 19, 20, 27 (Brazhnikov, 1937); (in Aniv Bay), (near Ayan) (in Nagayevo Inlet) (Kobyakova, 1937).

The specimens at our disposal were found to be perfectly typical, with the exception of certain individuals, in which the number of the dents of the lower plate of the rostrum reached 4 (not more than 3, according to Brazhnikov). Thus the formula of the equipment of the rostrum and of the cephalothoracic carapace must look as follows:

$$2 - 3 + \frac{0 - 2 + 0}{2 - 4} + 1$$

It is a shelf-form, which, ranges similarly to *Spirontocaris*

groenlandica, i.e. it is lacking in the European seas and along the Arctic shores of Asia. On the Atlantic coast of America it was found from Greenland to Massachusetts Bay; it was found in Dolphin and Union Strait, in the areas of the Chukchi Sea adjoining Bering Strait and from there it ranges to Cook Bay (Alaska) and "zaliv Petra Velikogo Bay, at depths from the ebb-line to 183 m. It is known to occur in the Okhotsk Sea in Aniv Bay, in the area of Cape Terpenye, in the area of Mt. Ayan (perhaps the town of Ayan. Tr.) and of Nagayev Inlet at depths from 6 to 79 m. The specimens in the collections of the Pacific Institute originated from the Shantar area, of Cape Kamalny, from the area of the mouth of the Ozernaya river, from the area of Cape Khariuzov...

40. *Spirontocaris biunguis* Rathbun

1937. *Eualus biunguis* Kobjakova

Literary indications (along the east coast of Sakhalin), (at \neq Jonah Island), (in the southern part of the coast of Kamchatka) (Kobyakova, 1937).

A semi-bathypelagic form, which ranges from the latitude $\pi\pi$ of Cape Navarin in the Bering Sea to Oregon, Sado Island (the Honsu Sea of Japan coast) and the "zaliv Petra Velikogo" Bay at depths from 90 to 2090 m; in the Okhotsk Sea - from 307 to 1450 m..

41. *Spirontocaris pusiola* (Kroyer)

1941. *Heptacarpus pusiola* Makarov

Collections of the Pacific Institute: "Lebed", 1934, st. No 41

Only one small, but perfectly typical specimen, caught in the area of Cape Khariuzov at a depth of 115 m, was at our disposal. Therefore the fact this species occurs in the Okhotsk Sea cannot be doubted.

It is an amphiboreal form; an inhabitant of the shelf, in the southern parts of its range it descends into the bathyal. It occurs from Greenland to Nova Scotia; it was discovered up to 72° 56' of northern latitude in the Chukchi Sea; it is common in the Bering Sea (on the American coast to Bristol Bay), it was found in Avacha Inlet; it is common in the Okhotsk Sea; In the Sea of Japan it was found from the "Tatarskiy Proliv" to "zaliv Petra Velikogo" Bay. It was encountered at depths from 27 (in the Okhotsk Sea- from 46) to 267; in the Sea of Japan it descends to a depth of 1380 m.

(* 43. *Spirontocaris* *sachalinensis* (Brashnikov)

1937. *Birulia sachalinensis* Kobjakova

Literary indications: "Storozh", st. NoNo 3, 4, 7, 13, 27 (Brashnikov, 1907).

It is a shelf-form. It ranges along the SE coast of Sakhalin from Cape Terpenye to Cape Kril'on, in the Sea of Japan in the area of the entrance to La Perouse Strait and along the coast of the Primorye from Cape Kekurny to Furugel'ma Island at depths from 3 to 102 m (in the Okhotsk Sea- from 13 to 37 m).

The Family of Palaemonidae Bate

Genus *Leander* Desmarest

* 44. *Leander paucidens* (de Haan)

Collections of the Pacific Institute: Launch No 70.

Literary indications: Iturup Island, Lake Syana (Doflein, 1906); Sakhalin coast north of Cape Aniv, Lake Tunaycki (Brashnikov, 1907); the Tym river (Derzhavin, 1930).

It is an estuarine form encountered in brackish ^{waters} and fresh water-bodies occurring at a short distance from the sea. The collections of the Pacific Institute contain specimens from small rivers emptying into the Zaliv' Petra Velikogo Bay (the Suyfun river, the Pachikheza river, the Lyanchikhe river, the

Sedanka river, the Sidimi river), from the Lyebyazhya lagoon (in the western part of "zaliv Petra Velikogo" Bay) and Lake Onuma (Hokkaido); Brazhnikov reported its occurrence in Lake Tunaychi, a body of fresh water (the Okhotsk Sea coast of Sakhalin Island, north of Cape Aniv), Derzhavin reported its occurrence in the Tym river (the northern part of the Okhotsk Sea coast of Sakhalin Island). It is known to occur also in the estuaries and fresh waters of Iturup Island, of Hokkaido Island, Honsu Island, Kyu-Syu Island and Sea of Japan coast of Korea (Fusan, Gensan).

(*) 45. *Leander modestus* Heller

1868. *Leander modestus* Heller

1907. *Leander czerniavskiyi* Brazhnikov

1933. *Leander czerniavskiyi lacustris* Buldovskiy

Literary indications: (Cape Ozerpakh); (Cape Puir) (Brazhnikov, 1907); (river area of the Amur liman (lagoon. Tr.) (Ushakov, 1940).

The collections of the Pacific Institute contain specimens only from the higher-lying parts of the basin of the Amur river. The discovery of the species farthest up the Amur river, which, judging by the collections made by A. Ya. Taranets, was near the lower reaches of the Bidzhan river, is of interest. The species ranges from Shanghai, the basins of the lakes Puyankhu and Taykhu and Formosa to Khanka lake, the lower reaches of the Amur river and in Kk Lake Dalai-Nor (Kubo, 1940).

The species is very variable and forms two forms: With a smooth and with a serrated lower edge of the rostrum in its anterior third. Kemp (1917) and Kubo (1940) ascribe these differences or distinctions to variability in connections with age. buldovski (1933) ascribed ecological importance or significance to the two forms and assumed that the first form was peculiar to lakes and the second to rivers; he called the lake-form subsp. (?) *lacustris*. Birstein (1936) showed that the form with

the smooth end of the rostrum, i.e. the lake-form of Buldovski, should be regarded as the typical form. Thus the name *lacustris* should be entered into the synonymy of *L. modestus*. The description by Brazhnikov, cited by Buldovski with excisions, makes it possible to become convinced that also the shrimps, caught by him in the river area of the Amur lagoon, had a rostrum with a smooth end, i.e. they were typical and that the systematic position and the ecology of the form with a serrated rostrum-end are not yet established.

The family of Crangonidae Bell

Genus *Crangon* Fabricius

* 46. *Crangon septemspinosus* Say

Collections of the Pacific Institute: "Omar", 1937, st. No 1; "Lebed", 1938-39, st. NoNo(240-fry); 302; launch-station NoNo 35, 56, 59, 63;

Literary indications: "Storozh", st. NoNo 41, 42 and near the mouth of the Porantomari river (Brazhnikov, 1907); (Amur lagoon) (Ushakov, 1940). The article by Kobyakova does not state definitely that this form occurred in the collections from the Okhotsk Sea processed by her.

It is an amphiboreal form, an inhabitant of estuaries. It ranges on the Atlantic coast of America from the Gulf of St. Lawrence to Florida (terra tipica). It is known on the Alaska coast from Eschscholtz Bay (Arctic coast of Alaska) to the Shumagin islands; it is also reported to occur in the Amur lagoon, in Sakhalin Bay and Aniv Bay. The collections of the Pacific Institute contain specimens from Cape Khariuzov, from the pre-estuarine regions of the Icha river and the Kikchik river (west coast of Kamchatka), in the old port of the town of Okhotsk. Kobyakova (1937) reported its occurrence in various inlets and bays of the Primorye from De-Kastri to Pos'et. It is adduced

In regard to Japan under the synonyms of *C. affinis* de Haan and *C. crangon* Linne; furthermore, *C. affinis* also serves as a synonym of *C. septemspinosus* morpha *propinqua*, due to which the range of the form, of interest to us, in Japan cannot be established. It was encountered by Russian investigators or explorers at depths from 0 to 27 m.

* 47. *Crangon septemspinosus* morpha *propinqua* Stimpson

Collections of the Pacific Institute: "Plastun", 1933, st. No 59; "Lebed", 1934, st. No 46; "Lebed", 1935, st. No 55; "Lebed", 1938-39, st. No 621; launch: st. NoNo 14, 16, 17, 47, 49, 50, 51, 57, 58. (Zaks reported earlier (1929) that this species had been found at st. NoNo 14 and 17).

Literary indications: "Storozh", st. NoNo 5, 7 (Brazhnikov, 1907).

Brazhnikov distinguishes this morpha from a typical one on the basis of a slight carina (rather a small costa) on the dorsal surface of the 4th and 5th segments of the abdomen and body-proportions in two morphae that "digress" (The Russian term "zakhod-yashchiye" appears ambiguous and perhaps meaningless. The verb "zakhodit" means to enter, to call for, to penetrate... Tr.) In our opinion the most convenient distinguishing feature is the length of the rostrum, which in the typical form comprises 12-14% and in morpha *propinqua* 13-18% of the length of the cephalothoracic carapace..

The form, which either gave a start to the estuarine form of this species or perhaps is formed a second time from it, was found on the Asiatic shores of the Pacific Ocean. It is definitely known to exist at the following places: The Shantar islands (Zaks, 1929), on the SE coast of Sakhalin, the Tatarskiy Proliy and in "zaliv Petra Velikogo" Bay (Brazhnikov, 1907), in several places in Japan, the southernmost of which is the Inland Sea of Japan. The collections of the Pacific Institute contains specimens that were gathered not far from the mouth of the Bolshaya river, Cape Khayryuzov, in the estuary of the Kukhtuy river

(Okhotsk) and at Myyvo (northern part of the Okhotsk Sea coast of the island of Sakhalin). It was encountered on Soviet shores from the ebb-line to a depth of 35 m (in the Okhotsk Sea - to 33 m). In Japan, it is reported, this form occurred at a depth of up to 219 m. Its range in the Bering Sea is not known; the possibility of a transition into an estuarine form is not ascertained and its identity with the Japanese representatives that are usually adduced under the synonym of *C. affinis* is not clearly established...

(Tr. Note. L.G. Vinogradov, the author of the article "The decapod crustaceans of the Okhotsk Sea" persistently uses the term "Cape Khariuzov". This has been followed in the translation. However, a recent map of the USSR published by the "National Geographic Society" and a recent atlas of the USSR offer the following spelling: "Cape Khayryuzov". This is now the accepted spelling.)

* 48. *Crangon dalli* Rathbun.

Collections of the Pacific Institute: "Plastun", 1933, st. NoNo 11, 13, 26, 60, 91; "Lebed", 1934, st. NoNo 36, 38, 46; "Omar", 1937, st. NoNo 21, 64; "Lebed", 1938-39, st. NoNo 72, 87, 88, 195, 217, 239; (242-fry); (247-fry); 259, 301, 304, 494, 590, 599; (613-fry); 621; launch-station NoNo 15, 45, 47, 50, 52, 64.

Field determinations: "Omar", 1937, st. NoNo 2, 10, 12, 18, 38, 39, 50, 52, 61; (Volk, Vinogradov);

Literary indications: "Albatros", 1896, st. No 3646 (Rathbun); "Storozh", st. NoNo 5, 7, 10, 11, 12, 12, 13, 17, 44 (Brezhnikov, 1907) (along the east coast of Kamchatka to Icha inclusively); (In Sakhalin Bay) (Kobyakova)...

It is interesting that this form has been found only in Sakhalin Bay within the Glacial-Okhotsk Sea area...

It is a shelf-form, which in the south descends into the bathyal region. It was found in the Chukchi Sea at Cape Hope(?) along the west coast of America it ranges as far as Puget Sound. On the Asiatic coast of the Pacific Ocean it ranges apparently without an interruption as far as the eastern coast of Japan and the "zaliv Petra Velikogo" Bay. It occurs at depths from 3 to 100 m; in the Okhotsk Sea- from 3 to 90 m; in the "zaliv Petra Velikogo" Bay it descends to depths of 630 m, on the Pacific coast of Japan- to 331 m.

Genus *Sclerocrangon* G. O. Sars.

* 49. *Sclerocrangon communis* (Rathbun)..

Collections of the Pacific Institute: "Plastun", 1932, st. No 24; "Plastun", 1933, st. No 16; ~~MELESTUN~~ "Lebed", 1934, st. No No 10, 13, 14, 42, 44, 45, 51; "Lebed", 1935, st. NoNo 6, 8, 9, 10, 17, 25, 26, 30, ~~32~~ 32; "Lebed", 1938-39; st. NoNo 36, 226, 320, 323, 326, 327, 572.

Field determinations: "Omar", 1937, st. No 44 (Volk, Vinogradov).

Literary indications: "Storozh", st. NoNo 6, 26 (Brazhnikov, 1907) (along the west coast of Kamchatka) (in the NE part of Sakhalin) (in the NW part of the sea) (Kobyakova).

It is a eurybathic form, which ranges in the Chukchi Sea as far north as Herald Bank, on the west coast of America down to San Diego (California), on the Asiatic coast down to "zaliv Petra Velikogo" Bay, Toyama Bay and Cape Todo (Honsu). It was encountered at depths from 29 to 556 m; in the Okhotsk Sea-- from 60 to 335 m and, according to Kobyakova (1937), at 1150-1450 m.

* 50. *Sclerocrangon intermedia* (Stimpson)

Collections of the Pacific Institute: "Plastun", 1933, st. No 13; "Lebed", 1934, st. NoNo 37, 51; "Lebed", 1938-39, st. NoNo 88, 233, (273- fry).

Literary indications: "Storozh", st. NoNo 1, 15, 17 (Brazhnikov, 1907); (Shantar Bay); (west coast of Kamchatka) (Kobyakova, 1937).

It is a shelf-form, which in the southern parts of its range descends into the bathyal. It ranges on the American coast from St. Lawrence Island to Vancouver. On our coasts it is known to exist or occur at St. Lawrence Island, in the S part of Anadyrskiy Zaliv (Anadyr Bay. Tr.), in the areas of Cape Navarin, Cape Olyutorsk, Cape Afrika, Eering Island, Cape Zhubanov, Cape Shipunski, at the west coast of Kamchatka, Shantar Bay, the SE coast of Sakhalin and of the Primorye, where it was encountered ^{or ranges} from the northern part of Tatarski Proliv to the southern part of "zaliv Petra Velikogo" Bay. Doflein (1902) reported its occurrence at Yokohama. It occurs at depths from 16 to 183 m; in the Okhotsk Sea - from 18 to 180 m; in the Sea of Japan it descends to 400 m.

† 51. *Sclerocrangon boreas* (Phipps).

Collections of the Pacific Institute: "Plastun", 1938, st. No 44; "Lebed", 1935, st. NoNo 4, 46, 59; launch-station NoNo (5 - from the stomach of a codfish) (31 - fry); (66 - fry).

Field determinations: "Omar", 1937, st. NoNo 22, 38, 63 (Volk, Vinogradov); "Lebed", 1938-39, st. No 716 (Vinogradov).

Literary indications: (Ayan Inlet) (Brandt, 1851); "Storozh", st. NoNo 2, 7, 12, 17, 44, 45 (Brazhnikov, 1907); (the southern and the northern part of the east coast of Sakhalin); (Sakhalin Bay); (Shantar Bay); (west coast of Kamchatka north of the mouth of the Icha river) (Kobyakova, 1937).

It is a shelf-form; it ranges along the Arctic coast of Canada, apparently without interruption (the longest distance between finds - in Dolphin and Union Strait and at Cape Barrow).

It is lacking in the Laptev Sea and in the East-Siberian Sea. It ranges from the Chukchi Sea southward to British Columbia and to Vladimir Bay (northern Primorye) at depths from 8 to 250 m, in the Okhotsk Sea- from 13 to 90 m.

* 52. *Sclerocrangon salebrosa* (Gwen)

Collections of the Pacific Institute: "Plastun", 1933, st. No 121; "Lebed", 1934, st. NoNo(47-fry); 51; "Lebed", 1935, st. No 5; (21-fry); "Lebed", 1938-39, st. NoNo(237-fry); 314, 595, 597, 609.

Field determinations: "Lebed", 1937, st. NoNo 275, 278, 338, 339 (Volk and Vinogradov).

Literary indications: "Storozh", st. NoNo 5, 10, 43; (in the area of Cape Terpenye) (Brazhnikov), 1907; (southern part of the east coast of Sakhalin); (Sakhalin Bay); (Shantar Bay); (west coast of Kamchatka) (Abyakova, 1937).

It is a shelf-form. It is known to occur in Imatra Inlet northeast of Cape Olyutorsk), in Avacha Inlet, on the west coast of Kamchatka, in the Shantar and Sakhalin bays, on the southeast coast of Sakhalin, in the Sea of Japan from the Tatarski Proliv to "zaliv Petra Velikogo" Bay; it was encountered at depths from 10 to 250 m. It was encountered in large numbers in the northern part of Tatarski Proliv, where most specimens had a body-length of up to 30 cm and in "zaliv Petra Velikogo" Bay southeast of Russki Island.

53. *Sclerocrangon derjugini* Kobjakova

Collections of the Pacific Institute: "Lebed", 1935, st. No 27; "Lebed", 1937, st. NoNo 369, 371..

Literary indications: "Krasny Yakut", 1930, st. NoNo 134/19 and 135/20; "Lra", 1932, st. No 25/7; "Gagara", 1932, st. NoNo 228, 247, 248, 252, 254 (Abyakova, 1937).

It is a semi-bathypelagic form; an endemic of the Okhotsk Sea; it occurs in the Kobjakova collections from 8 stations,

the collections of the expedition aboard the trawler "Lebed" originated at 3 stations; it was found in the area between Cape Elizaveta (Russian "Mys Yelizavety". Tr.) and Jonah Island (Correct name: "St. Jona Island. Tr.) and on the 500-meter median plateau of the northern half of the Okhotsk Sea, at depths from 182 to 664 m.

Genus *Nectocrangon* Brandt.

In view of a certain change in the scope of the genus (introduction of *Sclerocrangon robusta* Kobjakova) we offer a new diagnosis. All remarks in connection with this were explained in the description of the species *Nectocrangon robusta* (Kobjakova).

The middle part of the frontal edge is raised upward. The eyes have one large tubercle, which occurs at the inner edge of the cornea. The walking legs of the 2nd pair are not shorter than the legs of the 1st and 3rd pairs and are equipped with chelae. The walking legs of the 4th and 5th pairs have flattened oval dactyli. Each gill chamber has 5 gills.

The species of *Sclerocrangon* (see table), examined by us, have eyes with a large tubercle, which occurs at the upper edge of the cornea, the width of the dactylus of the 4th pair of legs comprises not more than 26% of its length. In the case of the species of *Nectocrangon*, examined by us, the width of the dactylus of the 4th pair of legs comprises not less than 32% of its length. Brazhnikov (1907) united the species *Nectocrangon* lar and *N. dentata*; Kobyakova (1937), it seems, united the species *Nectocrangon dentata* and *N. ovifer*. We deem it necessary to re-establish the conception regarding these species, accepted by Rathbun, and offer a key ^{to} ~~for~~ the species of the genus *Nectocrangon* of the Soviet Far East.

Key to the species of the genus *Nectocrangon* of the Soviet Far East.

1(2) The median carina of the cephalothoracic carapace has one

small spine in the posterior half of the carapace and one large spine at the base of the rostrum, practically fusing with the latter, and, together with it, pointing forward and upward. The 1st, 2nd, 3rd and 4th segments of the abdomen are smooth, the 5th segment has a carina.... N. robusta.

2(1) The median carina of the cephalothoracic carapace has two or three dents, the anterior one of them is removed or at a distance from the rostrum. The 1st, 2nd, 3rd, 4th and 5th segments of the abdomen each have one median carina. 3;4.

3(4) The median carina of the cephalothoracic carapace has three dents. Two carinae, situated on the dorsal surface of the 6th segment of the abdomen, terminate in a rounded end..

N. crassa...

4(3) The median carina of the cephalothoracic carapace has two dents.. 5; 6.

5(6) The rostrum has the appearance of a spine turned up at an almost right angle towards the dorsal surface; it is separated from the upper lateral lobes of the super-orbital "kozyrek" (peak, visor, shield.Tr.) by deep depressions. The depth of these depressions comprises 0.7-1.5 of the depth of the slit between the upper lateral and the lower lateral lobes. The spine of the anterior edge of the cephalothoracic carapace, which occurs at the base of the cirri of the 2nd pair, is long; its width comprises less than 60% of its length. The chelae of the walking legs of the 1st pair are short: Their width "fits" 3.5-4 times into their length. Two carinae, situated on the 6th segment of the abdomen, terminate in points, which protrude beyond the edge of the segment... N. ovifer...

6(5) The rostrum has the appearance of a truncated stalk, pointing upward at 45° toward the dorsal surface of the carapace and separated from the upper lateral lobes of the super-orbital peak by slight depressions. The depth of these depressions comprises 0.3-0.5 of the depth of the slit between the upper lateral and the lower lateral lobes.... 7;8.

7(8) Two carinae, situated on the 6th segment of the abdomen, terminate in points, which protrude beyond the edge of this segment. The spine of the anterior edge of the cephalothoracic carapace, which occurs at the base of the cirri of the 2nd pair, is short; it is broadly triangular. Its width comprises more than 60% of its length. The chelae of the walking legs of the 1st pair are long: Their length "fits" five and more times into their length.... N. dentata...

8(7) Two carinae, situated on the 6th segment of the abdomen, have a rounded end. The spine of the anterior edge of the cephalothoracic carapace, situated at the base of the cirri of the 2nd pair, is long, its width comprises less than 60% of its length. The chelae of the walking legs of the 1st pair are short: Their width "fits" 3.5-4 times into their $\frac{1}{2}$ length....

N. lar.

* 54. *Nectocrangon robusta* (Kobjakova)

1937. *Sclerocrangon robusta* Kobjakova

Collections of the Pacific Institute: "Lebed", 1934, st. No 44; "Lebed", 1935, st. NoNo 5, 12.

Literary indications: (south and north-west of St. Jona Island) (Kobyakova, 1937).

This extra-ordinarily peculiar species was assigned to the genus *Sclerocrangon* by the authors, who described it. Actually it is a transition form between the species of the genus *Sclerocrangon* and the species of the genus *Nectocrangon* and perhaps should be assigned to the latter. The genus *Nectocrangon* was first described by Kröyer (1842) under the name of *Argis* (nomen preoccupatum). Brandt described it a second time under the name of *Nectocrangon* and described it in the following way: "Penultimi et ultimi pedum paris tibiae, tarsi et metatarsi satis compressi et dilatati. Digniti eorum ovaies, plani, abbreviati, breviter acuminati, satis recti. Frontis pars media sursum elevata. Oculi valde approximati." Kröyer and also Brandt

accept the only species known to them- *N. lar* (Gwen)- as the type of the genus. Ortmann in his revision of Crangonidae orbis terrestris provides the following diagnosis of the genus: "Second pereopoda not shortened, with chela(i.e. the same as also in the genus Crangon into which Ortmann united the genera Crangon and Sclerocrangon. L.V.). Five(?) branchiae, like Crangon. Eyes partly concealed by frontal margin. Posterior pereopoda with lanceolate dactyli with fringes of hair." Brazhnikov, who examined only three species of the *f* genus(*N. lar*, *N. dentata* and *N. crassa*), provides the following description of the genus in the key: "The eyes are practically concealed in a tubular sheath formed by the processes of the frontal edge of the carapace; the dactyli of the last two pairs of pereopoda are considerably broadened." Finally, de Man(1920), distinguishes the genus *Argis* from the genera Crangon, Sclerocrangon and Pontophilus by the following feature: "Fourth and fifth pairs of pereopods having the seventh joint dilated, natatorial". (The above sentence was copied as it occurs in the text. Page 95. Tr.)

Thus the genus *Nectocrangon* can be characterized by the following features: The middle part of the frontal edge is turned up and forms a tube in which the animal conceals the eyes. The walking legs of the 2nd pair and are not shorter than the legs of the 1st and 3rd pairs and are equipped with chelae(a common distinguishing feature with the genera Crangon and Sclerocrangon). The walking legs of the 4th and 5th pairs have flattened oval dactyli. Each gill chamber has five gills: Four pleurobranchiae and one arthrobranchia(i.e. the same as in the genera Crangon and Sclerocrangon).

In *N. robusta* the middle part of the *g* frontal edge is comprised of two *xxx* trihedral lobes, situated one below the

other and turned upward at an angle of 45° . The eyes are free they have a large tubercle on the ^sside of the cornea, which is turned inward (the same applies to the species of the genus *Nectocrangon* examined by me). The postorbital dent is small (the same as in *Sclerocrangon*) and is not transformed into a large lobe, which, together with the rostrum, forms the tube for the eyes as is the case in regard to *Nectocrangon*. From the postorbital dent, the same as in many species of the genus *Nectocrangon*, there runs, towards the posterior, a slight sinuous carina that is turned upwards in the posterior third of the carapace; a sharp spine with two slight carinae, which diverge from it towards the posterior, occurs under this carina in the gill region of the carapace. This sculpture follows the general plan of the structure of the species of the genus *Nectocrangon*; furthermore, there ~~is~~ exists a number of sculpture-particulars that were not observed on the species of the genus *Nectocrangon* at my disposal. The general proportions of the body and of the abdomen come close to those of *Nectocrangon*. The walking legs of the 2nd pair have chelae and their length exceeds the length of the legs of the 1st and of the 2nd pair. The walking legs of the 4th and 5th pairs have a square, in a cross-section, femur and knee and a compressed propodus, their dactyli are flattened and oval, the plates are convex in the anterior part and concave in the posterior... Each gill chamber has four pleurobranchiae and one arthrobranchia..

Thus all the distinguishing features of ~~Nectocrangon~~ the animal come close to the diagnosis of the genus *Nectocrangon*; an exception is the tubular middle part of the frontal edge or margin and, if one agrees with the opinion of Brandt, that this genus "acquires a different shape, especially because of the peculiar, just described formation of the two posterior pairs of legs", then the diagnosis of the genus must be corrected and from it must be eliminated the words about the formation of a tube for the eyes by the frontal edge or margin...

We will adduce the measurements of the dactyli of the legs of the species Crangon, Sclerocrangon and Nectocrangon that were at our disposal.

We took the measurements of one of the largest specimens of each species for the table.

Table 2.

Ratios of the length of the dactyli of the legs of the 4th and 5th pairs in regard to their width in the species Crangon, Sclerocrangon and Nectocrangon.

The absolute values are in millimeters.

-
- A- Name of species (See p. 96 for scientific names. Tr.)
 B- Length of cephalothorax together with rostrum.
 (tip)
 C- Length of body from the end of the rostrum to the end of the telson.
 D- Dactylus of the leg of the 4th pair:
 1- Length; 2- Width; 3- Ratio(%);
 E- Dactylus of the leg of the 5th pair:
 1- Length; 2- Width; 3- Ratio(%).

Nectocrangon robusta is a shelf-form, which descends into the bathyal. It occurs in the Sea of Japan from "zaliv Petra Velikogo Bay to Tatarski Proliv. In the Okhotsk Sea it was encountered in the area of St. Jona Island (Kobyakova), in the area of Cape Khayryuzov, in the Ayan area and in the area of Cape Elizaveta (our material). In the Okhotsk Sea, according to Kobyakova, it was encountered at depths from 50 to 515 m and in the Sea of Japan - to 1380 m; specimens in our collections from the Okhotsk Sea came from depths of 85 to 230 m. They are encountered, according to the material by Kobyakova and our own, mainly at negative temperatures.

★ 55. Nectocrangon ovifer Rathbun.

Collections of the Pacific Institute: "Lobed", 1935, st. No. 8, 9, 17, 25, 26, 32, 71; "Lobed", 1938-39, st. No. 39.

All the 18 specimens, that were at our disposal, were found to be completely typical; almost all the finds were made at negative temperatures. This species is exceptionally common in the northwestern part of the sea (7 finds) in the zone of the residual winter cooling at depths from 100 to 190 m at temperatures from - 1.6 to +0.2. It was found on one occasion in the area of Cape Lopatka in a trawl, spread out from 104 to 185 m at a temperature of +1.05°C. Furthermore, it is known to exist in the Bering Sea from the Pribyloff Islands to Kodiak Island at depths from 100 to 293 m.

* 56. *Nectocrangon dentata* Rathbun.

1907. *Nectocrangon* lar Brashnikov (partium)

1937. *Nectocrangon dentata* Kobjakova (partium?)

Collections of the Pacific Institute: "Lebed", 1938-39, st. No 168.

Field determinations: "Lebed", 1937, st. No 298, 323, 369 (Volk).

Literary indications: (at the west coast of Kamchatka to the area of the mouth of the Icha river); (along the coast of eastern Sakhalin) (Kobyakova, 1937).

We had only three defective specimens of this species at our disposal; however, the following could be distinguished clearly in each of them: The protruding points of the carinae of the 6th segment of the abdomen and the spines of the cephalothoracic carapace, which are shorter than in the two related species. The spine, which occurs at the base of the cirri of the 2nd pair, stands out especially by its broadly triangular form. Rathbun (1904) emphasizes this feature: " Spines of carapace appressed; those of anterior margin short", although its drawing speaks of the reverse and, judging by the description, it seems that the drawings of *N. lar* and *N. dentata* were interchanged. The proportions of the chelae of the walking legs of the 1st pair in our

specimens and also in the Brazhnikov specimens deviated from proportions of the chelae in the Rathbun specimens, namely, the width of the chelae comprised 24-28% of their length (according to Rathbun, in *N. dentata* the width does not comprise more than 21% of the length of the chela and in *N. ovifer* and *N. lar* - from 25 to 29%, which, it seems, should be ascribed to variability in connection with age (the Rathbun specimen had a cephalothoracic carapace that was 19 mm, whereas the Brazhnikov specimens and my own measured 14.7-15.1 mm in length). We are amazed by the absence of *N. ovifer* in the collections, processed by Kobyakova, and we are also amazed by her report that *N. dentata* had been encountered at a temperature of -1.35°C . *N. dentata*, according to Rathbun, is a warm-water species; the lowest temperature at which it was discovered by Makarov (1941), was -0.27°C . Since Kobyakova restricts herself to adducing the drawing and diagnosis of Rathbun and does not offer her own systematic remarks it can be assumed that part of her material belongs to *N. lar* or to *N. dentata*, to species, which do not avoid low temperatures.

It is an amphiboreal(?) semi-bathypelagic form, which "resorts to the shelf. Rathbun reports that it exists in the western Atlantic from Greenland to Nova Scotia; but not a single author, besides her, reports the occurrence of this form there. Its range in the Pacific Ocean from the Pribyloff Islands to Sitka and from the area of the mouth of the Anadyr river (Makarov, 1941) to "zaliv Petra Velikogo" Bay at depths from 49 to 2090 m. It was found in the Okhotsk Sea in collections made on the shelf and the slope of Sakhalin and Kamchatka at depths from 92 to 1450 m.

Ill. 4. Anterior parts of cephalothoracic carapaces: a-Nectocrangon lar (Cwen), "Lebed", 1935, st. 6, x 3.5; b-Nectocrangon dentata Rathbun, "Lebed", 1938, st. 168, x 3.5; v-Nectocrangon ovifer Rathbun, "Lebed", 1935, st. 8, x 3.5..

* 57. *Nectocrangon* lar (Owen)1907. *Nectocrangon* lar Brazhnikov (partium)

Collections of the Pacific Institute: "Plastun", 1932, st. No 24; "Plastun", 1933, st. NoNo 11, 28; 29; (59-fry); 121; "Lebed", 1934, st. NoNo 32; (37-fry); 39, 40, 41, 42, (47-fry); 51; ichthyological station No. 57; "Lebed", 1935, st. NoNo 5, 6, 12, 47; "Omar", 1937, st. No 64; "Lebed", 1938-39, st. NoNo 72, 168, 176, 354; (414-fragments); 597, 600, 729; launch-station No(66-fry).

Field determinations: "Omar", 1937, st. NoNo 42, 52, 53, 65 (Volk, Vinogradov); "Lebed", 1937, st. No 275, 302, 338 (Volk, Vinogradov).

Literary indications: "Albatros", 1896, st. NoNo 3646, 3647 (Rathbun), 1904; "Storozh", st. NoNo 43, 44, 45 (Brazhnikov, 1907); (Sakhalin Bay); (area of the Shantar Islands); (along the west coast of Kamchatka) (Kobyakova, 1937).

All our specimens are fully typical and their characteristics agree with the description by Rathbun (1904). Brazhnikov reduces (?) to a synonym this species of *N. dentata*, but in the description he separates the only specimen of *N. dentata* that was at his disposal; due to this it is easy to reproduce the range of distribution of the species of the genus *Nectocrangon* by the stations of the schooner "Storozh".

It is an amphiboreal form, an inhabitant of the shelf; it descends to the continental slope in the southern areas of its range. It ranges from Greenland to Nova Scotia, in the Chukchi Sea it ranges northward to Herald Bank and Cape Barrow, in the west coast of America- to Sitka, on the Asiatic coast to "Zaliv Petra Velikogo" Bay and Toyama Bay at depths from 0 to 400 m (Rathbun, 1919), in the Okhotsk Sea- from 10 to 280 m.

* 58. *Nectocrangon* crass Rathbun

Collections of the Pacific Institute: "Lebed", 1934, st. No 36; "Lebed", 1935, st. No 1; launch-station No 31.

Literary indications: "Storozh", st. NoNo 1, 11, 19, 45 (Brazhnikov, 1907) (SE-coast of Sakhalin); (Terpenye Bay); (Sakhalin Bay); (Nagayevo area); (along the west coast of Kamchatka to Cape Khayryuzov inclusively) (Kobyakova).

It is a shelf-form, which ranges south of St. Lawrence Island to Sitka and to Vladimir Bay in the Primorye. It is known to occur on our coasts at Cape Chaplin, Cape Navarin, Cape Olyutorsk, the Commander Islands, the SE coast of Kamchatka, the west coast of Kamchatka, Nagayevo Inlet, the area of the town of Ayan, the area of Sakhalin and Terpenye bays and of the Primorye; it ranges at depths from 7 to 125 m; in the Okhotsk Sea- to 79 m.

Genus of Paracrangon Dana

(*) 59. Paracrangon echinata Dana

Literary indications: "Storozh", st. No 11 (Brazhnikov).

It is an amphipacific form, an inhabitant of the shelf. It ranges from Port Etches (Alaska) to La-Yola (California) and Terpenye Bay and the northern part of Tatarski Proliv to Sagami Bay and Tsushima Strait at depths from 15 to 177 m. It was encountered only once in the Okhotsk Sea, namely, in Terpenye Bay at a depth of 27-37 m.

The family of Potamobiidae Huxley

Genus Cambaoides Faxon

* 60. Cambaoides schrenckii (Kessler).

It is a freshwater form, encountered in the river area of the Amur lagoon (Brazhnikov, 1907, Ushakov, 1940). We had specimens which were gathered in the estuary of the Amur river, at Cape Pronge and from a lake at the village of Grigoryevka of the Rybnovskii district (Sakhalin). It was found by Klumov in small rivers on Sakhalin, which emptied into the Amur lagoon. It ranges in the lower reaches of the Amur river, where it do

ascend beyond the Khingan slopes (the westernmost place of occurrence, according to our material, are the lower reaches of the Bidzhan river), in the lower reaches of the Sungari and Mudadzyan rivers, in the basin of the Ussuri river right down to Lake Khanka, the upper reaches of the Lefu river and the middle reaches of the Mulinkhe river- the town of Mishan (Miyadzi and Koba, 1940).

* 61. *Cambaroides dauricus koshevníkowi* Eirstein et Winogradov.

It is a freshwater form. The Kozhevnikov (Koshevníkov. Tr.) subspecies was encountered only in the river area of the Amur lagoon and in the lower reaches of the Amur river (Erazhnikov, 1907, and Ushakov, 1940). We had specimens that were collected at Cape Pronge, in the estuary of the Amur river and at the town of Nikolayev.

Two other subspecies are separated from the Kozhevnikov crab or crayfish by the region of the range of the Schrenck crab: *C. dauricus* (Pallas) occurs in Dauria, *C. dauricus wlediwostokiensis* Eirst. et Win. occurs in the small rivers of the basin of "zaliv Petra Velikogo" Bay and in the tributaries of the Mudadzyan river (see Eirstein and Vinogradov, 1934). Miyadzi and Koba (1940) report the occurrence of *C. dauricus*, but do not provide a key down to the subspecies, in Dun-khua (basin of the Tyumen-Ula river), in Lake Kio-Khaku (basin of the Mudadzyan river) and at the town of Girin (the Sungari river).

The family of Axilidae Eate

The genus *Calastacus* Faxon

62. *Calastacus quiqueseriatus* Rathbun

Literary indications: "Gagara", 1932, st. No 229 (Kobyakova, 1937).

It is a bathyal form (?). The species of this genus have been encountered from the Okhotsk Sea to California, from the

Arabian Sea to South Africa at depths from 294 to 1733 m. Our species was found at the coast of California and in the middle of the Okhotsk Sea at depths from 288 to 1150 m.

The family of Galatheidæ Dana

Genus *Munidopsis* Whiteaves

63. *Munidopsis beringana* Benedict

Literary indications: "Cagara", 1932, st. No 208 (Aobyakova, 1937).

It is a bathyal form. The species of this genus were encountered from the European waters to Patagonia and from the Bering Sea to New Guinea at depths from 150 to 4700 m. Our species was found only on two occasions: In the area of the Pribyloff Islands at a depth of 3188 m and in the southern, the deepest part of the Okhotsk Sea at a depth of 3500 m.

The family of Paguridæ Dana

Genus *Pagurus* Fabricius

Makarov (1938) made a splendid job of revising the synonymy of our species of this genus. Prior to the work by Makarov great confusion existed in the understanding regarding the species of *P. undosus*, *P. ochotensis*, *P. rathbuni*, *P. pubescens*, *P. capillatus*. However, regardless of the merits of the work by Makarov, the lack of shaded illustrations or drawings of hermits and the unfortunate principle as the base of the Makarov key complicate the determination of our species of the genus *Pagurus*. In the key Makarov compares species with and without a pillary cover on the right chela, species, which have spiniform granules on the right chela and species, which have rounded granules. However, the pillary cover is often worn off in specimens that had one right after the molt and the spiniform and rounded granules can often be found on the chelæ of one and the same species. For this reason I deemed it necessary to provide a new key for the species of the genus *Pagurus*.

which inhabit the waters of the coast of the Soviet Far East.

Key for the species of the genus *Pagurus* of the Soviet Far East.

- 1(4) The entire dorsal surface of the cephalothoracic carapace is hard, calcified... 2; 3.
- 2(3) The anterior part of the cephalothoracic carapace is covered with granules. The rostrum is short, broad and horizontal... *P. splendescens*...
- 3(2) The anterior part of the cephalothoracic carapace is covered with spines. The rostrum is narrow, long, pointing forward and upward... *P. anomalus*..
- 4(1) Only the anterior part of the cephalothoracic carapace is hard; the gill and the heart regions are soft... 5; 8.
- 5(8) The upper surface of the "zapyastye" (^{carpus}wrist.Tr.) of the right chela is smooth, hairless, without spines and large granules and is either perfectly smooth or is covered with barely noticeable granules. 6; 7.
- 6(7) The ^{carpus}wrist of the right chela has lateral knobs, is much wider than the "ladon" (palm.Tr.) ... *P. gilli*...
- 7(6) The carpus of the right chela is without lateral knobs, its width is the same as that of the "palm". *P. middendorffii*
- 8(5) The upper surface of the carpus of the right chela is covered with spines or readily noticeable granules; at times it is covered or equipped with a thick hairy cover, at times it is "studded" with short individual hairs, at times it is devoid of hairs altogether... 9; 16.
- 9(16) The lower or bottom surface of the merus of the right leg of the 1st pair has one blunt spine or two large tubercular granules. 10; 13.

10(13) The bottom surface of the merus of the right leg of the 1st pair has two large tubercular granules.. 11; 12.

11(12) The upper surface of the "palm" of the right chela is covered with soft hairs the length of which exceeds the length of the spines "sitting" below them. Often the hair growth conceals the entire sculpture of the upper surface of the "palm".

P. brachionastus..

12(11) The upper surface of the "palm" of the right chela is devoid of a hair growth and is thickly studded with granules, the larger and pointed ones of which form in the middle of the "palm" a figure in the form of an inverted Roman "five" the tip of which points forward..

P. beringanus

13(10) The bottom surface of the merus of the right leg of the 1st pair has one blunt spine... 14; 15.

14(15) The palm of the right chela has almost parallel external and internal margins; the length of the chela exceeds twice its width. The upper surface of the left chela has long, soft hairs...

P. dubius..

15(14) The palm of the right chela has rounded external and internal margins; the length of the chela less than twice exceeds its width. The upper surface of the palm of the left chela is almost hairless or has very short individual hairs.

P. samuelis..

16(9) The bottom surface of the merus of the right leg of the 1st pair is either smooth or is equipped with one large tubercle and several small granules or it has from 4 to 10 granules and spines varying in size... 17; 24.

17(24) The palm of the left chela is of a severely asymmetrical triangular shape with a heavily developed posterior-external angle and an oblique or slanting triangular external-upper surface separated from the internal upper surface by a sharp median crest, which has one row of spines or granules....

18; 21.

18(21) The upper surface of the palm of the right chela has a distinct median longitudinal ridge, which, together with the ridge occurring near the external edge or margin, forms a complex sculpture. The entire upper surface of the palm is granulated. 19; 20.

19(20) The median ridge of the palm of the right chela terminates, at the base of the dactyli, in a horn or beak, which points forward and upward... P. cornutu...

20(19) The median ridge of the palm of the right chela terminates abruptly towards the internal margin of the immovable dactylus.... P. undosus

21(18) The upper surface of the palm of the right chela is uniformly convex and is studded with spiniform granules or spines 22; 23.

22(23) The dactyli of the left chela are long and bent downward. The upper surface of the carpus of the right chela has a round tuft of hairs in a special rounded socket on the anterior-internal angle of the carpus.... P. rathbuni...

23(22) The dactyli of the left chela are ^{of} the ordinary kind. The upper surface of the carpus of the right chela lacks the special tuft of hairs; hairs occur only at the base of the spines... P. pubescens....

24(17) The palm of the left chela is a more or less symmetrical oval form, without a sharp median ridge.... 25;30.

25(30) The upper surface of the right palm is covered with granules, at times they are large; but they ^e never pass into spines. The tiny hairs on the upper surface of the right palm, if they occur, are very small, barely visible to the naked eye.. 26;27.

26(27) The palm of the right chela is considerably broader than the ~~the~~ carpus. The upper surface of the palm of the left chela is almost flat and has raised edges.. P. tenuimanus...

27(26) The width of the palm of the right chela does not ~~exceed~~ or very slightly exceeds the width of the carpus. The upper surface of the palm of the left chela is more or less convex,

raised
without edges ...

28; 29..

28(29) The upper surface of the right chela is covered on the margins with larger, in the middle with smaller and sparse granules and isolated tiny hairs. The frontal margin of the carapace is without lateral dents. The bottom surface of the merus of the right leg of the 1st pair has one large tubercle and several small spines... P. hirsutiusculus....

29(28) The upper surface of the palm of the right chela is covered with very tiny and scattered granules, is almost smooth. The upper surface of the carpus of the right chela has three longitudinal rows of spines. The frontal margin of the carapace has distinct lateral dents that are equipped with sharp spines. The bottom surface of the merus of the right leg of the 1st pair is smooth or slightly granulated. P. gracilipes...

30(25) The upper surface of the palm of the right chela is equipped with spines or with sharp spiniform granules. The hair growth on the right palm is at times heavily developed, at times it is almost lacking.... 31; 32.

(immovable)
31(32) The immobile or rigid dactylus of the right chela is twice as wide as the movable one; its external margin forms a broad curved line. Small spines are scattered over the entire upper surface of the palm of the right chela and they form sharp longitudinal crests only on its external and internal margins; the upper surface of the right palm has a thick hair growth... P. lanuginosus...

32(31) The rigid dactylus of the right chela is $1\frac{1}{2}$ times broader than the movable one: The contours of the right chela are of the ordinary kind. The hair growth of the palm is ^{at times} never developed, at times it is almost lacking... 33; 34.

33(34) The upper surface of the palm of the left chela is horizontal; has a thick ridge, covered with two rows of spines, on the internal margin of the palm. The carpus of the left

chela has a row of large spines on the internal margin and smaller spines on the remaining surface, which slopes towards the external margin. The upper surface of the palm of the right chela is without a hair growth. The length of the propodus of the walking leg "fits" more than $1\frac{1}{2}$ times (about two times) into the length of the dactylus.... P. pchotensis...

34(33) The upper surface of the palm of the left chela is more or less convex and has two rows of spines on the middle line. The upper surface of the carpus of the left chela is narrow, smooth, separated from the slanting lateral surfaces by two parallel rows of large spines. The upper surface of the right chela usually (not ^a always) has long soft hairs. The length of the propodus of the walking leg "fits" less than $1\frac{1}{2}$ times (usually 1-1.5 times) into the length of the dactylus... 35;36.

35(36) The carpus of the right chela has one row of large spines, which bifurcates towards the anterior angle, on the external margin of the carpus. The remaining surface of the carpus is almost smooth, it has a few isolated spines or granules... The upper surface of the palm of the right chela is equipped with 8 rows of long spines. The bottom surface of the right palm is convex and is almost perfectly smooth between the base of the movable dactylus and the external margin; the impression, which adjoins the anterior margin of the carpus, occupies an insignificant part of the bottom surface of the right palm... P. pectinatus..

36(35) The upper surface of the carpus of the right chela is covered with irregular rows of spines. The upper surface of the palm of the right chela is equipped with more than 8 irregular rows of spines or spiny granules; two of them, joining towards the anterior margin, often form a \wedge -shaped figure. A considerable part of the bottom surface of the palm of the right

chela is "occupied" by the impression that adjoins to the anterior margin of the carpus; the lower surface of the right palm between the base of the movable dactylus and the external margin of the palm, is covered with many small spines or spiniform granules, which have tufts of hairs at their bases....*P. capillatus*.

* 64. *Pagurus splendescens* Owen

Collections of the Pacific Institute: "Plastun", 1932, st. No 24; "Plastun", 1933; st. NoNo 13 (292-fry), 35, 89; "Lebed", 1934, st. NoNo 42, 51; "Omar", 1937, st. No 64; "Lebed", 1938-39, st. No 168, 261; (272-fry); (298-fry), 414, 423, 498, 500 (501-fry); 598, 599, 729; launch-station No 61.

Field determinations: "Omar", 1937, st. NoNo 42, 55, 67 (Volk and Vinogradov); "Lebed", 1937, st. NoNo 275, 339 (Volk and Vinogradov); "Lebed", 1938-39, st. NoNo 41, 42, 413, 422, 424, 574, 656, 698, 717, 719; 720; ~~737~~ 734; 745; 747; 752; 753 (Gordeyeva).

Literary indications: "Krasny Yakut", 1930, st. NoNo 140/25, 148/33, 167/52, 169/54; "Ara", 1932, st. NoNo 21/1, 25/7; "Gagara", 1932, st. NoNo 225, 226, 257, 258, 261, 262; "Plastun", 1932, st. NoNo 1, 32, 101, 239 (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

We will adduce cases of the largest specimen of this species:

Length of the anterior part of the cephalothoracic carapace -		18 mm
Width	"	20 mm
Length of cephalothoracic carapace		28.5 mm
Width	"	30 mm
Length of stretched out abdomen		about 33 mm
From the end of the left chela to the end of the stretched out abdomen		about 117.5 mm

It is a shelf-form, which in the southern sections of its range descends to the continental shore. It ranges in the Chukchi Sea northward to Cape Barrow and Herald Bank. On the Pacific coast of America it ranges as far south as Washington,

on the Asiatic coast- to Sakhalin Bay. This was encountered at depths from 1 to 411 m; in the Okhotsk Sea- from 22 to 220 m.

* 65. *Pagurus middendorffii* Brandt.

Collections of the Pacific Institute: Launch-station NoNo 8, 9, 32, 38, 67. (Zaks reported earlier that this species had been encountered at stations NoNo 8 and 9), 1929).

Literary indications: (Okhotsk Sea) (Brandt, 1851), "Krasny Yakut", 1930, st. NoNo 143/28, 155/40, 165/50 (Kobyakova, 1937); (east coast of Sakhalin); (near the city of Okhotsk) (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

It is a coastal form. It ranges from the Aleutian islands to Vancouver and from Olyutorsk Bay to Hokkaido Island and "Zaliv Petra Velikogo" Bay. In the Okhotsk Sea it is known to exist in Tauysk Bay, in the area of the city of Okhotsk, of the NE coast of Sakhalin. The collections of the Pacific Institute contain many specimens gathered by Zaks in Shantar Bay. It was encountered in the littoral zone.

* 66. *Pagurus hirsutiusculus* (Dana).

Collections of the Pacific Institute: Launch-station No 20.

Literary indications: (Yakshin Inlet of Bolshoy Shantar Island) (Zaks, 1929); (Okhotsk Sea) (Makarov, 1938).

It is a coastal form. It was found from the Aleutian Islands to San Diego (California) and from the Commander Islands to Sangar Strait and the "Zaliv Petra Velikog" Bay. In the Okhotsk Sea it was encountered in Shantar Bay (Zaks, 1929). The collections of the Pacific Institute contain specimens collected in Konstantin Bay (Shantar area). It ranges from the ebb-line to depths of 30 m; in the Okhotsk Sea- to 6 m. Yukoya encountered it at 110 m (Sangar Strait), Kobyakova at 494 (in the Sea of Japan).

* 67. *Pagurus undosus* (Benedict)

Collections of the Pacific Institute: "Lebed", 1934, st. NoNo 26, 35, 36; "Lebed", 1935, st. NoNo 21, 49, 55; "Lebed", 1938-39, st. NoNo 65, 69, 70; launch-station st. NoNo 18, 40, 41, 65, 66.

Literary indications: "Albatros", 1896, (near Tyuleniy Island) (Rathbun, 1904); "Gagara", 1932, st. NoNo 203, 221; "Plastun", 1936, st. No 76; (east coast of Sakhalin) (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

It is a shelf-form, which ranges from the Lering Sea to La Perouse Strait and "zaliv Petra Velikogo" Bay. In the Bering Sea it is known to exist in the Chaplin area (Northernmost occurrence), on the Alaska coast, in the area of Cape Olyutorsk and the Commander Islands; in the Okhotsk Sea- in the area of Cape Lopatka, in the area of Cape Khayryuzov, on the NE coast of Sakhalin, in the area of Tyuleniy Island. In the Sea of Japan it is known to exist along the continental coast down to the entrance into Posyet Bay. It ranges at depths from the ebb-line to a depth of 100 m (in the Okhotsk Sea- to 80 m). On the basis of the collections of the Pacific Institute one must point out new places of occurrence in the western part of the Okhotsk Sea: At Cape Ploskiy, at Bolshoy Shantar Island, at the entrance to "zaliv Akademiyi" Bay, in Tugur Bay.

* 68. *Pagurus rathbuni* (Benedict).

Collections of the Pacific Institute: "Plastun", 1933, st. No 20; "Lebed", 1935, st. NoNo 17, 32.

Literary indications: "Albatros", 1896, (Near Tyuleniy Island) (Rathbun, 1904); "Krasny Yakut", 1930, st. No 140/25; "Gagara", 1932, st. No 204 (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

All three specimens, which were at our disposal, lack the round tuft of hairs on the anterior-internal angle of the

carpus of the right walking leg of the 1st pair, which is characteristic of this species according to the descriptions by Benedict, Rathbun and Makarov. The left chela of all three specimens was of an narrow-oval shape, typical of this species, but its dactyli curved downward. The lack of a tuft of hairs on the carpus of the right chela, it seems, is explained by the fact that our three specimens were very small; the largest of them had an 11 mm-long anterior part of the cephalothorax, whereas in an adult specimen, according to Makarov, this part reaches a length of 15 mm.

It is a shelf-form, which descends to the bathyal. It ranges from the mouth of the Kolyma river to "zaliv Petra Velikogo" Bay, it occurs at depths from 10 to 210 m; in the Okhotsk Sea- from 79 to 206 m; in the Sea of Japan- to 545 m (Kobyakova, 1937). In the Okhotsk Sea it is known to exist in the area of ^{Cape} Terpenye Ezy and at the entrance to Tauysk Inlet. The collections of the Pacific Institute contain specimens that were caught in the middle of the sections from St. Jona Island to the city of Okhotsk and from St. Jona Island to the city of Ayan and at the parallel of 52°20' northern latitude on the west coast of Kamchatka....

* 69. *Pagurus pubescens* Kröyer.

Collections of the Pacific Institute: "Plastun", 1933, st. NoNo(13-fry); 16, 18, 44, 47, (71-fry)/117; "Lebed", 1934, st. NoNo 2, 32, 36, 37; (39-fry)0, 41, 42, 43, (44-fry), 51; "Lebed", 1935, st. NoNo 1, 5, 6, 9, 10, 12, (21-fry), 28, 29, 30, (39-fry); 73; "Omar"; 1937, st. No(64-fry); "Lebed", 1938-39; st. NoNo 64, 298, 318, (320-fry); 360, 367, 374, 376, 422, 423, 497, 572, 598, 600, 729; 731; 732; launch-station NoNo 27, 53, 63, (66-fry).

Field determinations: "Lebed", 1937, st. NoNo 263, 266, 271, 278, 282, 338, 341, 346, 349 (Volk, Vinogradov); "Omar", 1937,

st. NoNo 5, 67 (Volk, Vinogradov); "Lebed", 1938-39; st. NoNo 36, 42, 62, 63, 338, 424, 427, 734, 745, 746, 753, 754 (Gordeyova).

Literary indications: "Krasny Yakut", 1930, st. NoNo 130/15, 135/20, 140/25, 141/26; "Ara", 1932, st. NoNo 21/1, 21/5, 22/2, 22/6, 23/1, 23/4, 23/6, 24/1, 24/3, 24/5; "Gagara", 1932, st. NoNo 204, 210, 218, 233, 234, 241, 243; 244; 246; 247; 248; 250; 266; 267; "Plastun", 1932, st. NoNo 1, 17, 73(?) (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

It was often adduced under the synonym of *Eupagurus trigonochirus* Stimpson. It is an amphiboreal, eurybathic form, but it is mostly encountered at depths not exceeding ca 200 m. It ranges from Novaya Zemlya to the Kattegat, from Greenland to Delaware Bay, from Cape Barrow to Oregon and from Long Strait to Nagasaki. It was encountered at depths from 5 to 900 m; in the Okhotsk Sea - from 25 to 330 m and once - at 500 m.

* 70. *Pagurus capillatus* (Benedict)

Collections of the Pacific Institute: "Lebed", 1934, st. No 47; "Lebed", 1935, st. No 47; "Lebed", 1938-39, st. NoNo 313, 729; launch-station NoNo 40; (44-fry), (45-fry), 49.

Literary indications: "Krasny Yakut", 1930, st. No 130/15; "Gagara", 1932, st. No 247; "Plastun", 1932, st. NoNo 11, 101, 150 (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

This species is easily distinguished from *Pagurus pubescens* by ~~its~~ ^{the} almost symmetrical oval form of the left chela the median crest of which is formed by two rows of spines. In *Pagurus pubescens* the posterior outward angle of the left chela is heavily developed thereby lending a characteristic asymmetrical shape to the chela, but the median crest of this chela is formed by one row of denticles. The hair growth on the right palm, according to Makarov, is a characteristic feature of *Pagurus capillatus*; it is not thick and is worn off in many specimens. We will cases (in millimeters) of some of our specimens:

Station	729	729	313
Sex	male	female	female
Length of the anterior part of the cephalothoracic carapace	11	11	9.5
Width of the anterior part of the cephalothoracic carapace	10	10.5	9.5
Approximate length of cephalothorax	20	19	17
" " " abdomen	50	70	65
" " " the right leg of the 1st pair	-	42	38
Length of the palm of the right leg of the 1st pair	-	17.5	15.5
Width " " " " "	-	10	10
Length of movable dactylus of this leg	4-	9	8
Length of palm of left leg of 1st pair	14	13.5	12.5
Width of palm of left leg of 1st pair	7	6.5	6
Length of propodus of right leg of 2nd pair	-	9.5	8.5
" " " " " "	-	14.5	12
Width " " " " " " "	-	2	2

It is a shelf-form, which descends into the bathyal. It ranges from the Chukchi Sea, where it is encountered in its southern part, which adjoins the Bering Strait, to California and the northern part of Korea at depths from 0 to 432 m; in the Okhotsk Sea- to 79 m, but it is seldom encountered on the slope (on one occasion it was caught at 180 and once at 500).

* 71. *Pagurus ochotensis* Brandt.

Collections of the Pacific Institute: (in collections for visual aids from the West Kamchatka shelf without a label; "Lebed", 1938-39).

Literary indications: (Okhotsk Sea) (Brandt, 1851); (Okhotsk Sea) (Makarov, 1938).

It is readily distinguished from *Pagurus pubescens* by the regular oval shape of the left chela, which is studded with spines on the upper side, is without a median crest, but has a thickened ridge on the inner edge or margin of the chela.

It is a shelf-form. It ranges from Unalaska to Oregon and from Avacha Inlet to Cape Inuboo (Pacific coast of Japan, north of Tokyo) and Nagasaki. Exact indications of places of occurrence in the Okhotsk Sea are not given. It is common in the Sea of Japan. It is encountered at depths from 1 to 250 m.

(4) 72. *Pagurus pectinatus* (Stimpson)

Literary indications: "Gagara", 1932, st. No 203 (Kobyakova, 1937); (La Perouse Strait) (Makarov, 1938).

It is a shelf-form. It ranges from La Perouse Strait to Sangar Strait and from De Kastri Bay to Tsushima Strait at depths from 5 to 200 m. It was encountered at a depth of 56 m in La Perouse Strait.

The family of Lithodidae Dana

Genus *Hapalogaster* Brandt

* 73. *Hapalogaster grebnitzkii* Schalfeew

Collections of the Pacific Institute: "Lebed", 1934, st. No 47; "Lebed", 1935, st. No 1, (53-fry), 57, 59; "Lebed", 1938-39, st. No 69-fry, 70, 71-fry; launch-station No 11-fry; (65-fry).

Literary indications: "Storozh", st. No 7, 11, 16, 49 (Brazhnikov, 1907); "Gagara", 1932, st. No 203 (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

It is a coastal form, descends to a depth of 90 m. It ranges from Bering Strait to Humboldt Bay (California), from La Perouse Strait to Cape Povorotnyy (it is the cape, which forms the eastern boundary of "zaliv Petra Velikogo" Bay). On our coasts it is encountered in Bering Strait, at Cape Chaplin, Cape Navarin, Cape Olyutorsk, the Commander Islands, Avacha Inlet, Shantar Bay, Terpenye Bay, Cape Olympiada (Primorye) and Cape Povorotnyy. The collections of the Pacific Institute, furthermore, contain specimens from the areas of Cape Kayryuzov and Cape Borisov. In the Okhotsk Sea it was encountered at depths from 16 (fry from 4) to 75 m.

Genus Dermaturus Brandt

* 74. Dermaturus mandtii Brandt

Collections of the Pacific Institute: "Lebed", 1934, st. No (35-fry); "Lebed" 1938-39, st. No 70; launch-station NoNo 13, 63, (65-fry).

Literary indications: "Storozh", st. No 16 (Brazhnikov, 1907); "Gagara", 1932, st. No 203 (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

It is a coastal form; it is known to exist on the west coast of America from the Pribyloff Islands to Sitka, on the coast of Asia from Cape Olyutorsk to La Perouse Strait. The collections of the Zoological Institute of the Academy of Sciences, USSR, contain two jars with animals of this species from more southern regions; but Makarov doubts that they are properly labeled. Kobyakova cites them for the Okhotsk Sea in the La Perouse Strait, Brazhnikov- for the area of Cape Terpenya. The collections of the Pacific Institute contain specimens of the form that were gathered in the area of Cape Khayryuzov and at Bolshoy Shantar Island. It is common from the littoral to depths of 30 m, rarely encountered at greater depths (up to 72); in the Okhotsk Sea it was encountered at depths up to 56 m.

Genus Paralithodes Brandt

I ^{have} dealt in greater detail with the range of this genus (Vinogradov, 1946); for this reason I will abstain from adducing doubtful indications discussed by me and present a general description of the range.

We deem it necessary to adduce a key of the species of this genus with which we supplied the workers of the institute when they left on an expedition.

Key to the species of the genus Paralithodes of the Soviet Far East.

1(2) Three pairs of spines in the heart region of the cephalo-thoracic carapace. There is one large anterior spine, which often

bifurcates at the end, on the upper side of the rostrum and one pair of smaller posterior spines. The scaphocerite has the appearance of an ordinary spine. *P. camtschatica*...

1(2) Two pairs of spines in the heart region of the cephalothoracic carapace. There is one pair on the upper side of the rostrum; the unpaired spine is very small or is lacking altogether.

The scaphocerite is ramose.

3; 4.

3(4) The end of the rostrum is pointed. There are two parallel rows of large spines (not counting the small and unpaired ones) in the stomathic region of the cephalothoracic carapace. The propodus of the walking legs of the 2nd, 3rd and 4th pairs is longer than the carpus. The scale near the antennae (Russian- "pri-usikovaya cheshuyka". Tr.) of the 4th pair is biramose

P. brevipes....

This key can be used also for determining fry, if it is borne in mind that in the fry or young of *Paralithodes platypus* the spines of the cephalothoracic carapace are replaced with tubercles, but that the count and the arrangement of these tubercles ^{are} are the same as in adult specimens.

* 75. *Paralithodes camtschatica* (Tilesius)

1932. *Paralithodes rostrofalcatus* MacKay

Collections of the Pacific Institute: "Lebed", 1938-39, st. NoNo(69- an underyearling); (295- a fragment in a sample from a bottom-grab); (507- the same); launch-station NoNo(24-fragment); 68.

Field determinations: "Dal'nevostochnik", 1930, July voyage, st. No 8 (Krivobok); "Krasno-armeyets", 1931, June voyage, st. No No 1, 2, 3, 7, 8, 9, 10; 13; 14; 15; 16; 17; 19, 23, 26, 27, 28, 29, 30, 31, 32; 33; 34; 34, 35, 36, 37, 38, 39, 41; 42; 43, 44, 45, 46, 47, 48, 49, 51; 52; 53; 56; 57; 59, 61, 62, 63, 64, 65, 66, 68, 69; 70, 71, 72, 73; 74; 75, 76, 77 (Krivobok and Generozova); "ara", 1932, st. No(20/1- according to clean copies

or journals No 496 and No 340 one young king crab was shown, according to the original No 550-v- one small female of the blue crab)(P. Yu. Schmidt and Krivobok); "Plastun", 1932, st. No No 11, 12, 22, 34, 45, 47, 48, 53; 54; 56; 64; 65, 66; 67, 68, 71, 72, 83, 84, 120, 127, 129; 177; 201; 202; 208(Polutov); "Plastun", 1933, st. NoNo 1, 3, 8, 26, 28, 29, 30, 31; 32; 33, 34; 36. 37, 39; 40, 41, 42, 43; 44, 45, 46, 55, 58, 59, 63, 70, 72, 76, 77; 81; 82; 83; 84, 85, 86, 88, 89, 90; 92; 93; 95, 96, 97, 99, 100; 101, 102, 103, 104, 105, 106, 108, 109; 110; 111; 112; 114, 115, 116, 117, 118, 120, 121, 123, 124, 125, 126, 127, 132 (Bozhko, Vinogradov, A. I. Rumyantsev), "Lebed", 1934, ichthyological station NoNo 2, 3, 4, 5, 6, 8, 10, 11, 12, 15, 19; 20, 22; 24; 25, 26, 27, 28, 29, 30, 31, 32, 33; 34, 35; 36; 37; 38; 39; 41; 42; 43; 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58; 59, 60, 61, 62, 63, 64, 66, 68, 69, 70, 71; 73; 74; 79; 83; 84; 85; 86, 87, 88, 90, 92, 93, 94, 95; 96; 97; 98, 99, 100, 101, 103, 104, 107; 108; 110; 111(Moiseyev, Vinogradov); "Lebed", 1937, st. NoNo 6, 8, 42, 43, 44; 53, 54, 55; 56; 57, 58, 60, 62; 63; 66; 69; 86; 92, 93, 96, 97, 98, 101(L.E. Rumyantsev); 266, 274, 275, 276, 278, 279, 280, 281, 282, 283, 284, 312, 334; 335; 337; 338, 339; 341; 342, 343, 345, 346, 347, 348, 349, 350, 351, 352, 354, 355, 356, 357, 358; 359; 360; 361; 362, 363, 364; 365; 366; 373; 374, 375(Volk, Vinogradov, L.E. Rumyantsev). "Omar", 1937, st, NoNo 1, 10, 21, 37(drag-nets)(Volk, Vinogradov " Lebed"; (Translator's Note: Now follow - pp.108-109- 16½ lines of solid figures; the only exception is line 12, which contains the name"Gordeyeva".)(Vinogradov, L.E. Rumyantsev). Exploration aboard a "kavasaki"- a small fishing vessel with motor and sail- in Tauysk Inlet, 1932, at depths of 82 and 86 m east and north-east of Lake " Ol'skoye ozero"(Bambulevich).

Literary indications: Tugur Bay(Brandt, 1851); "Storozh", st. NoNo 10, 27 (Brazhnikov, 1907); west coast of Kamchatka)

(Marukava, 1919) (on the east coast of Sakhalin ^{from} Aniv Bay to the 49th parallel) (Marukava, 1933); (from Aniv Bay to Terpenya Bay) (Isi, 1933); (Paramushir; Alaid; Shikushu, Shirinka, Iturup; Kunashiri and the islands of the Malaya Kuril'skaya range) (industrial statistics); (western coast of Kamchatka) (Kobyakova, 1937); (Okhotsk Sea) (Makarov, 1938).

I showed in 1946 that *Paralithodes rostrofalcatus* MacKay is a synonym of *Paralithodes camtschatica*.

It is a shelf-form, which descends to the slope in winter. In the Okhotsk Sea it was encountered in summer at depths from 4 to 198 m and in winter- from 75 to 270 m.

* 76. *Paralithodes platypus* Brandt.

Collections of the Pacific Institute: "Lebed", 1935, st. No (4- fry); "Lebed", 1938-39, st. No (71- fry); launch-station No(40 -fry).

Field determinations: "Dal'nevostochnik", 1930, July voyage, st. No 8 (Krivobok); "Krasnoarneyets", 1931, June voyage, st. No No 3, 7, 9, 13; 14; 15; 16, 17, 27, 28, 29, 30; 33; 34; 35; 36; 37, 38, 39, 53, 57; 58; 59; 61, 62, 64; 65; 69, 70, 71, 72; 73, 74, 75 (Krivobok, Generozova); "Ara", 1932, st. No No 20/1, 22/1, (25/5- illegible entry); 25/6, 25/7, 25/8, (28/4- original and clean copy ~~not~~ provide different determinations); 39/1, 30/2 (P. Yu. Schmidt and Krivobok); "Plastun", 1932, st. No No 56, 57, 63; 64; 65; 66, 67, 70, 71; 72; 83; 84; 86, 87, 119, 120, 177, 180 (Polutov); "Plastun", 1933, st. No No 32; 63; 82; 83; 88; 95; 96; 99 (100-fry); 108, 109, 110; 11, 115, 116, 117, 121, 122, 123, 125 (Bozhko, Vinogradov, A.I. Romyantsev); "Lebed", 1934, ichthyological stations No No 2, 3, 4, 5, 6, 8; 12; 30; 33; 34, 37, 38, 39, 43, 44, 45, 46, 47, 48, 51; 52; 53; 54; 55; 56; 57; 58, 59, 61, 62, 63, 68, 69, 73, 74, 83; 84; 85; 90; 95; 96; 97; 98 (Moiseyev, Vinogradov); "Lebed", 1935, st. No No (2-fry); 28, (60-fry);

"Lebed", 1937; st. NoNo 57(L.E. Rummyantsev); 262; 263; 264; 265; 266; 268, 269, 271; 272; 273, 274; 275; 276; 278; 279, 280, 281; 282, 312, 318, 337, 339, 343, 373, 375(Volk, Vinogradov, L.E. Rummyantsev); "Lebed", 1938-39, st.NoNo 62, 98, 102, 103, 106, 110, 111, 112, 114, 119, 120, 125, 126, 161, 377, 406, 508, 600, 605, 608, 613(Gordeyeva), 696, 701, 729, 736, 741; 742; 750 (Vinogradov, L.E. Rummyantsev). Exploration aboard a "kavasaki" in Tauysk Inlet in 1932; it is very common from Cape Chirikov to Ol'ski Island and from Ol'ski Island to Koni Peninsula at depths from 60 to 100 m(Pambulevich).

Literary indications:(near Ayan)(Brandt, 1851);(near Cape Terpenye)(Brazhnikov, 1907); (on the east coast of Sakhalin from the northern tip to the parallel of 51°); ^{it rarely occurs} (at Hokkaido Island);(along the Kuril range from its northern tip to the 47th parallel)(Marukava, 1933); "Krasny Yakut", 1930, st. No (169/54-fry); "Gagara", 1932, st. 210,(on the west coast of Kamchatka) (Kobyakova, 1937);(Okhotsk Sea)(Makarov, 1938).

RE It is a shelf-form, it is rarely encountered on the slope. The form was encountered at depths from 14 to 500 m, usually not below 200-250 m. In the Okhotsk Sea it is encountered at depths from 14 to 220 m and, furthermore, it was caught in "trawl" suspended" from 220 to 447 m. One young specimen was caught at a depth of 447 m.

* 77. Paralithodes brevipes(A.Milne-Edwards et Lucas)

Collections of the Pacific Institute: Launch-station No 69.

Field determinations: "Lebed", 1938-39, st.No672(Vinogradov); near Ayan, 1930(Zaks); Amakhton Bay in rubbish in September of 1932(A. I. Rummyantsev); at $156^{\circ}50'$ E $57^{\circ}30'$ N on June 2, 1937, 0.1% of the catch of the floating factory "Vsevolod Sibirtsev" consisted of adult males of the spiny crab; south of Ptichiy Island, in catches in crab-nets brought to the island on June 3, 1937, and on June 15, 1937(Vinogradov).

Literary indications: In Lebyazhaya Inlet of Beklistov Island; in Udskeya Cuba (Cuba-inlet. Tr.); near the mouth of the Ulya river; near Ayan; Paramushir Island; Saimushu Island (Brandt, 1851); west coast of Iturup Island (Doflein, 1902); Bolshoy Shantar Island at Cape Filip; at Ol'ski Island at the water-line (Zaks, 1929) (Okhotsk Sea coast of Hokkaido); Nemuro Sea (Narukawa, 1933); (coast of the provinces of Toekhara and Sikuka); (Kunashiri and the islands of the Malaya Kuril'skaya range) (industrial statistics). (Okhotsk Sea) (МАКАРОВ Makarov, 1938). Doubtful indications, which were discussed in the work of 1946; they are not adduced.

It is a coastal form, which was encountered from the ebb-line to a depth of 50 m. In the Okhotsk Sea this form was caught on one occasion with an ~~otter trawl~~ otter trawl at a depth of 37-42 m, the other places of occurrence were closer to the shore.

Genus *Lithodes* Latreille

* 78. *Lithodes aequispina* Benedict.

Collections of the Pacific Institute: "Lebed", 1938-39, st. No (96- fry).

Field determinations: "Lebed", 1937, st. NoNo 25, 26, 32, (L.E. Romyantsev); 262, 297, 298, 299, 301, 303, 316, 318, 323, 325; 330; 331; 367; 368; ~~33~~ 369; 371, 372 (Volk, Vinogradov, L.E. Romyantsev); "Lebed", 1938-39, st. NoNo 39, 435, 548 (Gordeyeva).

Literary indications (Okhotsk Sea- definitely an erratum) (Navozov-Lavrov, 1929); "Cagara", 1932, st. NoNo 247, 250 (Kob-yakova), 1937); (Okhotsk Sea) (Makarov, 1938).

Besides the division of the integuments of the 2nd segment of the abdomen into 3 plates (a distinguishing feature of the genus) and the general outward appearance of the species it is easily distinguished from the Okhotsk Sea species of the genus *Paralithodes* by the larger number of spines in the heart region of the cephalothoracic carapace. This number usually equals 10.

It is a semi-bathypelagic form; it is known to occur at the Pribyloff Islands, the Pacific coast of Kamchatka, the area of Cape Elizaveta (in the Okhotsk Sea) and Cape Siroya (Pacific coast of Honsu) at depths from 315 to 730 m. The expeditions of the Pacific Institute often recorded its occurrence on the west Kamchatka slope and on the 500-meter median plateau of the northern half of the Okhotsk Sea, at depths from 185 to 500 m. On one occasion it was caught in a trawl suspended from 104 to 185 m.

Genus *Paralomis* White

* * 79. *Paralomis verrilli* (Benedict)

Collections of the Pacific Institute: "Lebed", 1937, st. No. 325.

Only 4 specimens of this species were at the disposal of zoologists: 1- in the hands of Benedict (1894) 2- in the hands of Schmidt (1921) and one - in our hands. We had an adult male with small, regenerated walking legs of the 1st pair at our disposal. Apparently in connection with the trauma suffered by the animal and the subsequent regeneration of the injured parts of the body it has the following distinguishing features in comparison with the description by Benedict: The left scaphocerite is equipped with 4 (according to Benedict - with 3) spines on the external margin and with 3 large and 2 small spines (according to Benedict - there are only 3) on the internal margin; the right scaphocerite is normal; the internal margin of the carpus of the right walking leg of the 1st pair is equipped with only 2 (according to Benedict - with 3) denticles. Furthermore, there is the following distinguishing feature: The frontal margin is equipped on each side between the post-orbital and pro-lateral denticles with 2 small spines (according to Benedict there should be a row of tiny spines and 1-2 tubercles). Finally, Benedict does not mention

the 7 small spines, which occur among the 12 large spines, of each lateral margin of the cephalothoracic carapace.

It is a bathyal form; the species of this genus were encountered from La-Plata to Magellan Strait and from the Bering Sea to Tierra del Fuego and the Prince Edward islands in the Indian Ocean; one species(the Tierra del Fuego one) is sublittoral, the other are bathypelagic ones(400-1300 m). Our species was found in the areas ^{from} the Pribyloff islands to California at depths from 1238 to 1480 m. The expedition aboard the trawler "Lebed" obtained 1 specimen from the 500-meter median plateau of the northern half of the Okhotsk Sea(the depth-450 m, the temperature was *1.5°C).

The family of Majidae Alcock

We deem it necessary to adduce the key of our genera of the family, since the keys provided by Rathbun(1925), Sakai(1938) and Kamit(1941) are unsuitable under our conditions. These tables contain a multitude of genera not occurring in our waters (literally "that we do not have".Tr.) and the differences between the genera Chionoecetes and Hyas, of which we have an abundance of representatives, are not stressed sufficiently. Finally, the tables of Kamit are written in hieroglyphics for the explanation of which the author introduces several scores of new combinations of hieroglyphs.

Key for the genera of the family of Majidae of the Soviet Far East.

- 1(4) The first joint of the external antennae is long, thin, almost cylindrical; its length exceeds the length of the eye. 2;3.
- 3(2) ~~2(3)~~ The "kozyrek"(peak, visor.Tr.), which from above ^{above} the base of the eye, rounds off downward towards the base of the external antennae and does not form a spine... Oregonia..
- ~~2(3)~~

2(3) The visor, which from above covers the base of the eye, forms a spine in its anterior part.... *Fugettia*....

4(1) The first movable joint of the external antennae is small and thickened; its length is considerably less than the length of the eye... 5;6.

5(6) The visor, which from above covers the base of the eye, forms a spine in its anterior part... *Pisoides*....

6(5) The visor, which from above covers the base of the eye, rounds off downward towards the base of the external antennae without forming a spine. 7;8.

7(8) The width of the cephalothoracic carapace of adult specimens equals or exceeds its length. The crest, which extends from the cardiac region of the cephalothoracic carapace towards the margin of the branchial region, is oriented under a right angle towards the longitudinal axis of the body. From under the posterior half of the anterior lateral excrescence of the carapace there emerges and stretches a spiny lateral crest along the lateral surface of the carapace; the crest is plainly visible when the animal is viewed from above. The joints of the walking legs are flattened... *Chionoecetes*....

8(7) The width of the cephalothoracic carapace of adult specimens is considerably less than its length. A row of tubercles, which stretches from the border of the stomathic ^{and of} ~~to~~ the cardiac region of the carapace towards the margin of the branchial region, is oriented obliquely (about 40°) towards the longitudinal axis of the body. The joints of the walking legs are ridgy(?).

Hyas....

Genus *Oregonia* Dana

* 89. *Oregonia gracilis* Dana

Collections of the Pacific Institute: "Lebed", 1934, st. No 37; launch-station NoNo 40, 54;

Field determinations: It is common in the littoral "dips"

(perhaps "pools". Tr.) on Kamen Island (north and northwest of Cape Khayryuzov) (Volk).

Literary indications: "Albatros", 1906, st. NoNo 5031, 4801 (Rathbun, 1925); (in the area of the mouth of the Icha river, at the west coast of Kamchatka) (Kobyakova, 1937).

It is a shelf-form. It ranges from Nunivak Island to Monterey (California) and from the Commander Islands to Cape Inoboo and Chifu (the Yellow Sea). In the Okhotsk Sea it occurs in the area of Shimushu Island, of the mouth of the Icha river and the north shore of Hokkaido Island. The collections of the Pacific Institute contain specimens gathered at Cape Kambal'ny, at the mouth of Ozernaya river and at Cape Khayryuzov (west coast of Kamchatka).. It was not encountered in the waters of the Primorye. It ranges from the ebb-line zone (in littoral and pools on Kamen Island in the area of Cape Khayryuzov) to 386 m (usually to 100 m). It was encountered in the Okhotsk Sea at depths from 0 to 65 and from 157 to 195 m.

81. *Oregonia bifurca* Rathbun

Literary indications: "Gagara", 1932, st. No 214 (Kobyakova, 1937).

It is a semi-bathypelagic form, which was encountered only 4 times: 3 times in the western part of the Bering Sea and once in the southern part of the Okhotsk Sea at depths from 486 to 1375 m.

Genus *Pugettia* Dana

() 82. *Pugettia quadridens* (de Haan).

Literary indications: "Gagara", 1932, st. No 203 (Kobyakova, 1937).

It is a shelf-form. It ranges from Aniv Bay to Kagoshima (Pacific coast of Honsu) and from the southern Primorye to Hong Kong at depths from 2 to 324 m; it occurs in the Primorye at depths not exceeding 50 m. It was found in La Perouse Strait at a depth of 56 m.

Genus *Chionoecetes* Kroyer83. *Chionoecetes angulatus* Rathbun

Literary indications: "Gagara", 1932, st. NoNo 215, 216, 231, 251 (Kobyukova, 1937).

It is a semi-bathypelagic form, which ranges from the Pribyloff Islands to Oregon; it was encountered at the Commander Islands, in the open sea opposite the entrance into Avacha Inlet, in the central part of the Okhotsk Sea and on the 500-meter median plateau of the northern part of the Okhotsk Sea; it was encountered at depths from 88 to 2600 m; in the Okhotsk Sea— from 591 to 1643. In the Sea of Japan it is replaced by the subspecies *Chionoecetes angulatus bathyalis* (Derjugin et Kobjakova).

84. *Chionoecetes opilio* (Fabricius)

Collections of the Pacific Institute: "Plastun", 1933, st. NoNo (11; 18; 29; only fry); "Lebed", 1934, st. NoNo 13, 39; only fry 42, 43, 44, 45; (50-fry); "Lebed", 1935, st. No (33-fry); "Omer", 1935, st. NoNo (5, 64, only fry); "Lebed", 1938-39, st. NoNo 36 (109, 222, 259, 273, 274, 295, 296, 297, 298, 308; 314, 315, 316, 317, 318, 319, 320, 326, 327, 329, 331; 332; 499; 501; only fry); 595.

Field determinations: "Dal'nevostochnik", 1930, July voyage st. No 103 (Krivobok); "Krasno-armeyets", 1931, st. NoNo 58, 59, 61 (Krivobok and Generozova); "Plastun", 1932, st. NoNo: 1, 18, 23, 27, 28, 30, 31, 32, 34, 37; 42; 43; 45; 49; 63; 70; 72, 90, 98, 101, 110, 132, 198, 209, 222; 229, 231, 234, 235, 237 (Polutov); "Ara", st. NoNo: 21/2, 21/4, 22/1; 22/4; 22/5; 22/6, 22/ 23/2, 23/ 24/1; 24/3; 24/5; 25/5; 25/6, 27/1; 28/3; 29/2; 29/3; 29/5; 30/2 (P. Yu. Schmid and Krivobok); "Plastun"; 1933; st. NoNo: 1, 3, 4, 7, 9; (11-fry); (18-fry); 23; 24; 29; 30, 70, 81, 88; 89; 122; 124; 126; 130; 131; 135 (Lozhko, Vinogradov, A. I. Romyantsev); "Lebed", 1934,

ichthyological st.NoNo 2,3,4,5,6(19-fry); 22;24; 37;38;39;
 42;55;57; 58; 61; 68, 69, 70, 71, 73, 74,76, 79, 81; 83; 85;
 86,87, 88, 95, 96, 97, 98, 100; 101; 103; 104; 105; 107; 108;
 109; 110; 111, 112(Moiseyev, Vinogradov); "Lebed", 1937, st.
 NoNo 8,9,(26);(27);(28);(29); 42,54,55,56, 57, 58, 69,70(L.E.
 Rumyantsev); 266; 271; 272; 273; 274; 275; 276; 278;300; 301,
 302,303, 306,307,309,312,327 329,330,331,338,342,343,345,347,
 348; 349;;350,(367),(369),373, 374,375(Volk,Vinogradov, L.E.
 Rumyantsev)(in brackets are the observations made a great
~~great~~ depths of 300-400 m, which are in need of revision);
 "Omar", ~~st.~~st.NoNo(5, 26; 41; only fry); 44;(52; 53; only fry);
 56;(64; 65; 67;68; only fry),(Volk,Vinogradov); "Lebed",1938-39;
 st.NoNo 4; 36; 41; 61;62; 63; 64; 96; 98; 111; 112;114;116;
 118; 120; 121;137;141; 143; 145;146;149;168,279,280,281,282;
 283,323,362,366,367,374,385,386,404,413,414,415, 482,423,424,
 428, 430,432,435,439,440,441,442,445,446,450,466,467; 469;470;
 481; 550; 551; 559; 562; 570; 571; 574,575, 595,598, 599, 600,
 (Gordeyeva);663, 664, 666; 667;668; 672;673; 680; 716, 717,
 729; 751; 752(Vinogradov, L.E. Rumyantsev);

Literary indications:"Storozh", st. NoNo:11; 16; 17; 18;
 23; 26(Brazhnikov, 1907), "Albatros", 1896, and 1906 at.NoNo:
 (3651, 4798, 4799);5005; only fry); 5006;(5008; 5009; 5010,
 5011; only fry);5012;(5013;5018;5022; 5024; 5026; 5027; 5032;
 only fry)(Rathbun;1925); (along the east coast of Sakhalin)
 (northwestern part of the sea)(along the west coast of Kamchat-
 ka)(Kobyakova, 1937).

Rathbun, in 1924, set up the "strigun"(an English equiva-
 lent has not yet been found.Tr.)crabs of the Sea of Japan as
 the separate subspecies *C. opilio elongatus*. The meruses(*Ok-*
meroi. Tr.)of the walking legs of the 2nd pair of the adult ma-
 les of this subspecies are longer than the meruses of the legs

of the 1st pair(in the ^{typical} ~~EXAMINE~~ form they are shorter or are exactly the same as the meruses of the legs of the 1st pair), the length of the merus of the leg of the 2nd pair exceeds its width by 5.5-6.3 times(in the typical form - 4.9-5.2 times). However, regardless of the evident isolation or distinctness of the Sea of Japan form the distinguishing features or characteristics suggested by Rathbun for its identification were not successful; thus Kamita of the 5 adult male crabs that were in his collection and caught in the Sea of Japan could assign only one to the Sea of Japan subspecies. In connection with this the assertions of Rathbun and Kobyakova about the close^r affinity of the Okhotsk Sea "strigun"-crab to the Sea of Japan subspecies than to the typical form are premature. We are of the opinion that judging by the dimensions of the Okhotsk Sea "strigun"-crab the width of the cephalothoracic carapace of which on the average is about 8 cm and rarely reaches 12cm(i.e. the same as in the typical form) can hardly be related to the Sea of Japan "strigun"-crab, which has a carapace with a width up to 16 cm. We lacked sufficient material for a biometric analysis and in connection with this the problem of the characteristics of the Sea of Japan subspecies and the question to what subspecies the Okhotsk Sea "strigun" belong must remain open.

11.5(Left) *Pagurus capillatus* (Benedict), female, "Lebed", 1938, st. 313, X2;

a- Anterior part of cephalothorax; b- Left chela; v- Right chela. The points or ends of the large spines are worn off.

11.6.(Right) Cephalothoracic carapaces and eyes of young ones: а and б- *Chionoecetes opilio* (O. Fabricius); в and г- *Hyas coarctatus alutaceus* Rathbun; X6.5.

The bottom grab collections of the trawler "Lebed" contained very few young ones of the "strigun"-crab and of the spider-crab (*Hyas coarctatus alutaceus*).

The proportions of the body and the sculpture of the carapace, which differ from those of adults, complicated the determination of the young ones and compelled us to trace the change in the characteristics from the largest to the smallest specimens.

The young or fry of *Chionoecetes opilio* can be determined by the wide or broad depression of the rostrum the distance between the ends of the lobes of which almost equals the depth of the depression, by the lack of a large tubercle, at times replaced by several small ones, on the anterior side of the orbital stalk, by the narrow basic joint of the external antennae and the slightly compressed subsequent one (the first mobile one) joint of these antennae, the width of which does not exceed more than 1.5 times its thickness (in *Hyas coarctatus alutaceus* the width of this joint twice exceeds its thickness).

The smallest "strigun"-crabs with a carapace-width of 2-5 mm can be distinguished from the young of the spider-crab by the above described equipment of the anterior side of the orbital stalk and by the post-orbital process, which is pointed, spiniform, has smooth edges or margins, of the cephalothoracic carapace. In the corresponding specimens, in regard to size, of *Hyas coarctatus alutaceus* this process is broader and resembles in regard to shape the process or projection of the carapace of an adult "strigun"; the edges of this projection are finely serrated.

It is an eurybathic form, which ranges from Greenland to Keskö Bay (Portland, USA); it was found in the region of the mouth of the Mackenzie river, at Cape Barrow, in the region of Wrangel Island, it ranges south as far as British Columbia and Honsu. It is replaced in the Sea of Japan by the subspecies *Chionoecetes opilio elongatus* Rathbun. It was encountered at the coast of Chile. It occurred at depths from 7 to 1000 m (on the coast of Japan, according to Rathbun); in the Okhotsk Sea - from 16 to 530 m.

Genus *Hyas* Leach* 85. *Hyas courcatus alutaceus* Erasm. t

Collections of the Pacific Institute: "Plastun", 1933, st.NoNo: (13, 21; only fry); 26, 29, (44, 40, 47, 59; only fry); 60, 128; "Lebed", 1934, st. NoNo 2, (3-fry); 4, (7-fry), 14, 32, (35-fry), 37, (41, 42, 43; 44; 47; only fry); 51; "Lebed", 1935, st. NoNo: (1-fry); 4, 5, 7, 9, 10; 12; (21; 30; only fry), 39, (59-fry); "Omar", 1937, st.No (64-fry); "Lebed", 1938-39, st.NoNo fry); 71; (72; 87; 88; only fry), 89, (96, 98, 109, 168; 176; 197; 200; 221; only fry); 237; (264; 272, 273, 274; 295, 297, 308, 314, 315, 328; only fry); 364; (377-fry); 414; (498; 590; 595; 612; 613; 698; only fry); 703, 704; 706; 729, (731; 732; only fry); launch-station NoNo 2, (3, 4, 18; 23; 24; only fry); 34, (43, 44, 46, 54; only fry); 60; (62-fry); 63, (65-fry):

Field determinations: "Krasno-armeyets", 1931, June voyage; st.NoNo: 1; 3; 7; 8; 9; 23; 24; 27; 28; 29; 30; 31; 32; 33; 34; 35; 36; 37; 38; 41; 42; 43; 44; 45; 46; 47; 48; 49; 52; 56; 57; 58; 59; 61; 62; 63; 64; 65; 66; 72; 73; 74; 75; 77 (Krivobok, Generozova); "Ara", 1932, st.NoNo: 20/1; 20/2; 21/1, 21/2, 21/3, 21/4; 22/1; 22/2; 22/5, 23/1, 23/2; 23/4; 23/5; 23/6; 24/1; 24/2; 24/5; 25/2, 25/6, 25/8; 27/1; 27/2; 28/2, 29/2 (P.Yu.Schmidt and Krivobok); "Plastun", 1932, st. NoNo: 1; 14; 22; 26; 32; 37; 43; 45; 49, 63, 90, 101; 201, 217 (Polutov); "Plastun"; 1933, st.NoNo: 1; 7; 8; 9; 11, (13-fry); 14; (21-fry); 26, 29, 40; 42; 44; 47; 59, 60, 63, 77, 79; 80; 81; 83; 87; 88, 89, 112; 114; 116, 122, 123; 125; 127; 128; 131, 135; 136 (Bozhko, Vinogradov, A.I.Rumyantsev); "Lebed", 1934, ichthyological stations NoNo: 2, 2 3, 4, 5, 6, 8 10; 11, 12, 20, 22; 24; 27; 30; 35; 37; 38; 39; 43; 45; 46, 47, 48, 51, 52; 53; 54; 61; 71; 76; 79; 81; 83; 85; 86; 87; 90; 92; 93; 94; 95; 96, 97, 98; 99; 100; 101 (Moiseyev, Vinogradov); "Lebed", 1935, st.No 8 (Okhryamkin); "Omar", 1937, st. NoNo: 22; 24; 28; 30; 36; 39; 41; 42; 44; 50; 52; 53; 54, 55, 60; 64, 65; 67 (Volk, Vinogradov)

"Lobed", 1937, st. NoNo:263; 264; 265; 266; 275; 282, 327, 329; 339; 341; 342; 343; 346; 348; 349; 350; 373 (Volk, Vinogradov; L.E. Rummyantsev); "Lobed", 1938-39, st. NoNo:53, 96; 98; 101; 121; 130; 166; 173; 177, 190; 290; 354; 367; 413, 414, 422, 423, 424, 428, 570, 571, 574; 590; 591, 595; 596, 598, 599, 600, 612; 613; 614; 620, 685, 694, 696, 697, 698, 703; 704, 706, 707; 709; 716; 717; 718; 719; 723; 729, 732; 734; 747; 753 (Gordeyeva).

Literary indications: (Medvezhiy Island in Udskeya Inlet) (Brandt, 1851); (Okhotsk Sea) (Stimpson), 1893 * "Storozh", st. NoNo: 3, 4, 8, 11, 26, 46; (Brazhnikov, 1907); "Albatros", 1896 and 1906, st. NoNo: 3646, 3649, 3651, (4798-fry), (4799-fry), 5005, 5006, 5008, 5010, 5011, 5012, 5013, 5016, (5017-fry), 5018, 5024, (5031-fry) (Rathbun, 1925); (along the east coast of Sakhalin); (north of Sakhalin Island to St. Jona Island); (in Sakhalin Bay); (near Ayan); (in Nagayev Bay); (along the west coast of Kamchatka) (Kobyakova, 1937).

Brazhnikov (1907) and Rathbun (1925) established that the spider-crabs of the Okhotsk Sea, even those gathered in the southernmost part of it, belong to this subspecies. Although at times specimens are caught that lean towards *H. coarctatus ursinus* of the Sea of Japan, they are, nevertheless, closer related to the subspecies *H. coarctatus alutaceus*. The spider-crabs, which were at our disposal had a short rostrum, the same as in the subspecies *H. coarctatus alutaceus*, the length of which "fits" from 7 (in medium-sized) to (in large) times into the length of the cephalothoracic carapace....

In large and medium-sized specimens of spider-crabs the length of the cephalothoracic carapace considerably exceeds its width. In young ones the length of the carapace equals or is less than its width; the other proportions and the shape of the body of young ones also are close to the proportions and the shape of the body of the "strigun"-crabs and can be differentiated from them only by the features that were discussed in the description of *Chionoecetes opilio*.

* The remark by Stimpson was published as a supplement to the work by Rathbun

It is a shelf-form ranging from Greenland to Newfoundland and Cape Breton; it was encountered in the region of the mouth of the Mackenzie river, in the Chukchi Sea, at Bennett Island. It is very common in the Bering Sea, on the south-east coast of Kamchatka and in the Okhotsk Sea; in the Sea of Japan it is replaced by the subspecies *Hyas coarctatus ursinus* Rathbun, in the European seas- by the typical subspecies *Hyas coarctatus coarctatus* Leach. It occurs primarily from the ebb-line zone to a depth of 200 m, but ~~xx~~ at times it descends ^{to} greater depths. One report~~s~~ states that ~~it~~^{it} was encountered at a depth of 1650 m (Rathbun); in the Okhotsk Sea adult spider-crabs were encountered in summer at depths from 25 to 250 m and on two occasions at a depth of 400 m.

The family of Atelecyclidae Ortmann

Genus *Telmessus* White

* 86. *Telmessus cheirgonus* (Tilesius).

Collections of the Pacific Institute: "Lebed", 1934, st. NoNo 26(35-fry); "Lebed", 1935, st. No.55; "Lebed", 1938-39, st. NoNo(65-fry); (68-fry); 640; launch-station NoNo(11, 12; only fry); (21- young ones in the bulk); 28, (29, 31, 36, 37; only fry); 42, 55, 59(64, 66; only fry).

Field determinations: "Lebed", 1937, st. No 335(Volk, Vinogradov); "lebed", 1938-39, st. NoNo 632(Gordeyeva); 690, 695, 699 (Vinogradov, L.E. Romyantsev); Amakhton Bay in refuse in September of 1932(A. I. Romyantsev);

Literary indications: (Okhotsk Sea)(Brandt, 1851); 2- --- "Albatros", 1896, Syan Bay of Iturup Island on September 4 (Rathbun), 1930); "Storozh", st. NoNo 43, 44; at Korsakov on Aniv Bay; Terpenye Bay, Lebyazhya Inlet of Feoktistov Island; Yakshina Bay of Bolshoy Shantar Island(Erazhnikov, 1907).

The Dulkeit collection (our launch-station No 21) "made" on floating algae 130-140 nautical miles northeast of Aniv Bay is of interest. The sample contained a "mass" of the fry or young of the pentagonal hairy crab, which, it seems, had just emerged from the megalopa stage, and the mass of megalopa, apparently belonging to this species. Unfortunately the label does not contain the species of the alga neither does the sample contain pieces of the alga.

It is a coastal form; it is common in the estuaries of rivers. It ranges from Port Clarence (area of Bering Strait, American coast) to California and from Olyutorskiy (Bay) to Hakodate* and the coastal province of Kankiokhokudo (North Korea). In the Okhotsk Sea it is known to exist in the Shantar, Sakhalin, Terpenye and Aniv(a) bays and at the Iturup Island. The collections of the Pacific Institute contain specimens that were gathered in the areas of Cape Lopatka, of the mouth of the Bolshaya river, of Cape Khayry^uzov, of Cape Utkolokski (west coast of Kamchatka); some came from Tauysk Inlet, from the area of the town of Okhotsk. This form was encountered from the ebb-line to a depth of 37 m (one find was made in ^atrawl suspended from 52 to 57 m).

This form was encountered in the Vladivostok area in the heavily freshened part of EK Amur Bay in the mouth of the Suyfun river.

Genus Erimacrus Benedict

* 87. Erimacrus isenbackii (Brandt)

Collections of the Pacific Institute: Launch-station No (48-fry):

Field determinations: "Plastun"; 1932, st: NoNo 37; 53; 54; 55; 226; 227; 237 (Polutov); "Plastun", 1933, st. NoNo 1; 8; 13; 14; 35; 37; 51 (Bozhko, Vinogradov; A.I. Rumyantsev); "Lebed",

* In Tokyo Bay - T. acutidens (see Sasaki, 1939).

1934, st. NoNo 10; 11; 12; 22; 24; 25; 26; 27; 28; 30; 31; 32; 33; 36; 103; 107; 108; 110, 111 (Moiseyev, Vinogradov); "Lebed", 1937, st. NoNo 6; 42; 86 (L.E. Rummyantsev); 335; 350; 352; 356; 359; 360; 362; 364; 365; 366 (Volk, Vinogradov, L.E. Rummyantsev); "Lebed", 1938-39, st. NoNo 49; 101; 102; 149; 155; 166; 168; 190; 354; 404; 422; 634; 639 (Cordeyeva); 671, 672, 673, 675, 685, 686, 704, 707, 716, 719, 720, 721, 723, 724, 731, 732, 735, 741, 748, 750, 751, 752, 755 (Vinogradov, L.E. Rummyantsev).

Literat^{ry} indications: (Iturup Island); (Okhotsk Sea) (Rathbun, 1930); (on the west coast of Kamchatka from the mouth of the Icha river to Cape Khayryuzov) (Kobyakova, 1937).

It is a shelf-form. It ranges from the Pribyloff islands to Cook Inlet (Alaska) and from the area of the entrance to Avacha Inlet (Rathbun, 1930) to Sendai Bay (Pacific coast of Honsu), almost to Tsushima Strait (along the Sea of Japan coast of this island) and to Unkovski Bay in Korea. Rathbun points it out for the Nagasaki area. It is known to occur in the Okhotsk Sea in the area of the southern Kuril islands (Rathbun) and in the area from the parallel of Cape Khayryuzov to the parallel of the mouth of the Icha river (Kobyakova). The field journals of the trawling expeditions of the Pacific institute report that this form is common along the west coast of Kamchatka from Cape Lopatka to the parallel of 54°40' northern latitude and is rare north of this parallel to the parallel of the mouth of the Moroshechnaya river. Erimacrus isenbeckii is an article of trade on the southern Kuril islands, on the west coast of southern Sakhalin and on the Sea of Japan coast of Korea. It was encountered from the ebb-line (in the Okhotsk Sea - from 24) to a depth of 153 m; on the coast of Japan it descends to greater depths, for at Sado Island at station 4812 of the vessel "Albatros" it was encountered at a depth of 322-366 m.

Genus *Trachycarcinus* Faxon88. *Trachycarcinus balsii* Rathbun

Literary indications: Cape Rollin of Simushir Island (Rathbun, 1932).

It is a shelf-form. It was found at Sinushir Island (Rathbun, 1932) - west of Cape Rollin (Rorin), on both coasts of Honsu Island (Sakai, 1930), at Nagasaki, on the Korean coast of Tsushima Strait (Kamita, 1941) at depths from 50 to 200 m.

The family of Grapsidae Dana

Genus *Hemigrapsus* Dana

We deem it useful to provide a key for our species of the genus *Hemigrapsus*.

Key of the species of the genus *Hemigrapsus* of the Soviet Far East.

1(2) The cephalothoracic carapace is quadratic, the lateral margins are almost parallel in respect to each other and the upper surface is studded with thin short hairs... *H. longitarsis*..

2(1) The cephalothoracic carapace has a smooth upper surface; its maximum width considerably exceeds its length; the lateral margins of the cephalothoracic carapace are slightly arched...

3;4.

3(4) The sub-orbital crest is discontinued or disrupted below the external angle of the orbits and continues in the form of 2-4 small tubercles situated close to each other. The male has a thick "brush" of thin hairs on the chelae of the walking legs of the 1st pair... *H. penicillatus*

4(3) The sub-orbital crest, which is covered with very thin transverse notches, continues uninterruptedly beyond the external angle of the orbits.... *H. sanguineus*...

(*) 89. *Hemigrapsus sanguineus* (de Haan)

Literary indications: (Aniv Bay) (Sakai, 1939).

It was often mentioned under the synonym of *Brachynotus sanguineus* de Haan. After the publication of the works by Rathbun in 1918 and 1919 the generic name *Brachynotus* applies only to part of the species of the genus *Brachynotus* in the sense in which Tesch (Tesch, 1918) understood it.

It is a coastal form. It ranges from Aniv Bay and Monneron Island (Sakai, 1939), along the coast of Hokkaido Island, Honsu Island, the southern Primorye, Formosa Island to Australia and New Zealand; it was also encountered at the Hawaii Islands; it is common at the ebb-line.

(*) 90. *Hemigrapsus penicillatus* (de Haan).

Literary indications: At Korsakov in the low-tide zone, occurs in large numbers (Brazhnikov, 1907); (Aniv Bay) (Sakai, 1939) was often mentioned under the ^{synonym} name of *Brachynotus penicillatus* de Haan...

It was encountered from Aniv(a) Bay, at Monneron Island (Sakai, 1939) and the southern Primorye, along the coast of Hokkaido Island, Honsu Island, of Korea and China to Formosa and Hong Kong. It is common at the low ebb-line.

Genus *Eriocheir* de Haan

(*) 91. *Eriocheir japonicus* de Haan

Literary indications: At Korsakov in the low ebb-zone; in the channel of fresh-water Tarayka lake on the coast of Terpenye Bay (Brazhnikov, 1907); (the small rivers in the northern part of Sakhalin) (Derzhavin, 1930); (Amur lagoon) (Ushakov, 1940).

It is a coastal form which in summer goes upstream during feeding migrations (Dulkeit, 1937, and Kamita, 1941); during the fall downstream migration cases of travel on land were observed. It is known to exist in the small rivers of the Okhotsk coast of northern Sakhalin, of the Amur lagoon, of Terpenye and

Aniv(a) bays, of Suifun(Dulkeit), of Hokkaido Island, on both coasts of Honsu Island, of the Sea of Japan and Tsushima coasts of Korea, at Kyu Syu; it was reported to occur at Formosa and Hong Kong....

List of sloop(launch) and littoral collections of decapod crustaceans from the Okhotsk Sea, which are kept in the museum of the Pacific Institute....

1. May 14, 1925, Bolshoy Shantar Island, upper end of Yakshina Inlet, drag-net at a distance of 180-200 m from the mouth of the Amuka river. From ice with a depth of 2-2.5 m, dries up during low tide, small and medium-sized pebbles; temperature of the surface of the water was $+0.2^{\circ}\text{C}$, that of the water close to the bottom was 0.0°C . Dulkeit, collector (Station 3, work by Lindberg and Dulkeit, 1929). Inventory No 930(11) 275.
2. May 31, 1927. Kikchik. Crab-nets. Polutov.
3. May 25, 1927. Kikchik, base No. 2. Polutov. Inv.No 736/11
4. 1927. Kikchik, base No. 2. Stomach of cod. Polutov. Inv.No 737/11
5. 1927. Kikchik, base No 2. Stomach of cod. Polutov. Inv. No. 926/11.
6. July 3, 1927. Two nautical miles offshore from Cape Kambalny (depth about 25 m). Inv. No 933(11)57.
7. July 27, 1927. 12-15 nautical miles SW from Alaid Island. Surface. On floating laminaria. Dulkeit. Inv. No. 1300(11)463.
8. August 2, 1927. Bolshoy Shantar Island, Cape Anaur, littoral reefs. Zaks. Inv. No 2001/11.
9. August, 1927. Bolshoy Shantar Island, Cape Raduzhny, 3 m. drag-net. Zaks. Inv. No 1183/11.
10. August 10, 1927. Bolshoy Shantar Island, Yakshina Inlet, 6.5 m, pebbles. Zaks (trawl 9, works by Zaks, 1929). Inv. No 920/11.

11. August 10, 1927, Bolshoy Shantar Island, Yakshina Inlet, 4 m, from the roots of laminaria. Zaks. Inv. No. 735/11 and 738/11.
12. August 13, 1937: Bolshoy Shantar Island, Cape Anaut. Reef. Plankton net over bottom growths. Zaks. Inv. No 928/11
13. 1927. Bolshoy Shantar Island, Cape γ Filips, flotsam, Zaks. Inv. No. 743/11
14. August 17, 1927. Bolshoy Shantar, Yakshina Inlet, at low-ebb. Saks. Inv. No 935/11.
15. August 17, 1927. Ust-Bolsheretsk, $\frac{1}{2}$ -1 nautical mile off-shore (depth about 5-10 m), trawl. Dulkeit. Inv. No 936(11)441.
16. August 18, 1927. Ust-Bolsheretsk, - $\frac{3}{4}$ nautical mile off-shore (depth about 5-10), trawl. Dulkeit. Inv. No 936(11)441.
17. August 19, 1927. Bolshoy Shantar Island, Yakshina Inlet, at low ebb - tide. Inv. No. 923/11.
18. September 10, 1927. Bolshoy Shantar Island, neck of Yakshina Inlet, 26 m. Rocks. Zaks. Inv. Nos. 732/11; 934/11; 943/11 1181/11.
19. September 23, 1927. Bolshoy Shantar Island, Lake Bolshoye, in the strait near the shore, with a lift or dip net. Zaks.
20. September 28, 1927. Konstantin Bay, low tide zone or strip. Dulkeit (station 69, works by Lindberg and Dulkeit, 1929). Inv. No. 1186(11)64.
21. March 25, 1928. 130-140 nautical miles NE of Aniv(a) Bay, surface, on floating algae. Dulkeit. Inv. No. 1308(11)227.
22. May 12, 1928. Olski Island, Rassvet Inlet, (at the shore), with dip net (Dulkeit). Inv. No. 922/11.
23. May 16, 1928. Kikchik, Crab-nets. Plutov. Inv. No ~~1655/11~~ ^{1238/11}
24. June 4, 1928. Kikchik. Crab-nets. Plutov. Inv. No 1655/11
25. June 22, 1928. Olski Island, Rassvet Inlet, near mouth of river, during low tide, $\frac{1}{2}$ m, with dip net. Dulkeit. Inv. No 1246(11)689..

26. July 3, 1928. Olski Island, Rassvet Inlet, during low tide, at a depth of $1\frac{1}{4}$ - $2\frac{2}{3}$ m. With dip net. Dulkeit. Inv.No 1246(11)668.
27. July 13, 1928(?). Eastern longitude $144^{\circ}17'$, northern latitude $52^{\circ}12'$; 91.5 m, sand. Skobunov.
28. July 14, 1928. West of the new mouth of the Okhota river, in flotsam. Temperature of the water at the shore was $+11.8^{\circ}\text{C}$, specific gravity- 1.00058. Golovanov. Inv.No 730/11
29. July 16, 1928. Olski Island, Rassvet Inlet, 0.4 m, sand, with a dredge. Dulkeit. Inv. No 1248(11)676.
30. July 25, 1928. Olski Island, Rassvet Inlet, 12-15 m, trawl. Dulkeit. Inv.No 1248(11)591.
31. July 26, 1928. Olski Island, Rassvet Inlet, 5-10 m, trawl. Dulkeit. Inv. No 1300(11)559.
32. July 31, 1928. Olski Island, lake on Cape Severny, 0.1 m, temperature of water was $+14.8^{\circ}$. Dulkeit. Inv.No 1188(11)667.
33. August 1, 1928. Olski Island, Rassvet Inlet, puddle in the low tide zone. Dulkeit. Inv.No 1246(11)608.
34. August 4, 1928. Kikchik. Drag-net. Polutov. Inv.No.724(11)707.
35. August 9, 1928: Mouth of the Kikchik river(depth of 5-10 m). Polutov. Inv. No 1308(11)229.
36. August 15, 1928. Olski Island, western tip of Rassvet Inlet, Cape Dorokhovski, low tide zone, among rocks. Dulkeit. Inv. No 733(11)585.
37. August 18, 1928. Olski Island, Rassvet Inlet, depth of 0.2 m, sand, temperature of water was $+9^{\circ}\text{C}$. Dulkeit. Inv.No 1300(11)571.
38. September, 1928. Olski Island. Rassvet Inlet. Dulkeit. Inv. No 1182/11.
39. 1928. Olski Island, Rassvet Inlet, 1-2m, with a dredge among algae. Dulkeit. Inv.No 1248(11)671.

40. March 31, 1929. Kambal'naya Inlet, during low tide. Borisov. Inv.Nos. 1185(11)848 and 1189/845.
41. 1929. Kambal'naya Inlet, during low tide under rocks. Borisov. Inv.No 1184/11
42. April 12, 1929. Kambal'naya Bay or Inlet(at the shore). Borisov. Inv. No.723(11)849.
43. July 4, 1929. Icha, section No.30, 7 nautical miles offshore, 23 m, crab-nets. Danilin. Inv. Nos. 740/11 and 742/11.
44. July 7, 1929. Bolsheretski area, 34 m, sand, drag-net. Krivobok. Inv.No 1305(11)868.
45. July 7, 1929. Bolsheretski area, 31 m, sand, drag-net. Krivobok. Inv.No 1305(11)869..
46. July 9, 1929. Bar of the Bolshaya river, 10 versty(a "versta" = 3500 ft.Tr.) southwest of section of 203 of AKO, 38 m, sand, $\frac{1}{2}$ Krivobok. Inv.No 725(11)874.
47. July 18, 1929. Icha, No 2 AKO plant, near the shore, $\frac{1}{2}$ 3 m, drag-net. Danilin. Inv. No.1305(11)863.
48. July 22, 1929. Icha, No 2 AKO plant, 2 nautical miles offshore, 15 m, small pebble,, drag-net. Danilin. Inv. No. 729(11)861.
49. July 22, 1929. Icha, No 2 AKO plant, $1\frac{1}{2}$ nautical miles offshore, 12 m, sand, drag-net.Danilin. Inv.No 925(11)864.
50. August 22, 1929. Icha, section No.30, 1.5 km offshore, 30 m, pebble, drag-net. Danilin. Inv. No.921(11)858.
51. August 22, 1929. Icha, section No. 30, 800 m offshore, depth of 5 m, pebble with sand, drag-net. Danilin. Inv. No 1305(11)862.
52. August 23, 1929. Icha, section No 30, 10 nautical miles offshore. Danilin. Inv. No 1305(11)851.
53. September 19, 1929. Kikchik, crab-nets. Belavin. Inv.No. 2005/11.
54. 1929. Opposite Ozernaya river(depth about 30 m). Kochmarov. Inv.No.726/11.

55. October 31, 1929. 1 km west of the mouth of the Kukhtuy river, in flats. Ya.Ya. Smirnov. Inv. No. 745(11)1842.
56. June 23, 1930. The Kukhtuy river. Ya.Ya. Smirnov. Inv. No. 924(11)1909.
57. July 7, 1930. Mouth of the Kukhtuy river. Ya.Ya. Smirnov. Inv. No. 929(11)1969.
58. August 2, 1930. Myyvo, in the sea within 400 fathoms (a fathom = 7 ft. Tr.) of the shore, depth 7-8 m, sand, drag-net. Belokurov. Inv. No. 1297/11.
59. August 16, 1930. Okhotsk, in the old port. Inv. Nos. 727/11 and 927(11)1903.
60. September 16, 1930. Eyrineyskaya Inlet, depth of 55 m. Inv. No. 728(11)1841.
61. May 22, 1931. 155°23' eastern longitude, 55°37.5' northern latitude, depth 48 m, crab-nets. Penzikov. Inv. No. 1187/11.
62. June 5, 1931. 156°06' eastern longitude, 56°57' northern latitude, depth 24 m, crab-nets. Penzikov. Inv. No. 741/11.
63. July, 1933. Area of Cape Khayryuzov, near Kamen Island on its southwestern side, depth about 27 m.
64. July 10, 1934. 156°37' eastern longitude, 57°15.5' northern latitude, depth about 17 m, skid drag-net. Vinogradov.
65. July 10, 1934. 156°22' eastern longitude, 57°15' northern latitude, depth about 29 m, rocks, sand, pebble, skid-drag-net. Vinogradov.
66. July 10, 1934. 156°27' eastern longitude, 57°17' northern latitude, depth- 27 m, finely crushed shells and pebbles, many sponges and hydroids, masses of polychaeta (worms). Vinogradov.
67. July 26, 1936. Tugur Bay, during low tide, on reefs. Kuznetsov. Inv. No. 1642/17.
68. May 7, 1945. City of Okhotsk, a herring pound net. Ayushin.
69. August, 1945. City of Okhotsk, salmon pound net. Ayushin.
70. August 25, 1946. Iturup Island, Syana Lake. Konakov.