The fauna of Akkeshi Bay
X. Actiniaria[1)]

By

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(*With 5 textfigures*)

Akkeshi Bay being washed by the cold Oyasio current, actinians found in the neighbourhood of the Akkeshi Marine Biological Station comprise only boreal forms and are markedly different from those occurring on the south-eastern coasts of Hokkaido, such as at Oshoro and Muroran. The actinians from the southern parts of Hokkaido are rather common with those from the northern parts of Honshu, while the species in the vicinity of Akkeshi mostly coincide with those from the northern Pacific coasts of North America. Out of nine species here considered, the following three species; *Tealia felina* var. *coriacea*, *Diadumene Luciae* and *Metridium senile*, are circumboreal in distribution. The four species; *Charisea saxicola*, *Eubolocera multicornis*, *Anthopleura xanthogrammica* and *Epiactis prolifera* have hitherto been reported from the North Pacific. *Milne-Edwardsia akkeshi* is a single species peculiar to this Bay, though probably occurring on other coasts of Hokkaido. Except this species, the species hitherto never recorded from Japan are *Charisea saxicola* and *Tealia felina* var. *coriacea*. Just near the Marine Biological Station *Epiactis prolifera* is most commonly found attached in abundance to rocks and *Anthopleura xanthogrammica* is also common in crevices and depressions of rocks in shallow water between the tidal lines. *Tealia felina* var. *coriacea* is found not unfrequently buried in sand in depressions of rocks, bearing pebbles and shells on the column. *Charisea saxicola* extending the body somewhat worm-like is found attached to rocks

1) Contributions from the Akkeshi Marine Biological Station, No. 33.

especially in Daikokujima. *Diadumene Luciae* has never been found on rocks which are directly washed by ocean tides but it does occur abundantly on oyster shells in shallow water in Akkeshi Lake which is connected with Akkeshi Bay. *Milne-Edwardsia akkeshi* is common in muddy sand in the flat of Shinryu between the tidal line. *Metridium senile* var. *fimbriatum* is often dredged from shallow parts. The large abyssal species *Eubolocera multicornis* is frequently accidentally caught off Akkeshi Bay.

The actinians hitherto obtained in the Bay are listed in the following:

Tribe Nynantheae
Subtribe Athenaria
Family Edwardsidae

1. *Milne-Edwardsia akkeshi* UCHIDA

Subtribe Endomyaria
Family Condylanthidae

2. *Charisea saxicola* TORREY

Family Boloceridae

3. *Eubolocera multicornis* (VERRILL)

Family Bunodactiidae

4. *Anthopleura xanthogrammica* BRANDT
5. *Tealia felina* var. *coriacea* RAPP
6. *Epiactis prolifera* VERRILL
7. *Corynactis* sp.

Subtribe Acontiaria
Family Diadumenidae

8. *Diadumene Luciae* (VERRILL)
9. *Metridium senile* var. *fimbriatum* VERRILL

Milne-Edwardsia akkeshi UCHIDA

Milne-Edwardsia akkeshi: Uchida, 1932, Ann. Zool. Jap., vol. 13, pp. 571–575.

Body 24–33 mm long and 4–5 mm wide in the capitulum, scapus and physa being narrower than the capitulum. Body elongated and divisible into physa, scapus and capitulum. Surface of the

column apparently smooth and lacking nemathybomes. Scapus surrounded by a thin covering, imbued with detritus particles. When contracted, the capitulum and the physa can be nearly concealed in the covering. Capitulum short and provided with 24 short conical tentacles which are arranged in two circlets, the inner tentacles being shorter than the outer. Scapulus with a smooth and thin wall, showing lines of insertion of the mesenteries. Physa small and barely distinguishable from the scapus. At the terminal end of the physa opens an aperture leading upwards into a central canal which is blind and is not connected with the coelom. Colour of the body generally pinkish brown. Endoderm of the tentacles transversely striated with several black bands. There are several yellowish white spots arranged in two longitudinal rows, one on the outer and the other on the inner side of the tentacles. A large white spot occurs on the marginal portion of the oral disc just below the base of each tentacle. Mesenteries 24 in number, of which 8 are perfect and 16 imperfect. Out of the 8 perfect mesenteries 4 in 2 pairs are directives. Retractor situated close to the actinopharynx, circumscribed in transverse sections, giving rise to 7–10 arborescent foldings which repeat division several times into shorter ones and are arranged more or less in bilateral symmetry. Perfect meseteries all provided with mesenterial filaments, while imperfect ones are devoid of the filaments.

This worm-like actinian is common in a muddy flat of Akkeshi cove. The species bears some resemblances to the actinian described by Verrill (1922) as *Drillactis pallida* from Provincetown, Mass. Carlgren personally informed the present writer that the Japanese actinian belongs to new species of *Drillactis*. If he is right, the species must be named *Drillactis akkeshi* (Uchida).

Charisea saxicola TORREY
(Fig. 1)

Charisea saxicola: Torrey, 1902, pp. 388–390, pl. 24, Figs. 7–9, 18, 19; Carlgren, 1934, pp. 348–349.

This actinian occurs attached to rocks by the pedal disc. The body is not especially differentiated and nearly equally broad through the whole length. It can extend to a great length and is somewhat vermiform. The column is rather thin and deficient in verrucae.

Tentacles are arranged in several cycles and are retractile. Colour pale pinkish in the whole body. The species is especially common in Daikokujima off Akkeshi and Muroran. The ectoderm of the column is thick and contains numerous gland cells, and the endoderm is also equally thick, but the mesogloea is thin throughout the body. The ectoderm of tentacles is beset with many nematocysts which are oblong and arranged in several irregular layers, the mesogloea is thin and provided with ectodermal muscles and the endoderm is very thick and blackly pigmented. The capitulum is deficient in sphincter in the mesogloea. The stomodaeum has two siphonoglyphs and extend over the half length lower down. In the writer's examples the mesenteries are 24 in 12 pairs, out of which 12 are perfect and the others are imperfect. In the perfect mesenteries inequality is seen only in the upper portion of the column. In the whole mesenteries the parietobasilar muscle is well-developed. The 12 perfect mesenteries are furnished with well-developed circumscribed muscle pennons and mesenterial filaments. These mesenteries are fertile in the lower portion of the column. The detailed description of this species will be given in another paper. Judging from the numbers of mesenteries, the Japanese specimens seem to be in the younger stage than the specimen described by Torrey.

Fig. 1. *Charisea saxicola* Torrey, two preserved specimens. ×2

Distribution. Hitherto known on the coasts of Alaska, Unalaska and Aleutian Islands.

Eubolocera multicornis (VERRILL)

(Fig. 2)

Eubolocera multicornis: Verrill, 1922, p. 117, pl. 33, Fig. 2.
Bolocera brevicornis: McMurrich, 1893, pp. 158–160, pl. 23, Figs. 31–33.

This is a large red abyssal actinian having the appearance of a dahlia flower. The oral disc is 100 mm in diameter and is furnished with over 200 crowded tentacles, which are of moderate length. The column is very short and much narrower

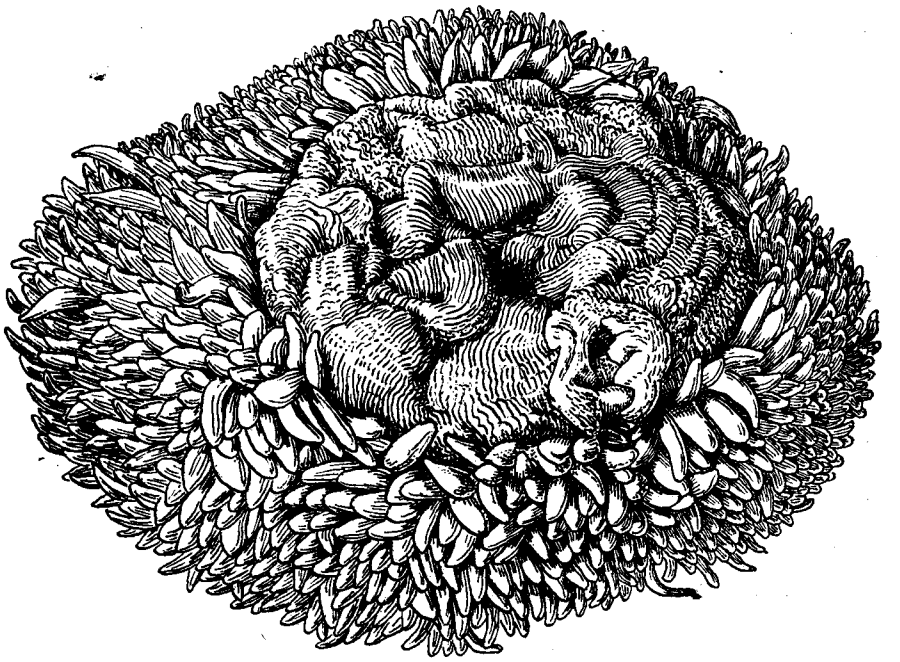

Fig. 2. *Eubolocera multicornis* (Verrill). ×1

than the disc, even in full extension. The oral disc and tentacles are not retractile. Tentacles are deciduous. The pedal disc is circular in outline and adherent. This actinian is not uncommon off the coasts of Hokkaido and Northern part of Honshu.

Distribution. Off the Atlantic and Pacific coasts of North America. Northern parts of Japan.

Anthopleura xanthogrammica BRANDT

Anthopleura xanthogrammica: Uchida, 1938, pp. 298–302.

This actinian is abundantly found on the coast between the tidal lines and exactly accords with the former description on specimens from Mutsu Bay by the writer. It is, however, very

noticeable that in Akkeshi there are found large specimens buried in muddy bottom below the tidal lines. They are distinctly larger than those attached to rocks between the tidal lines, and are characterized in the possession of a few marginal spherules. In some individuals the spherules were indeed hardly visible. The distinction between *Bunodactis* (or *Cribrina*) and *Anthopleura* lies in the absence or presence of the marginal spherules. Therefore the individuals below the tidal lines show a considerable approach to *Bunodactis*. When these individuals were reared in shallow aquaria for a month, however, they were all observed to be equipped with many marginal spherules as in the individuals found between the tidal lines. Judging from these facts the marginal spherules are probably degenerated owing to some conditions.

Distribution. Atlantic and Pacific coasts of North America. In Japan: Hokkaido and Northern part of Honshu.

Tealia felina var. *coriacea* RAPP

(Figs. 3 & 4)

Tealia feilna var. *coriacea*: Stephenson, 1933, British Sea-anemone, vol. 2, pp. 139–155, pl. 8, pl. 9, pl. 12–13, pl. 29.
Tealia (*Urticina*) *felina* var. *crassicornis*: Carlgren, 1934, p. 349.

The variety is common on the coasts of Northern Europe and has been recorded from Alaska. On the coasts of Hokkaido the species is common in the littoral zone between the tidal lines. The young specimen of this actinian somewhat resembles *Anthopleura xanthogrammica* in external appearance and in its habits, but is easily distinguishable from the latter by the possession of pentamerous symmetry. Though they are found attached to rocks, they can be easily liberated without harm being done.

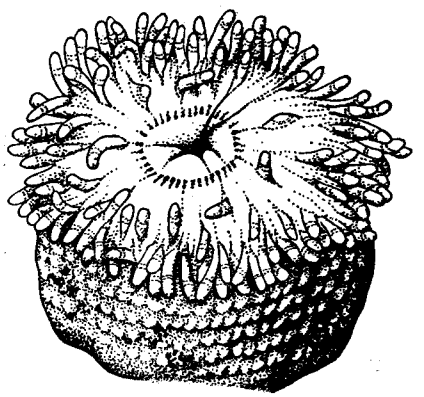

Fig. 3. *Tealia felina* var. *coriacea* Rapp, a young individual with tentacles extended. ×1

Body generally wider than high, exceeding 50 mm high and 50 mm in diameter, but usually less than 100 mm in height and

width, the base always being wider than the oral disc. Tentacles wide and short, shorter than the radius of the oral disc, bluntly tapering at the tip, pentamerously arranged as follows, 10, 20, 40, 80. The tentacles of the fifth cycles are seen in large specimens. These tentacles are nearly similar in length. Column with numerous rows of distinct verruciform papillae which are larger in the upper portion. When contracted, the verrucae come together thickly set as was described by Stephenson. Coloration quite similar to the description of Stephenson (1933). Oral disc; circumoral part greyish crimson (or olive), peripheral part grey with crimson (or olive) shade, marked with many opaque white stripes which arise from the base of tentacles near the mouth; the 10 stripes corresponding to the primary tentacles are continuous, but those corresponding to the second tentacles are generally discontinuous. Between each two of the stripes corresponding to the second tentacles and the mouth there exists an obscure white spot which is situated more axially. There are further 10 white stripes corresponding to the third tentacles and 20 more corresponding to the fourth tentacles, the third ones being shorter and narrower than the fourth. Oral angles often yellowish. The white stripes corresponding to tentacles in different series are each demarcated by dark greyish crimson (or brown) lines which are especially distinct near the marginal portion. The aboral side of the primary tentacles is featured by distinct wide white bands. Tentacles greyish crimson (or slightly olive-grey), traversed by several small white spots which are found only on the oral side of the inner tentacles. The aboral side of the primary tentacles is shaded a crimson colour. Column usually

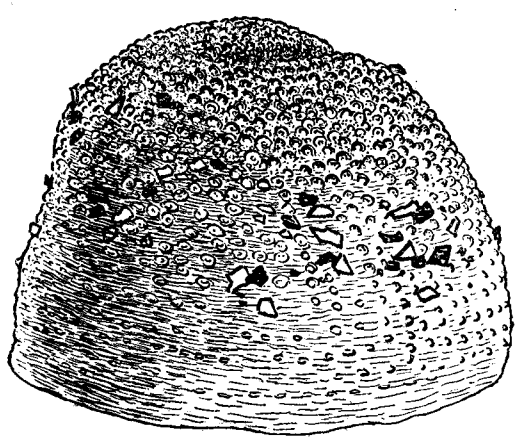

Fig. 4. ***Tealia felina*** **var.** ***coriacea*** **Rapp, a contracted specimen.** ×1

greyish crimson but in some specimens upper part greyish olive and the remainder greyish yellow. The anatomical notes will be given in another paper.

Distribution. Northern coasts of Europe. In the Pacific, Alaska. In Hokkaido, Akkeshi, Muroran and Usu. Kurile Islands.

Epiactis prolifera VERRILL

Epiactis prolifera: Uchida, 1934, pp. 17–31, pl. 3; ——, 1938, pp. 309–310.

This species is abundantly found attached to rocks between the tidal lines in the neighbourhood of the Akkeshi Marine Biological Station all the year round. The breeding season seems to be in February. The actinian bears embryos from March to August. In well-expanded condition the oral disc is radially streaked with prominent narrow white lines which correspond to tentacles.

Distribution. Pacific coasts of North America, from Alaska to California. In Japan: from the Kurile Islands through Hokkaido to the middle part of Honshu.

Corynactis sp.

(Fig. 5)

Only a single specimen has been dredged from the Bay. The final identification of the species must be delayed until more materials can be secured. This specimen seems to agree with *Corynactis* sp. recorded by Ricketts & Calvin (1935) from the Pacific coasts of North America in the small size and red coloration. These specimens may be possibly identified with *Corynactis californica* which was described by Carlgren (1936) on a specimen obtained in Monterey Bay, California.

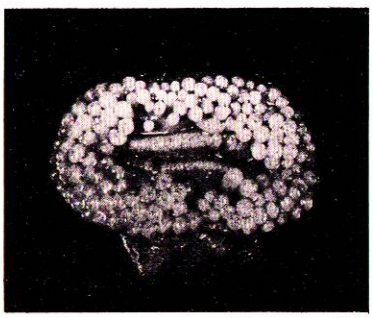

Fig. 5. *Corynactis* sp. ×2.

Diadumene Luciae (VERRILL)

Diadumene Luciae: Uchida, 1932, pp. 69–82, pl. 4; ——, 1936, pp. 896–906; ——, 1938, pp. 313–314.

This species is commonly found attached to oyster shells in Akkeshi Bay. Individuals found in this locality all agree with the European and American individuals in coloration and in frequency of asexual reproduction; their column is olive with longitudinal orange stripes which are normally 12 in number but variable according to longitudinal fission which frequently occurs. They are not so large in size as in those found on the coasts of Honshu. It is very interesting that the actinians in Akkeshi which is much influenced by the cold current all belong to the race of Europe and North America and that no other races found on the coasts of Honshu have been found.

Distribution. Northern coasts of Europe, the Mediterranean Sea, Atlantic and Pacific coasts of North America. In Japan: Hokkaido, Honshu, Kyushu, Shikoku, Corea and Loo Choo Islands.

Metridium senile var. *fimbriatum* VERRILL

Metridium senile: Uchida, 1938, pp. 314–315.

The actinians are common but occur below the tidal lines. The coloration of these individuals is generally more reddish vermilion than that of those occurring between the tidal lines in Asamushi. They are caught in Akkeshi by dredging the sea bottom.

Distribution. Pacific coasts of North America through Alaska, Kamchatka and the Behring Sea to the Kurile Islands, Hokkaido and Northern parts of Honshu, (Mutsu Bay, Onagawa Bay).

Hokkaido being affected by the two currents, the cold Oyasio and the warm Kurosio, the distribution of marine animals is quite peculiar to the coasts. Animals of Oshoro are rather common with those from Mutsu Bay, northernmost part of Honshu, while animals of Akkeshi are mostly those distributed in the Kurile Islands and Alaska. The interesting part is Muroran where the cold and the warm currents meet each other. In this place are found animals which are distributed in the above two different localities. The facts above mentioned will be shown as to actinians as indicated in the following table. The actinians here listed are limited to common shallow-water forms.

Species \ Localities	Onagawa Bay	Mutsu Bay	Oshoro	Muroran	Akkeshi	Alaska	Pacific coasts of U.S.A.
Harenactis attenuata	—	,,	—	—	—	,,	—
Charisea saxicola	—	—	—	,,	,,	,,	—
Anthopleura xanthogrammica	,,	,,	,,	,,	,,	,,	,,
Anthopleura stella	,,	,,	,,	—	—	,,	—
Anthopleura japonica	,,	,,	—	—	—	—	?
Anthopleura thallia	,,	—	,,	—	—	—	—
Anthopleura pacifica	—	,,	,,	,,	—	—	—
Epiactis prolifera	,,	,,	,,	,,	,,	,,	,,
Tealia felina var. *coriacea*	—	—	—	,,	,,	,,	—
Diadumene Luciae	,,	,,	,,	,,	,,	—	,,
Metridium senile var. *fimbriatum*	,,	,,	,,	,,	,,	,,	,,

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