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Some Medusae from the Central Pacific[1)]

By

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(*With 13 Textfigures*)

This report is based mainly on the medusan specimens collected in Iwayama Bay at Korror and in the vicinity of the Palao Islands by Mr. T. Tokioka during his sojourn at the Palao Tropical Biological Station in 1940–41 as a research member. Medusae found by Mr. S. Motoda at the same locality and by Messrs Y. Hada and S. Wada in the Java, Arafura, Sulu and China Seas etc. also have been treated in this report. In addition to them, the notes made by the writer himself during his journey to the Mariana and Caroline Islands in the winter of 1936 and observations on the specimens collected by the late Mr. S. Fujita from the Truk Islands in 1915 are also included in this paper. Most of the medusae here considered are known as common species in the tropical Pacific, but some were found to be new to science. The Trachomedusan family Petasidae was instituted by E. Haeckel in 1879 and at that time five species were described. Since then no specimen has ever been recorded. It is very interesting to the writer that several specimens of a new medusa belonging to the Petasidae, *Petasiella asymmetrica*, n. g. et n. sp., were found in Tokioka's collection.

Before proceeding further, the writer should like to express cordial thanks to the gentlemen above mentioned for the specimens which were intrusted to him for identication.

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Anthomedusae

1. *Sarsia brevia* n. sp.

(Fig. 1)

Bell 0.7 mm high and 0.8 mm wide. Jelly thick. Radial canals straight and four in number. Tentacles four in number, each arising from a conspicuous tentacle bulb. They are short and each armed with four clusters of nematocysts which are located on the abaxial side and at the tip of the tentacles. On the abaxial side of the tentacle bulbs is found a pigment fleck. Manubrium bulged and voluminous, with a small round mouth. Colour unknown. Two specimens were found in Tokioka's collection from Iwayama Bay.

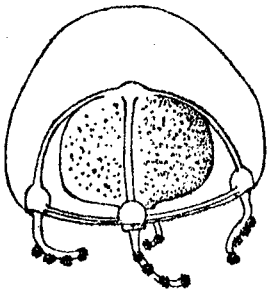

Fig. 1. *Sarsia brevia* n. sp., 0.7 mm high.

Remarks. The species is characterized by the enlarged manubruim and tentacles armed with a few rings of nematocyts.

2. *Dipurena ophigaster* Haeckel

(Fig. 2)

A dozen specimens of this medusa from the Palao Islands were all young individuals. Three of them are furnished with a short manubrium as seen in *Sarsia* but are characterized by the swollen tentacle bulbs and the tentacle shafts which are smooth near the bulb but are armed with conspicuous nematocyst clusters in the terminal half. The largest specimen among them is still young and 1.2 mm high and has a long manubrium bearing a ring of gonad around it and an apical projection in the point of juncture of the four radial canals with the manubrium. In the preservative the terminal end of the tentacles sometimes forms an enlarged nematocyst ball.

Remarks. This medusa is common in summer on the Pacific coasts of the middle and southern parts of Japan. The species was

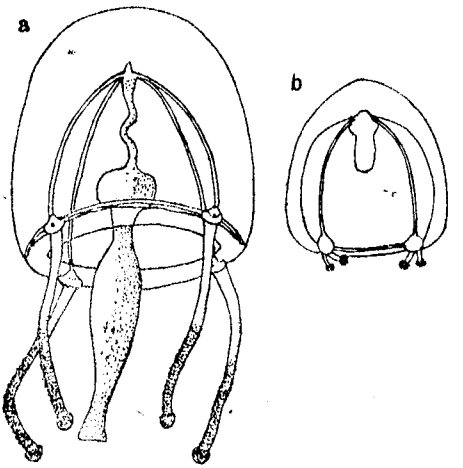

Fig. 2. *Dipurena ophigaster* Haeckel;
a. young medusa, b. young medusa newly liberated.

previously known only from Ceylon and Mexico. With the present record from the Central Pacific, it seems to be widely distributed in the tropical Indo-Pacific.

3. *Zanclea gemmosa* McCrady

A young specimen from the Palao Islands probably belonging to this species was examined. The species is recorded from Acapulco Harbour in the Eastern Tropical Pacific. The medusae belonging to this genus are often found but are generally few in number, so the identification is very difficult.

4. *Steenstrupia* sp.

Three specimens were caught in the vicinity of the Palao Islands.

5. *Euphysa bigelowi* (Maas)

This medusa is common from the tropical Indo-Pacific to the coasts of Japan. A specimen from Iwayama Bay was examined in Tokioka's collection.

6. *Cytaeis vulgaris* Agassiz & Mayer

Two specimens in which the gonads are already developed were found in the neighbourhood of the Palao Islands. The medusa is common in the Tropical Pacific.

7. *Podocoryne simplex* Kramp

(Fig. 3)

About a dozen specimens were collected in the Palao Islands. Some of them have only two tentacles. Most of them bear medusa-buds. The medusa is common on the Pacific coasts of Japan in summer.

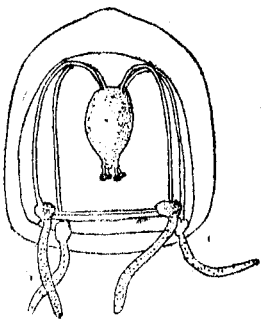

Fig. 3. *Podocoryne simplex* Kramp.

8. *Turritopsis nutricula* McCrady

Several young medusae belonging to *Turritopsis* were examined. Though they are small and still young, all seem to be identical with the common species widely distributed n the Indo-Pacific to the Suez Canal.

9. *Bougainvillia fulva* Agassiz & Mayer

Two specimens were found in Tokioka's collection. They are characteristic of the four-paired gonads. This species is widely distributed in the tropical Indo-Pacific to the coasts of Japan.

10. *Bougainvillia involuta* sp. nov.

(Fig. 4)

Bell dome-like, 4 mm high and 4.5 mm wide in the largest specimen. In young specimens the apical jelly is more or less narrowed upwards. Jelly thick and bell cavity about half as deep as the bell-height. Marginal tentacles arranged in 4 clusters and

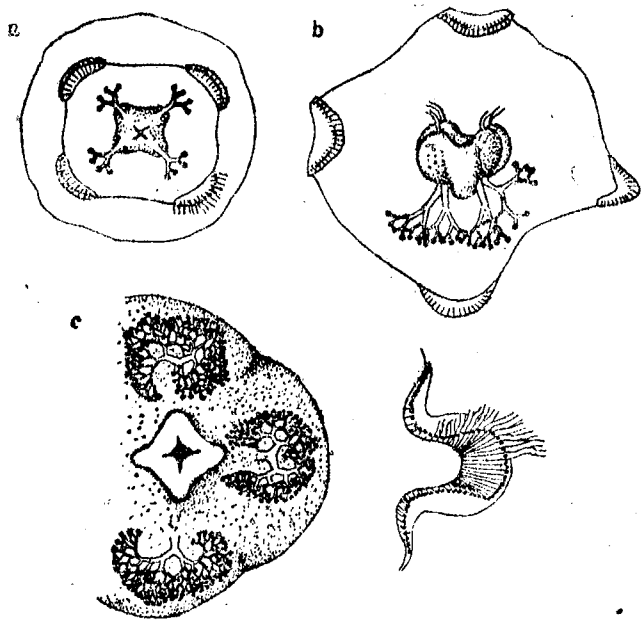

Fig. 4. *Bougainvillia involuta* n. sp., showing the tentacles, oral tentacles and gonads in three stages.

arising from the marginal swellings (epaulettes) which are various in size according to stages. In young medusae they are crescent in form but in large specimens they are crenulated and cover the larger part of the bell margin. Tentacles vary in number according to stages as shown in the following table :

Specimens	Bell diameter in mm	No. of tentacles in perradius	Bifurcation of oral tentacles	Gonads
A	4.5	60	7 times	developed in all specimens
B	3-3.5 mm	40	4-5 times	
C	2 mm	18	3 times	
D	1.5 mm	11	2 times	

The tentacles are short and extremely numerous compared with other members of the genus. Each tentacle has an ocellus on its axial side. Manubrium with a short four-sided peduncle and with four lips, with the gonads in each interradius. In large specimens

gonads are united with each other, encircling the manubrium which is represented by a rounded voluminous body. Oral tentacles are dichotomously branched 7 times in well-developed specimens. Ten specimens were examined in Tokioka's collection from Iwayama Bay in the Palaos.

Remarks. The new species is most similar in general appearance to *B. superciliaris* which is widely distributed in the Northern Atlantic, but is easily distinguishable by the more numerous tentacles and were widely crenulated epaulettes in relation to the size. Moreover, the distributions of these medusae are widely separated.

11. *Kanaka pelagica* n. g. et n. sp.

(Fig. 5)

Exumbrella bell-like, higher than wide, 1.8 mm high and 1.5 mm wide. Tentacles eight in number, one in each perradius and interradius, long and hollow. They are all similar in form, equal in length and nearly the same in width throughout the whole shaft. Tentacle bulbs not so enlarged but easily distinguishable. At the tip of these tentacles a nematocyst knob is present. Pigment fleck could not be seen in this preserved specimen. Ring canal straight and narrow. Radial canals curved concave in the middle portion of their length; the upper portion narrow and the lower portion suddenly slightly widened and ragged on the edge. Gonads seem to develop in the widened portion. Manubrium short and small, with four well-developed lips. Only a single young specimen was obtained but it shows features distinct

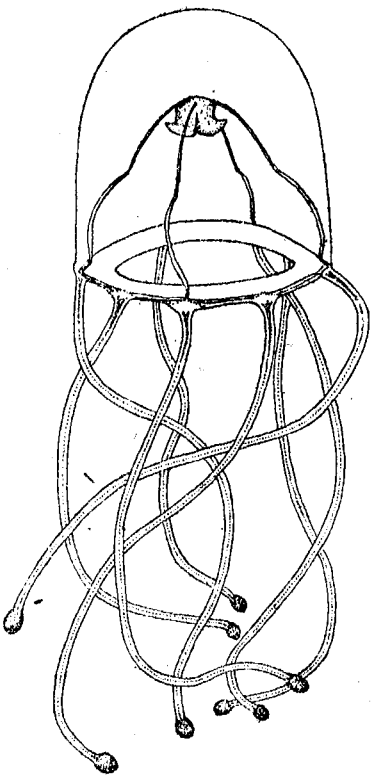

Fig. 5. *Kanaka pelagica* n. g. et n. sp.

from the Anthomedusae hitherto described, as shown in the following diagnosis of the new genus:

Kanaka n. g.

Anthomedusae belonging to the family Tiaridae, with four radial canals, of which the upper and the lower halves are differentiated; eight long tentacles each of which is furnished with a nematocyst knob at the tip. Ocellus uncertain. Manubrium short, with four well-developed lips. Gonads seem to develop on the lower half of the radial canals (?).

Leptomedusae

12. *Laodicea cruciata* L. Agassiz

This species is widely distributed and characterized by the presence of numerous sensory clubs between the tentacles. Seven specimens were examined. All were furnished with gonads. One specimen was caught by Mr. Y. Hada from the China Sea and six specimens were obtained by Mr. S. Motoda from Iwayama Bay, the Palao Islands on Sept. 22–26, 1935. The specimen from Mr. Hada is the most developed of these specimens. The medusa is 4 mm in diameter. Bell lower than a hemisphere. Tentacles thickly set and approximately 65, alternating in position with sensory clubs. Sensory clubs numerous. Tentacles not tapering in the tip but rather blunt and short in preservation. Gonads not yet developed. Manubrium short and flat. Ocelli could not be seen but probably faded out.

13. *Obelia* sp.

Fifteen specimens bearing gonads were found in the vicinity of the Palao Islands.

14. *Phialidium discoidum* Bigelow

(Fig. 6)

Several specimens of the common species were examined in the

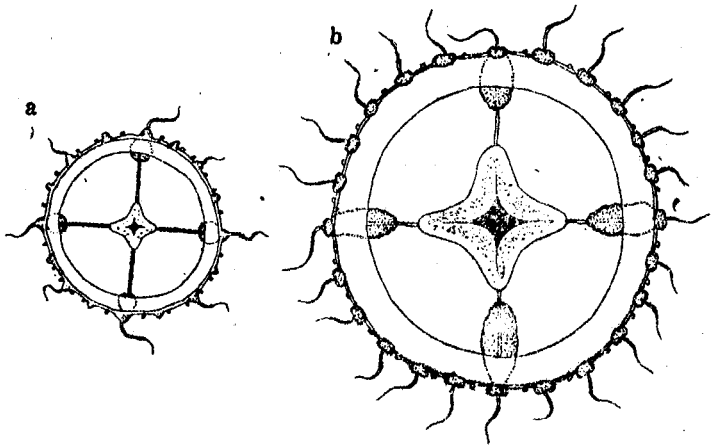

Fig. 6. *Phialidium discoidum* Bigelow; a. young medusa, b. well-developed medusa.

jars No. 9 and No. 25. In this species the number of tentacles, the size of gonads and the diameter of the bell do not always correspond to stages. In larger specimens the statocysts and tentacles are alternative in position but the tentacles are generally fewer in number than the statocysts. Then the statocysts are not situated in the middle part of the intertentacular spaces. Tentacle knobs are very conspicuous in young specimens. Most specimens, 1 mm or more in diameter, are deficient in gonads and have the bell deeper than in the large ones. The gonads appear in the very distal part of the radial canals but gradually shift towards the axial portion. A single specimen is furnished with five radial canals, like *Pseudoclytia*, but it seems to be an abnormal one.

15. *Phialidium simplex* n. sp.

(Fig. 7)

Bell reaching 10 mm in diameter, low-dome-like in form. Manubrium four-sided, without peduncle. Lips of larger specimens larger and more expanded than smaller individuals. Radial canals straight, four in number. Gonads situated near margins of the radial canals but more remote from the ring canal than in *Ph. discoidum* Bigelow.

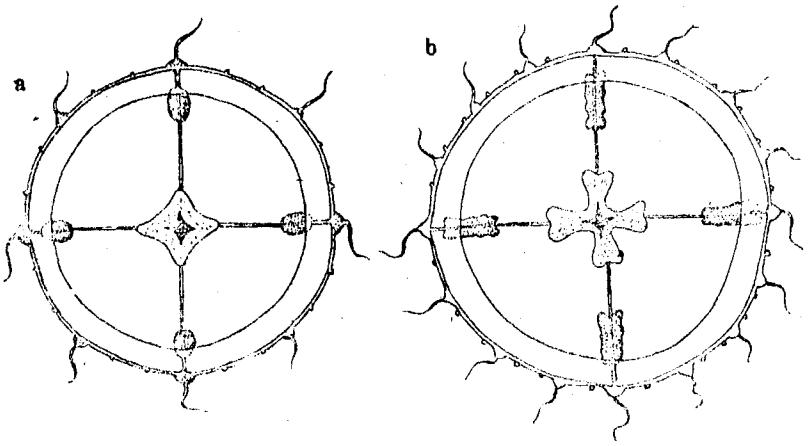

Fig. 7. *Phialidium simplex* n. sp.; a. young medusa, b. medusa fairly developed.

Gonads at first oval, becoming oblong like those of *Laodicea cruciata* L. Agassiz, but are not rounded in outline. Tentacles short. Tentacle bulbs not as conspicuous as those of *Ph. discoidum*. The statocysts are more numerous than the tentacles since two statocysts are often present in an intertentacular space, although many spaces contain only one statocyst. The table, below, indicates the variation in numbers of tentacles and statocysts on four specimens studied.

Specimens	Bell in diameter	No. of tentacles	No. of statocysts
A (Cotype)	1.7 mm	8	16
B (Cotype)	4 mm (with gonads)	?	?
C (Cotype)	6 mm (with gonads)	16	24
D (Holotype)	10 mm (with gonads)	28	42

Lacalities. Nine specimens were examined in No. 4 of Tokioka. Several specimens were collected by Mr. S. Motoda in Iwayama Bay on Sept. 26, 1935 and July 8, 1936.

Remarks. In the present species, stage C (see table above)with 16 tentacles seems to be of long duration, so this medusa is somewhat similar in this respect to medusae of the genus *Clytia* (e.g. *Clytia folleata*), but in the interradial intertentacular spaces two

statocysts are present, thus the statocysts are always more numerous than the tentacles. The above-proposed species is notable in the genus in having relatively few tentacles for its diameter, and is further characterized by tentacle bulbs less prominent than those of other species.

16. *Phialucium carolinae* Maas

Single specimen with a diameter of 5 mm was obtained by Pelilu Island in the Palao Islands. The specimen is somewhat younger in stage than the medusa figured by Mayer (1910).

17. *Aequorea australis* n. sp.

(Fig. 8)

Bell 11–25 mm in diameter, exumbrella distinctly lower than the hemisphere and subumbrella slightly concave. Gelatinous substance rigid but rather thin in the genus. Bell cavity very shallow.

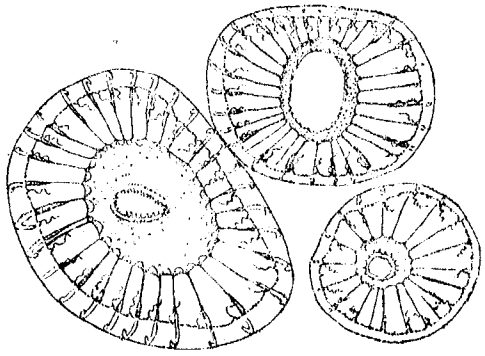

Fig. 8. *Aequorea australis* n. sp., three medusae in different stages. ×10/9.

There are 16–29 tentacles which are each mounted on a large tentacle bulb. The tentacles are slender, tapering, and less than half the length of the bell radius in preserved specimens. Between the tentacles are found tentacle knobs which are various in number according to stages as shown in the following table. Statocysts are nearly alternative in position with the tentacle bulbs.

Specimens	Diameter of bell	No. of radial canals	No. of tentacles	No. of tentacle knobs in each inter-tentacular space
A	11 (gonads not yet developed)	16	16 or more	3-5
B	25	32 (all with gonads)	32 or more	2-4
C	24	28 (25 bearing gonads)	26	3-7
D	19 (gonads not yet developed)	21	17	2-7
E	19	28	22	2-6
F	17 (gonads not yet developed)	16	22	2-4
G	31	29	29 or more	4-6
H	15 (gonads not yet developed)	20	17	6-7
I	18	partly damaged	?	?
J	23	32	33	?
K	20	30	30	?

No indication of eye-spots. Radial canals 16–29 in number, each canal nearly corresponding to a tentacle, all straight and unbranched. Gonads appear as faint linear forms in some radial canals in a medusa of 19 mm in diameter, but they develop as linear bands in all the radial canals of a medusa 25 mm in diameter. The outline of the gonads is slightly wavy but is nearly straight. Stomach a little narrower than half the diameter of the bell. Mouth of some specimens widely opened and of others constricted. Lips narrow and crisped on the margin, approximately coinciding in number with the radial canals.

Localities. Eight specimens were caught by Mr. S. Wada off the River Liverpool, Arnhem Land, Northern Australia. Three specimens were collected by Mr. Y. Hada on February 3, 1933 at

the western part of New Guinea, south to Jappen Island.

Remarks. The five following species of *Aequorea* are known in the tropical Pacific: *Aequorea conica, Aequorea parva, Aequorea macrodactyla, Aequorea pensalis, Aequorea globosa.* Among them *A. conica* is easily distinguished from the present new species by its peculiar form and large numbers of tentacles in relation to the number of the radial canals; and from the three following species: *A. macrodactyla, A. parva* and *A. pensalis,* by few numbers of tentacles as against those of the radial canals. *Aequorea globosa* is the most similar to the new species, but the relative numbers of tentacles and radial canals to the bell diameter given by Maas (1905) and Stiasny (1928) are distinctly different in these two species, even of the similar diameter, as is shown in the following table.

	Bell diameter	No. of tentacles	No. of radial canals
A. globosa (*fide* Stiasny)	11	30	30
	16	38	38
A. globosa (*fide* Mass)	20	49	49
	20	48	48
A. australis n. sp.	11	16	16
	17	16	22
	15	20	17
	19	28	22
	19	22	26

From the localities where the medusae were found, the species seems to be common along the coasts of New Guinea.

Limnomedusae

18. *Olindias* sp.

(Fig. 9)

The single young medusa is 7 mm in diameter and 5.5 mm high,

and has 12 tentacles, 2 statocysts and 4 short centripetal canals. Among the tentacles, those growing from the perradial portions are the longest and arise a little above the margin of the exumbrella. Between these perradial tentacles two marginal tentacles are growing, the longer one of them corresponds to the centripetal canal and

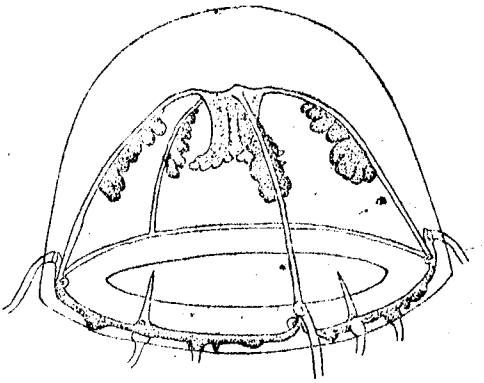

Fig. 9. *Olindias* sp., 5.5 mm high and 7 mm in diameter.

is provided with a statocyst at the base. Besides these tentacles, there are three endodermal thickenings in each quadrant on the ring canal, which are anlages of new tentacles. In this medusa the ring canal is wide and laded with thick endodermal cells on the outer part of it. Manubrium well-developed and four-sided. Gonads developing as folded masses, each on the upper half of the radial canal. The specimen was obtained by Mr. Y. Hada from the Sunda Strait.

Trachomedusae

Petasiella n. g.

Petasidae with four free marginal statocysts and *with tentacles arising asymmetrically*, at unequal intervals from the bell margin; not grouped in clusters. One sac-like gonad on each of the four radial canals. Four lips. Tentacles armed with conspicuous nematocysts only in the tip. Manubrium four-sided. Genotype:—*Petasiella asymmetrica* n. sp.

Medusae belonging to the Petasidae were first reported by Haeckel (1879). No other specimens have been recorded since that date. Haeckel examined specimens from several different localities; including: Gulf of Smyrna, Canary Islands, Kerguelen Island, Red Sea, Indian Ocean and China Sea. He divided the family into six species placed in four genera. Mayer (1910), however, reduced them into a single genus, *Petasia* Haeckel, 1879, which he defined as follows:

"Petasidae with free, marginal sensory clubs and with tentacles arising at equal intervals; not grouped in clusters. Four sac-like gonads on the four radial canals. Four lips. No Peduncle. No centripetal vessels. Tentacles without adhesive discs." (Mayer, 1910, vol. 2, p. 259).

The genus here proposed is distinctly related to Haeckel's genus and certainly is to be placed in the Petasidae in the possession of four radial canals, a four-sided manubrium; four gonads one upon each radial canal; naked statocysts and characteristic tentacles of which the tip is armed with conspicuous nematocysts. *Petasiella* bears the important difference from previously described Petasidae in passessing notably asymmetrical tentacular arrangement. At present the only species of *Petasiella* described is the following:

19. *Petasiella asymmetrica* n. g. et n. sp.

(Figs. 10–11)

Exumbrella bell-shaped, higher than wide in the young, but becoming dome-shaped and wider than high in the adult, 0.2–1 mm in diameter. Radial canals four, narrow and straight. Manubrium small, flask-shaped, distinctly four-sided in the adult. As the medusa grows larger the tentacles increase in number. A young medusa, 0.2 mm in diameter, was found to have four tentacles one in each perradius and eight tentacular buds. Another specimen slightly larger (0.32 mm in diameter) bears 12 tentacles and four buds. These medusae are still higher than wide. When the medusa becomes 0.5 mm or more in diameter, the bell becomes dome-like and the tentacles increase gradually. An adult specimen, 1 mm in diameter,

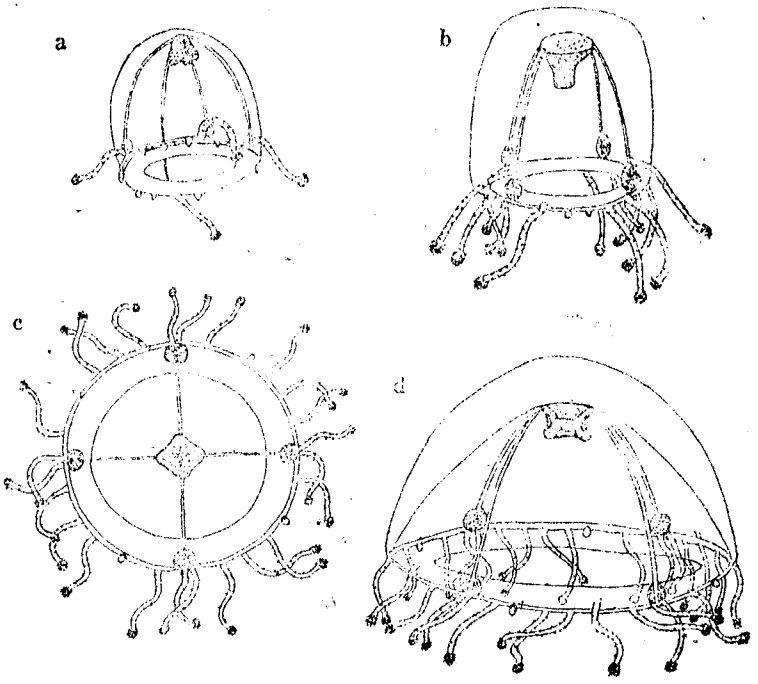

Fig. 10. *Petasiella asymmetrica* n. g. et n. sp., a. young medusa, 0.2 mm in diameter, b. young medusa, 0.32 mm in diameter, c. medusa, 0.75 mm in diameter, d. medusa, 1 mm in diameter.

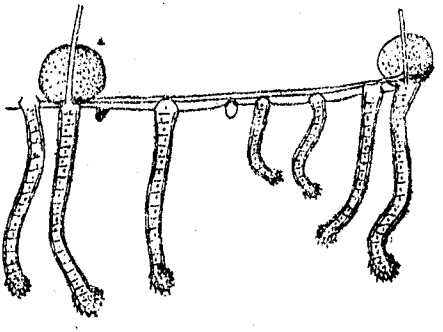

Fig. 11. Marginal quadrant *Petasiella asymmetrica* n. g. et n. sp.

bears seven tentacles in each quadrant. The tentacular arrangement is very peculiar and differentiates the present species from all previ-

ously described Petasidae. Tentacles in the adult medusa are grouped in pairs, giving the statocysts a demarcating position. On the right side of this organ 5 tentacles are counted, with younger tentacles nearest the statocyst. On the left side of the organ only 2 tentacles are found with the younger one also nearest the statocyst. These marginal tentacles seem generally to arise from the level of the ring canal but some are placed a little above it. The tentacles are rather short, solid, with a row of endoderm cells, and each tentacle tip is armed with large, but rather scarce nematocysts, as is characteristic of the Petasidae. The statocysts are rather four in number and naked, as described by Haeckel. They are situated at first in the center of each quadrant, but shift gradually to the left side with the increase in number of tentacles. Gonads appear in a young medusa, only 0.2 mm in diameter, as flat, round bodies, one on each radial canal at the junction-point with the ring canal. They remain in this position in larger specimens. Present specimens colourless, except opaque gonads.

Locality. About ten specimens were found in the jars No. 9, No. 11 and No. 12, which all were collected by Mr. T. Tokioka in the vicinity of the Palao Islands, and are at present in the collections of the Hokkaido Imperial University.

20. *Aglaura hemistoma* Péron et Lesueur

Several specimens were examined in jar No. 21 from the Palao Islands (T. Tokioka) and in the jar containing medusae from the Southern Pacific in Mr. Y. Hada's collection from the Sulu Sea.

21. *Amphogona apsteini* Browne

Many specimens were examined, including both young and adults. Some specimens bear gonads which are of various sizes. The arrangement of the gonads is not regular but the interradial ones seem to be larger than the perradial. Several specimens were found in jar No. 2 collected by Mr. T. Tokioka in the Palaos.

22. *Liriope tetraphylla* Chamisso et Eysenhardt

The medusa is widely distributed in the Pacific. Specimens here examined were found in jar No. 12 collected by Mr. T. Tokioka and those by Mr. S. Motoda on March 21 and on Dec. 1, 1936 from Iwayama Bay, and also in Hada's collection from the Sulu Sea and the China Sea.

Narcomedusae

23. *Solmaris corona* Haeckel

Several young specimens were found in the jar No. 22 collected by Mr. T. Tokioka in Iwayama Bay.

24. *Aegina* sp.

A young 4-tentacled medusa probably referable to this genus was found in jar No. 12, from Iwayama Bay (Tokioka).

25. *Cunina* sp.

A young medusa with 8 tentacles was examined in Tokioka's collection from the Southern Pacific. It seems to be referable to *Cunina*.

26. *Solmundella bitentaculata* (Quoy et Gaimard)

Many young specimens are contained in the jar No. 20, from Tokioka's Korror collections.

Scyphomedusae

Cubomedusae

27. *Tamoya bursaria* Haeckel

(Figs. 12-13)

On account of the sparity of material and the briefness of pub-

lished descriptions, Cubomedusae found in the Pacific were of uncertain specific determination. In 1929 the present writer applied the specific name, *Tamoya alata* (Reynaud), for Cubomedusae of large size, of relatively narrow outline, and having deep rhopalar niches and numerous velar canals. This course has been followed by Stiasny (1929–1937) and by Rao (1931). In 1938, however, Bigelow who examined the Cubomedusan specimens obtained in the Bermuda Oceanographic Expeditions, pointed out the validness of the specific name *Charybdea alata* Reynaud for the medusae described under the names, *Charybdea alata, Tamoya alata, Chaybdea grandis, Charybdea moseri.* From Bigelow's paper it is clear that there is a species of Cubomedusae which is large in size, deep in the rhopalar niches and complicated in the velar canals but with a flat stomach, without mesenteries and having gastric cirri, forming brush-like bundles at the interradial corners of the stomach. This medusa must of course, belong to *Charybdea* and not to *Tamoya.*

There remains, however, another problem of whether the medusae hitherto described as *Charybdea alata*, etc., are sometimes overlooked in their mesenteries and gastral filaments, and reported as a member of the genus *Charybdea* only on account of the other external features. In the Pacific, there is at least one Cubomedusan species belonging to *Tamoya.* This species is very common in the Inland Sea of Japan and grows to a large size, and is equipped with the features of *Tamoya* enumerated by Bigelow and others, through the state of the gastric cirri is not clear. The Japanese species is called "hikurage" (fire-medusa) among fishermen and is named by Kishinouye (1910) as *Tamoya virulenta.* In

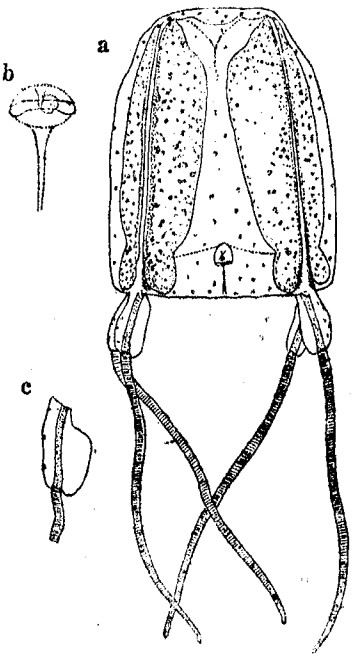

Fig. 12. *Tamoya bursaria* Haeckel; a. medusa, b. sensory niche, c. lateral view of pedalium.

addition, the medusae which were reported by Stiasny (1929) from Sabang off Sumatra and by Rao (1931) abundantly from the Bay of Bengal, both as *Tamoya alata*, seem to be also referable to *Tamoya*. In the writer's collection are two Cubomedusan specimens. They were obtained by Mr. S. Wada off the River Liverpool, Arnhem Land, Northern Australia. These medusae, though comparatively small in size, retain the features of the genus *Tamoya* in the outline, in the sensory niche and particularly in the presence of the mesenteries. The medusae are both approximately 30 mm high and 22 mm wide. The exumbrella is without prominent sculpture and the sensory niches are enclosed by a pair of scales below, as well as above. The gonads

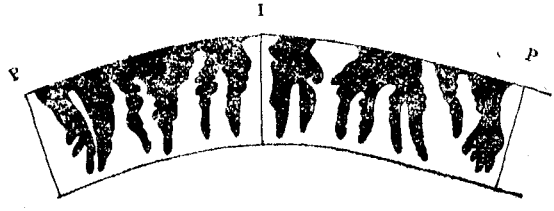

Fig. 13. Velar canals of *Tamoya bursaria* Haeckel.

are slightly folded but not so complicatedly in the adult. The velar canals are in three groups in each octant. They are irregularly branched. The gastral filaments could not be detected, though investigated in detail. From these features, the medusa is undoubtedly a member of *Tamoya*.

Such being the case, there is at least one species of *Tamoya* which is widely distributed in the Pacific from Japan to the tropical Pacific. The Japanese medusa is first reported as *Tamoya virulenta* which was identified by Mayer (1910) with *Charybdea alata*, and afterwards described by the writer as *Tamoya alata*. Stiasny (1929) pointed out the description of *Tamoya alata* that "an einer Identität mit *Tamoya bursaria* Haeckel kaum zu zweifeln ist." Now that, by the report of Bigelow (1938), *Charybdea alata* has become valid, the specific name *Tamoya alata* must be abandoned, so the Pacific cubomedusa must be called *Tamoya bursaria* Haeckel by priority.

Coronatae

28. *Nausithoë* sp.

A specimen was collected by Mr. M. Motoda off the Bay of Palao between the depths 300-0 m on Oct. 21, 1935. Two specimens were obtained by the same collector in Iwayama Bay between the depths 20-0 m on Sept. 26, 1935. The specimens appear to agree with the description of *Nausithoë punctata* Kölliker, but final identification is difficult in the genus, without knowing the scyphostoma characters.

Semaeostomae

29. *Pelagia* sp.

A specimen of ephyra belonging to the Pelagiidae was found in Tikioka's collcetion in the Southern Pacific.

30. *Aurelia aurita* Lamark

Several specimens were examined. They were collected by late Mr. S. Fujita from the Truk Islands in 1915 and were deposited in the Zoological Institute, Imperial University of Tokyo.

Rhizostomae

31. *Cassiopea ornata* Haeckel

The species was recorded by Haeckel (1879) from New Guinea and the Palao Islands. Many specimens examined by the writer all coincide with the description of Haeckel. It must be noted that the medusa figured by Haeckel is the female in possession of many vesicular appendages on the aboral side. Ephyrae and young specimens were collected by Messrs. T. Tokioka and S. Motoda. This species seems to be common in the Palao Islands, Yap, and Saipan Island.

32. *Mastigias papua* L. Agassiz

Several specimens collected in the Palao and Saipan Islands were examined by the writer.

33. *Crambione mastigophora* Maas

A young medusa of this species was obtained by late Mr. S. Fujita from the Truk Islands in 1915.

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