Some Actiniaria from the Commander Islands (Cnidaria: Anthozoa)

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Six species of sea anemones are found in material from the Commander Islands. A new genus and species of the family Isanthidae (*Paraisanthus tamarae* gen. et sp. n.) is described. *Cnidopus* Carlgren, 1934 (Actiniidae) is treated as a valid genus. Catch-tentacles previously known only in some acontiarian anemones are found in *Cnidopus*. The conspecificity of *C. japonicus* (Verrill, 1899) and *C. ritteri* (Torrey, 1902) is confirmed.

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Introduction

The present study is based on extensive collections of the Kamchatka Institute of Ecology and Environment, Petropavlovsk-Kamchatsky (KIE). The collections were made mainly by members of Laboratory of Benthic Communities during several expeditions to the Commander (Komandorskie) Islands. Now the benthic fauna of these islands is known much better than that of adjacent regions (Kamchatka, North Kurile Islands). Unfortunately, collecting methods were oriented on quantitative study, and collections were made only on hard bottom, and mostly from 5 to 30 m. Thus, burrowing species are not represented in the material, as well as some other species which are said to occur on the Commander Islands (for example, *Anthopleura* spp.).

Not all the material collected is described here. There are several unidentifiable or poorly preserved specimens in the collection, and their descriptions will appear when new reliable material will be available.

Nematocysts were examined in squash preparations according to the method described by England (1987).

Family **ISANTHIDAE**

Paraisanthus gen. n.

Type species *Paraisanthus tamarae* sp. n.

Diagnosis. Isanthidae with well developed pedal disc. Column smooth. Margin distinct. Sphincter mesogloeal, well developed. Radial muscles of oral disc and longitudinal muscles of tentacles ectodermal. Two siphonoglyphs, 2 pairs of directives. Six pairs of macrocnemes. More mesenteries distally than proximally, at least in adults. Cnidome: spirocysts, p-mastigophores, basitrichs, heterotrichs, holotrichs.

Paraisanthus tamarae sp. n.

(Figs 1-3)

Holotype (KIE 134/1): 9 mm in diameter, 13 mm in height (preserved and contracted), **Russia**, *Commander Islands*, Medny Island, Drovenskoy Point, intertidal zone, 0.2-0.4 m, 1.IX.1995.

Paratypes (KIE 135/2-145/12). **Russia**, *Commander Islands*: same data as holotype, 13 specimens; Medny Island, Drovenskoy Point: st. 5, 15 m, 23.VII.1995, 5 specimens; st. 10 and 12, 20 m, 24.VII.1995, 2 specimens; st. 14, 25 m, 25.VII.1995, 4 specimens; Glinka Bay, st. 57, 6-8 m, 10.VIII.1995, 1 specimen; st. 64, 10 m, 10.VIII.1995, 1 specimen; Bering Island: Podutesnaya Bay, st. 210, 20 m, 22.VII.1991, 3 specimens; Peresheek Point, st. 206, 20 m, 20.VII.1991, 4 specimens.

Other specimens: Medny Island, 15 specimens from Drovenskoy Point and Glinka Bay, 0-25 m; Bering Island, Poludennaya Bay, st. 182, 16 m, 16.VII.1991, 29 specimens; Buyan Point, st. 244, 10 m, 14.VIII.1991, 1 specimen.

Description. Body of largest living specimen 10 mm in diameter and 17 mm in height, preserved specimens smaller.

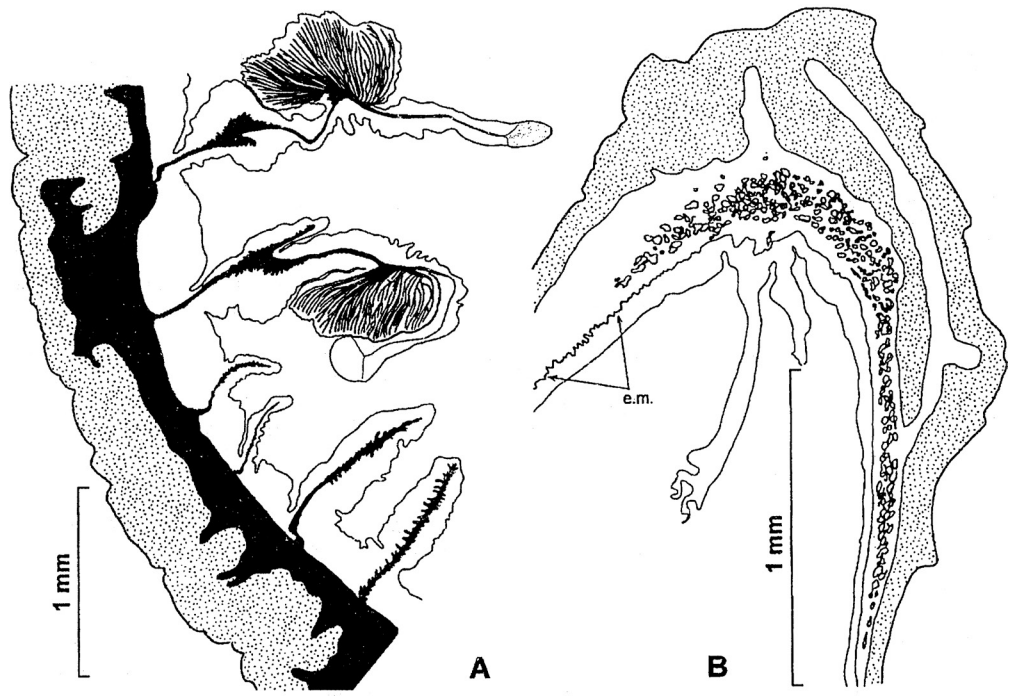

Fig. 1. *Paraisanthus tamarae* gen. et sp. n. **A**, transverse section on the level of unilobate filaments; **B**, mesogloeal sphincter (*e.m.* – endodermal circular columnar muscles).

Column about equal in height and diameter or somewhat taller, smooth, in preserved specimens with numerous, small, mainly longitudinal or irregularly distributed wrinkles, not differentiated into regions, without cuticle. Parapet and fosse distinct. Few cinclides arranged in distinct longitudinal rows were observed on living specimens.

Base circular, adherent, not wider than column.

Disc flat. Tentacles relatively short, with blunt apices, hexamerously arranged, with fine transverse wrinkles when contracted, inner tentacle the longest. Up to 74 tentacles, but only 48 in small specimens.

Actinopharynx with deep internal longitudinal folds and two siphonoglyphs supported by two pairs of directives.

All examined specimens, including small (3 mm in diameter) and large ones, have invariably 24 pairs of mesenteries (three cycles) in most part of column. Six pairs are macrocnemes, and the others are microcnemes. Additional, extremely small pairs of microcnemes belonging to a fourth incomplete cycle appear only just below margin. All microcnemes imperfect, devoid of gonads, filaments and retractors. Mesenteries of the second cycle larger than those of the third cycle and have significantly stronger muscles (Fig. 1, A). Macrocnemes, including directives, perfect and fertile.

Sphincter mesogloeal, alveolar, well developed, entirely separated from circular endodermal muscles of column, its form varies from compact in most specimens to fairly elongated in contracted specimens with deeply inrolled disc and upper part of column (Fig. 1, B). Endodermal circular muscles of column well marked, disappearing at the sphincter level. Retractors of macrocnemes very strong, strongly restricted, reniform or almost circumscribed; their mesogloeal lamellae branched, all of about equal length. Parietobasilar muscles of macrocnemes weak, forming shallow fold. Longitudinal muscles of tentacles and radial muscles of oral disc ectodermal. Basilar muscles present.

The sexes are separated. Mature oocyte up to 500 μm in diameter.

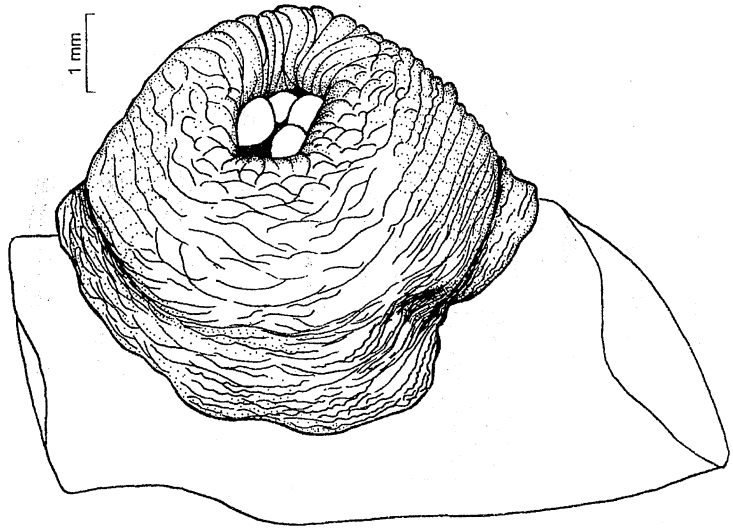

Fig. 2. *Paraisanthus tamarae* gen. et sp. n., external appearance.

Acontia absent.

Cnidome (letters in brackets refer to Fig. 3, all measurements in μm):

Tentacle	Spirocysts (a)	22-39 × 2.5-4
	Basitrichs (b)	17-30 × 3
Column	Holotrichs ? (a)	30-45 × 5-12
	Heterotrichs (b)	21-29 × 3-5.5
	Basitrichs (c)	25-35 × 3-4
	Basitrichs (d)	10-16 × 2-3
Actino-	p-Mastigophores (a)	23-31 × 4.5-5
pharynx	p-Mastigophores (b)	35-40 × 4.5-6
	Basitrichs (c)	25-36 × 2-4
	Basitrichs(d)	15-19 × 1.5-3
Filament	p-Mastigophores (a)	21-32 × 4-5.5
	p-Mastigophores (b)	15-19 × 2.5-3.5
	Basitrichs (c)	18-31 × 2-3.5

Coloration of living specimens quite constant. Column pale orange with lower part usually paler than upper or even whitish. Orange tentacles with dark brown transverse circular bands in their inner (endodermal) part; oral disc with complex pattern of brown blotches and radial bands corresponding to the tentacles.

Habitat. Most specimens were found growing in caves on the under surface of large pieces of the corallinae alga *Clathromorphum* sp. Intertidal specimens occur only in relatively deep pools on rocky shore, where the sea water persists at low tide, usually in small holes and crevices on vertical rocky surface.

P. tamarae often accompanies small specimens of *Metridium senile fimbriatum* (Verrill), and in contracted state, when tentacles are not visible, externally resembles them. The presence of highly distinctive and peculiar holotrichs and heterotrichs on the column in *P. tamarae* allows separation of even contacted fixed specimens without dissection.

Etymology. The species is named after Tamara Sanamyan who collected the holotype of this species.

Remarks. The presence of a mesogloeal sphincter accompanied by the presence of macro- and microcnemes and absence of acontia clearly place this species in the family Isanthidae Carlgren, 1938.

The family comprises five monotypic genera: *Isanthus* Carlgren, 1938, *Eltaninactis* Dunn, 1983, *Neophellia* Uchida, 1939, *Zaolutus* Hand, 1955 and *Austroneophellia* Zamponi, 1978. The present species cannot be assigned to the three latter genera all of which have more than six pairs of macrocnemes (12 in *Neophellia* and *Austroneophellia* and 7-12 in *Zaolutus*) in contrary to only 6 pairs in the present species. *Eltaninactis* has 6 pairs of macrocnemes, but has an extremely weak sphincter and the column divided into scapus and scapulus.

The relationship of the present species with the genus *Isanthus*, with its single species *I. capensis* Carlgren (from South Africa) is also clear. The main difference between *I. capensis* and the present species is the relation between the number of mesenteries at the margin and at the base. Carlgren (1938) reported 3 cycles of mesenteries and correspondingly 48 tentacles as a constant number for his species, while in the present spe-

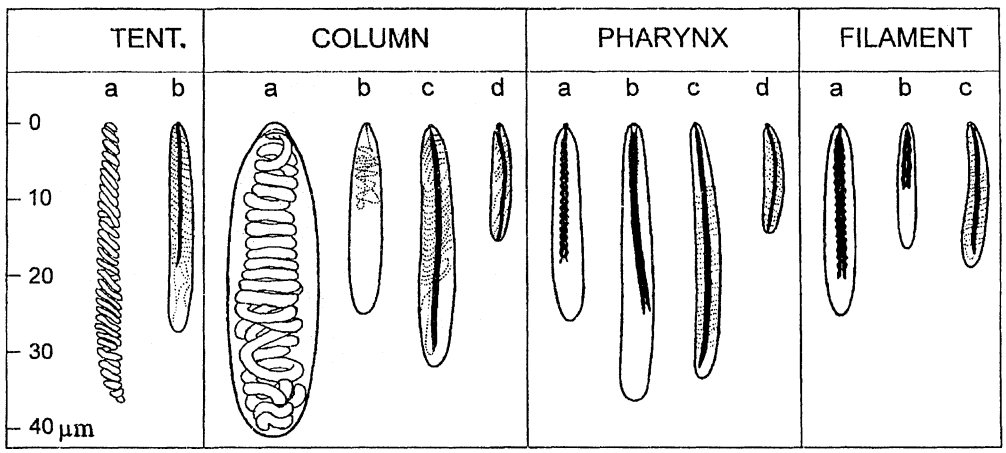

Fig. 3. *Paraisanthus tamarae* gen. et sp. n., cnidome.

cies, at least in adult specimens, the number of tentacles is invariably higher than the number of mesenteries at the base and in the middle part of column. England (1987) stated that, if there is less than half a cycle more mesenteries present at margin, a specimen should be referred to the category with the same number of mesenteries distally and proximally. However, in the present case both species have constant number of mesenteries in most part of column (24 pairs) and do not show any irregularity in their distribution, and therefore the presence of additional mesenteries at margin in *P. tamarae* is highly distinctive and should be considered as a character of generic level.

Carlgren (1949) reported only "spirocysts, basitrichs and microbasic p-mastigophores" for *Isanthus*, while in the present species holotrichs and heterotrichs were found in the column. Nevertheless, although the presence or absence of a category of nematocyst is usually also regarded to be of generic importance, in the present case this feature might be used for generic separation with some hesitation, because *I. capensis* was described before Carlgren differentiated between nematocyst types.

Family **ACTINOSTOLIDAE**

Stomphia coccinea (O.F. Müller, 1776)

Material examined. Medny Island, Drovyanye Stolby Point, st. 99, 22-23 m, 17.VII.1992, 1 specimen.

Family **METRIDIIDAE**

Metridium senile fimbriatum (Verrill, 1865)

Material examined. Bering Island: Vkhodnoy Rif Point, 0-6 m, 24 specimens; Poludennaya Bay, 23-30 m, 5 specimens; Monati Point, 20 m, 3 specimens; Ary Kamen Island: 5-25 m, 24 specimens; Medny Island: about 330 specimens from Bering Sea and Pacific coasts, 0-30 m, collected mostly during summer 1991 and 1995.

Remarks. This well known species is very abundant in the Commander Islands, although represented by rather small specimens, usually not over 1.5 cm in the contracted state.

Family **ACTINIIDAE**

Cnidopus japonicus (Verrill, 1899) (Figs 4-5)

Bunodes japonica Verrill, 1871: 62.
Epiactis ritteri Torrey, 1902: 393.
Cnidopus ritteri: Carlgren, 1934: 351; Zamponi & Excoffon, 1988: 45.
Not *Cnidopus ritteri*: Hand & Dunn, 1974: 188.
Cnidopus japonica: Averincev, 1967: 63.

Material examined. Medny Island: Glinka Bay: st. 54, 6 m, 8.VIII.1995, 2 specimens; st. 68, 4 m, 8.VIII. 1995, 1 specimen; st. 72, 73 and 74, 6 m, 11.VIII. 1995, 3 specimens; Drovenskoy Point: intertidal, 29.VII.1995, 2 specimens; st. 2, 10 m, 22.VII. 1995, 3 specimens; st. 8, 5 m, 23.VII.1995, 1 specimen; Bering Island: intertidal, VIII.1996, 5 specimens; near Nikolsky Village, st. 1, 1.5 m, 1.IX.1986, 6 specimens; Vkhodnoy Rif Point, 0.2-0.4 m, 3.IX. 1986, 7

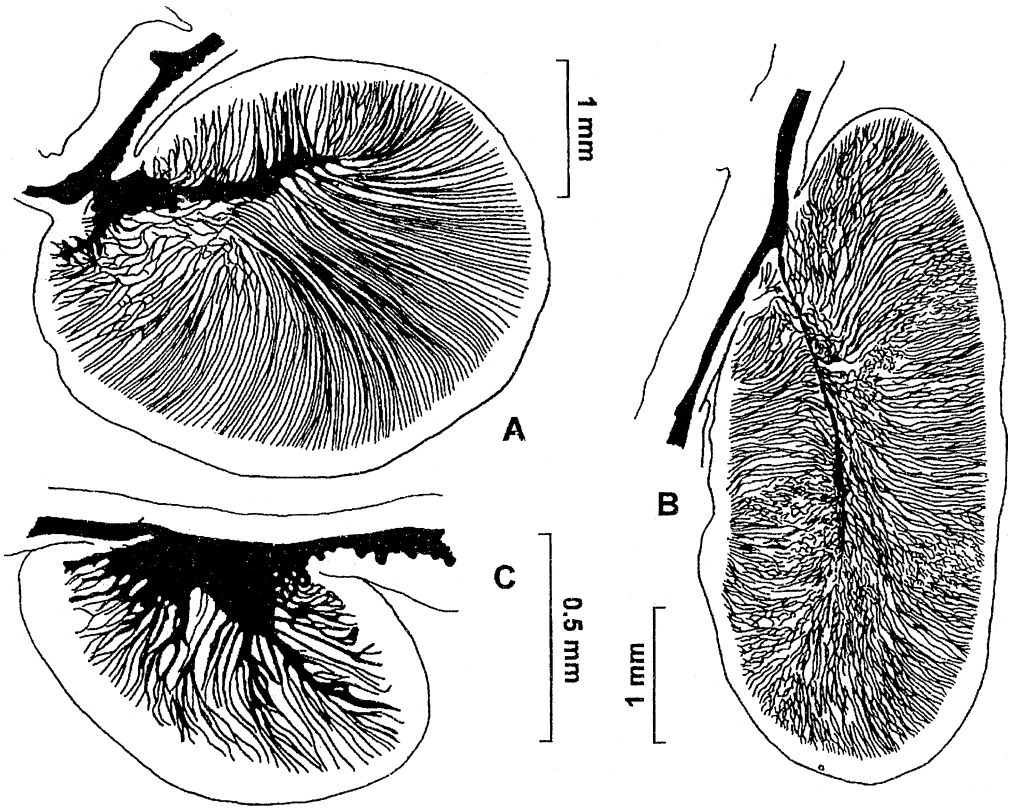

Fig. 4. *Cnidopus japonicus.* **A-C**, sphincters from three specimens.

specimens; st. 40, intertidal, 10.VI.1989, 2 specimens; st. 85, intertidal, 27.V.1991, 2 specimens. Poludennaya Bay, st. 1, 5 m, 10.IX.1986, 5 specimens; between Bering and Toporkov Islands: st. 5, 8 m, 19.IX.1986, 2 specimens; st. 180, 6-7 m, 12.VII. 1991, 3 specimens.

Description. Pedal disc firmly adherent and much wider than upper part of column. Lower part of column with numerous holotrichous spherules (sensu England, 1987), which are small, low, usually square in outline, non adhesive outgrowths with ectoderm of the same structure as in the rest column, but with extremely numerous holotrichs. They are densely packed, arranged in several transverse and longitudinal rows and form a distinct "ribbon" just above the limbus. The remainder of column may be quite smooth, or with non adhesive longitudinally arranged outgrowths connected with endocoels which are cowered with non-modified ectoderm (columnar spherules). Ectoderm of columnar spherules contains few basitrichs (of the same size as in the rest of column), but has no special stinging batteries. Outwardly, columnar spherules are clearly differentiated from holotrichous spherules by their arrangement and larger size, so that column is distinctly subdivided into two parts. In contracted preserved specimens, lower part of column with holotrichous spherules lies at some angle to the rest of column. The circular endodermal muscles are here weaker than in the rest of column. Tentacles of moderate length, tapering. Fosse deep. Sphincter strong, circumscript, pinnate. Mesenteries arranged hexamerously, in 5 cycles, of which 2-3 oldest cycles are perfect. Gonads on fifth, fourth and very rarely on third cycles. Other internal features well described by Uchida (1934). In several specimens, numerous embryos and young actinians attached to column were found.

Cnidome (measurement in μm):

Tentacle	Spirocysts	25-35 × 3
	Basitrichs	23-26 × 2
Holotrichous spherules on lower part of column	Basitrichs	16-25 × 2-3
	Holotrichs (numerous)	20-45 × 3-5
Rest of column	Basitrichs	19-24 × 2-3
	Holotrichs (very rare)	37-44 × 4-5
Actinopharynx	Basitrichs	22-31 × 2-3
	p-Mastigophores	19-23 × 4-5
Filament	Basitrichs	15-24 × 2.5-3
	p-Mastigophores	17-25 × 4-5

Basitrichs sparse over whole column, including surface of verrucae, but numerous in vesicles on lower part of column.

Remarks. The outgrowths on middle part of column are not verrucae, as defined by Carlgren (1949), although they more or less fall under definition of verrucae given by den Hartog (1987). The outgrowths in this species were once named "spherules, not verrucae" by England (1992, p.76), and this is followed in the present paper.

The genus *Cnidopus* was established by Carlgren (1934) for *Epiactis ritteri* Torrey, 1902. The original description of this species was based on specimens from Alaska (Popof Island). The specimens examined by Carlgren (1934) were from Alaska (St. Georges Island) and from the Commander Islands (Bering Island, Nikolsky village). The present specimens from the Commander Islands, including specimens collected near Nikolsky village, agree well with the original and especially with Carlgren's (1934) descriptions.

Cnidopus ritteri: Hand & Dunn, 1974, from central and northern California and from Oregon, differs in several points from the present specimens and seems to be specifically distinct. The column of Californian specimens is covered with adherent sand, "making the animal extremely cryptic in its normal habitat" (Hand & Dunn, 1974: 188), while in the present ones column, including protuberances in its lower part, is always free from any adherent particles. In addition, p-mastigophores were not found in actinopharynx in Californian specimens. Thus, we consider the "re-description" by Hand & Dunn (1974) as referring to another species.

Uchida (1934) described specimens from the Pacific coast of Honshu, Hokkaido and South Kurile Islands, which he tentatively identified with *Epiactis prolifera* (Verrill, 1869) and suggested *E. ritteri* was identical with *E. prolifera*. Carlgren (1940: 27) stated that *E. prolifera* is very different from the species he called *Cnidopus ritteri* and that they are not conspecific. Latter, Carlgren suggested that Uchida's anemone is specifically distinct from *E. prolifera* and "may probably be a *Bunodactis* and not an *Epiactis*" (Carlgren, 1947 p. 92) and then (Carlgren, 1950) he concluded that this species might be assigned to *Cnidopus*. This was confirmed by him after examination of specimens obtained from Uchida. He referred to this species as *Cnidopus japonicus* because it "is identical with Verrill's *Bunodes japonica*" and mentioned its close relationship with *C. ritteri* (Carlgren, 1952: 387). Thus, Uchida was quite right in identifying *E. ritteri* as the "Japanese actinian".

The conspecificity of *C. ritteri* and *C. japonicus* is confirmed by the present material, although at first we were inclined to consider these two species as distinct. Indeed, specimens from Japan Sea usually have large spherules on the middle part of column, while most (although not all) of the Commander Islands specimens have smooth column (apart from holotrichous spherules above the limbus). The degree of development of spherules on middle part of column is variable in different specimens. Close examination of additional specimens from Kamchatka, the Kurile Islands and the Sea of Japan shows, however, the absence of any significant differences between specimens with columnar spherules and without them. In all other features, including the habit of carrying embryos attached to column, these specimens are identical. Further, sometimes specimens with and without columnar spherules were found sitting close to each other (as, for example, specimens from Vkhodnoy Rif Point, Bering Island).

Four large specimens collected near Petropavlovsk-Kamchatsky (Avacha Bay, 8-15 m, 11.VIII.1988), should be noted separately. They differ from the other material in the large size (up to 5 cm in height and 6.5 cm in greatest diameter), strongly developed columnar spherules and presence of so called catch-tentacles, which were previously known in several acontiate families. Externally, the catch-tentacles are longer, narrower and more firm than other ones. The longitudinal ectodermal muscles are here significantly weaker than in the other tentacles.

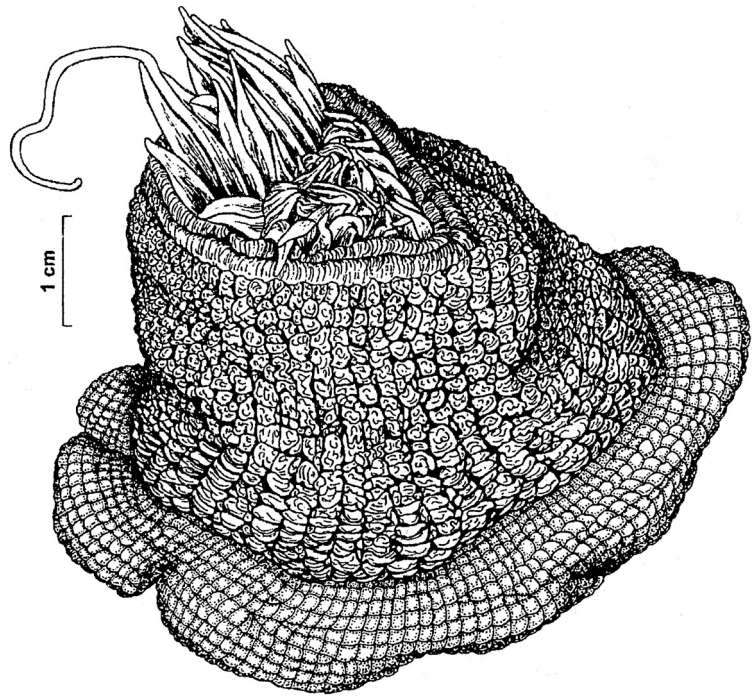

Fig. 5. *Cnidopus japonicus*, specimen with catch-tentacles.

The ectoderm on their basal part contains the same set of nematocysts as in other tentacles (spirocysts and basitrichs) and small number of holotrichs. At some distance from the basal part spirocysts and basitrichs are sparse, while holotrichs (31-40 × 3-3.5 μm) become extremely abundant, and close to the tentacle tip they form a dense "solid" layer. A few somewhat smaller holotrichs (29-33 × 3-3.5 μm) occur on the simple tentacles, and several capsules of this sort were found on the surface of column (including tips of columnar spherules). In other respects, cnidome of these larger specimens is identical with those of Commander Islands specimens.

In other features, the specimens are in agreement with the rest of material.

The genus *Cnidopus* was considered to be congeneric with *Epiactis* by Fautin & Chia (1986) because "at least some specimens" of *Epiactis prolifera* (type species of the genus *Epiactis*) possess holotrichs. "The other feature distinguishing the genus *Cnidopus* is the presence of adhesive patches on the lower column. This alone would not merit generic distinction for its possessor" (Fautin & Chia 1986: 1673). With this we cannot agree. Holotrichs in *Cnidopus* are not distributed over the whole column, but concentrated only in the protuberances on the lowest column. These hollow protuberances are not adhesive and are not verrucae, but are complex structures, which contain extraordinary numerous holotrichs and in some degree may be compared with acrorhagi (or "atrichal spherules") of *Anthopleura*. Such structures are lacking in *E. prolifera*.

England (1992: 72) agrees with Fautin & Chia (1986), but he inclined to establish a new (unnamed) genus for *Bunodes japonica* Verrill, 1871, because this species, according to him, is not referable to *Bunodactis*, *Epiactis* or *Gyractis* because outgrowths on "the centre of column are spherules, not verrucae". However, this species is considered to be conspecific with *E. ritteri*, the type species of *Cnidopus*.

C. japonicus is most conspicuous and abundant species in Commander Islands. It usually occurs in intertidal zone on rocky bottom and large stones, including places with strong wave action.

Urticina felina crassicornis (O.F. Müller, 1776)

Material examined: Medny Island, Drovenskoy Point: intertidal, 4.VIII.1995, 2 specimens; VIII. 1995, 3 specimens; st. 9, 5 m, 23.VII.1995, 2 specimens; st. 4, 15 m, 23.VII.1995, 1 specimen; Glinka

Bay: st. 42, 55, 54 and 56, 8.VIII.1995, 6 m, 6 specimens; st. 29, 5 m, 1.VIII.1995, 1 specimen.

Remarks. All the present specimens have smooth columns and conform well to descriptions of this subspecies (see Carlgren, 1921: 170).

The species has been already reported from the Bering Island (Carlgren, 1921, 118-136 m), it occurs often in intertidal zone accompanying *Cnidopus japonicus*.

Aulactinia stella (Verrill, 1864)

Material examined: Medny Island, Drovenskoy Point, intertidal, VIII.1995, 28 specimens; Palata Point, 29.VII.1995, 1 specimen; Bering Island, st. 209, 20 m, 1 specimen.

Remarks. The present specimens have the same number of mesenteries and tentacles (96-102 in large specimens) and conform to previous descriptions, especially to Verrill's (1922) one. Carlgren (1921) described specimens with much fewer tentacles (40-48) and stated that the species has more mesenteries than tentacles. Latter, he reported 3 specimens from Aleutian Islands with 96 mesenteries and tentacles (Carlgren, 1934; Grebelny, 1980).

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