

BULLETIN OF THE VANDERBILT MARINE MUSEUM
VOLUME VII

Scientific Results of the World Cruises of the yachts
"Ara," 1928-1929, and "Alva," 1931-1932, "Alva"
Mediterranean Cruise, 1933, and "Alva"
South American Cruise, 1935,
William K. Vanderbilt, Commanding

5456

MARINE ALGAE: CHLOROPHYCEAE AND CORALLINACEAE
COELENTERATA: HYDROIDA, LEPTOMEDUSAE, SIPHONOPHORA,
SCYPHOMEDUSAE, ALCYONACEA, PENNATULACEA,
ACTINARIA AND MADREPORARIA
ANNELIDA POLYCHAETA
ECHINODERMATA: ASTEROIDEA, CRINOIDEA, OPHIUROIDEA,
ECHINOIDEA AND HOLOTHUROIDEA
CRUSTACEA: ANOMURA, MACRURA, BRACHYURA, STOMATOPODA
AND CIRRIPIEDA
MOLLUSCA: CEPHALOPODA, AMPHINEURA, GASTROPODA,
NUDIBRANCHIATA AND PELECYPODA

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PART II

COELENTERATA

The Coelenterata presented in this Bulletin of the Vanderbilt Marine Museum, seventh in the scientific series, are part of the collections obtained by Mr. William K. Vanderbilt in a series of cruises in his yachts "Ara" and "Alva," during the years 1928 to 1935. These explorations included the World Cruise of the "Ara," 1928-1929, the World Cruise of the "Alva," 1931-1932, and the "Alva" South American Cruise of 1935. Although numerically small, the collection is surprisingly rich in the number of new and rare species it contains, and in the related extension of knowledge of their geographical and bathymetrical distribution and of their anatomy, as presented in the systematic discussion.

Hydroida

The Hydroida are represented by only one species, *Corydendrium splendidum* Boone, from Oahu, Hawaii, a new Gymnoblastea, possessing stages of development seldom found. These were collected by the "Ara" World Cruise, 1928-1929.

Leptomedusae

The Leptomedusae are represented by two exceptionally large specimens of the exceedingly rare *Aequorea coerulescens* (Brandt) which were collected in Valparaiso, Chile, by the "Alva" South American Cruise of 1935.

Siphonophorae

The Siphonophorae obtained by the "Alva" World Cruise of 1931-32 consist of eight species, the record of each of which contributes something of value to our knowledge of this group of miraculously beautiful ocean dwellers.

The "Alva's" deep-sea station in the Atlantic Ocean, off Fuerte Ventura, Puerto Cabras, Canary Islands, depth 250 fathoms, yielded four species, namely: A series of specimens of *Doromasia picta* Chun, of especial interest in being from Chun's type locality;

a series including both the Eudoxid and polygastric generation of *Cuboides vitreous* Quoy and Gaimard, originally taken near the Straits of Gibraltar; a series of the nearly circumtropic *Hippopodius hippopus* (Forsk.) and representatives of the widely distributed *Agalma okeni* Eschscholtz.

The comparatively rare *Amphicaryon acaule* Chun is represented by a single colony from the "Alva" deep-sea station in the Pacific Ocean, north of Nuka Hiva Island, Marquesas Islands, depth 150 fathoms. Likewise a series of specimens of *Abylopsis tetragona* (Otto) was taken here.

A new locality was established for the widely distributed *Diphyes bojani* (Chun) by the netting of a series of specimens in the Flores Straits, in a depth of 140 fathoms.

The several specimens of *Porpema prunella* (Haeckel), also taken in the Pacific north of Nuka Hiva Island, give the third record of this curious species, from a point intermediate between the widely separated type-locality, in the Pacific, north of New Guinea, established by the "Challenger" and the more recent "Albatross" record of it from the tropical eastern Pacific, off the west coast of Peru.

Scyphomedusae

The Scyphomedusae collection of the "Alva" World Cruise, 1931-32, contains only five species, but includes in these the remarkable, gigantic *Versura palmata* Haeckel. Four of these species are members of the *Rhizostomae*, two of which, *Versura palmata* Haeckel and the exquisite small *Mastigias papua* (Lesson) were taken in Banka Straits, off Muntok Island. The specimens of *Versura palmata* are much the largest recorded of this magnificent species and are apparently the only specimens of it in an American museum.

Cephea cephea (Forsk.) from the Pacific Ocean, north of the Marquesas Islands, is represented by a valuable series of young specimens, which establish a new locality for the species and the second deposit of it in an American museum.

Stomolophus meleagris (L. Agassiz) from Conway Bay, Galapagos Islands, is of exceptional interest, since it is the first record of an adult from this Archipelago, from which locality Haeckel (1880) described a solitary larval specimen. The species, rather scarce on the West Coast of the Americas, and more abundantly

COELENTERATA

Order: HYDROIDA

Family: CLAVIDAE

Genus: CORYDENDRIUM Van Beneden

Corydendrium splendidum, new species

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Plate 4

TYPE: A large colony taken in one fathom, at low tide, in Kaneohe Bay, Oahu, Hawaiian Islands, December 15, 1928.

DISTRIBUTION: Littoral zone of Hawaii.

TECHNICAL DESCRIPTION: Trophosome: Colony with a strong creeping, much branched, netlike hydrorhiza which gives rise to a much branched hydrocaulus, fascicled at the base, attaining a height of five to six inches, the primary ramification irregular, but with the successive branches uniformly alternate and distichous in their division, giving rise throughout their length, on the exposed upper or distal sides, to short branches which support the hydranths on their tips. The perisarc is horn-like, firm, elastic; the primary stem annulated with two or three rings at each joint and the branches with six to eight rings at the origin of these and the yet smaller branches which are the hydrophore-like supports of the hydranths. These hydrophore-like branches may be distributed alternately to the left and right of the supporting branch, or irregularly if the latter arrangement achieves a more advantageous distribution. The hydrotheca have an elongated, narrowed, ovoidal body, with numerous short to medium length filiform tentacles irregularly distributed over the surface, these tentacles varying in the hydranths examined from four to six short, button-like protuberances encircling the distal end to sixteen to twenty tentacles of medium length irregularly distributed over the entire body; in those where the greatest tentacle development exists some of these tentacles form a simple, encupping circle around the base of the hydranth body and vary in length from one-third to one-half the length of the body; while above these, on the same body, shorter tentacles occur, in some instances nearly concealing the body, giving it a black-berry-like appear-

ance, created by the close grouping of the rounded tentacle-tips, (See pl. 4.). More frequently these small tentacles are sparsely distributed with much of the surface of the hydranth body visible. In a great many instances there arise from the identical hydrophore one, two or three globular or ovoidal shaped sporosacs; each of these is attached proximally by a thread, these threads converging and forming the attachment with the lumen of the hydrophore-like stem. None of the several hundred hydranths examined showed any indication of being capable of retraction within the hydrophore-like stem. The hypostome was found in varying degrees of extensibility and dilation; in some instances resembling a mere puckered distal end with a small aperture, in others a pair of lips surrounding a slit-like aperture, while in a few examples, completely dilated, the proboscis resembles distally a concave saucer-like form united proximally by a narrowed neck to the body, the whole having a vase-like profile.

GONOSOME: There are a few isolated gonophores present. Each of these is attached singly by a short peduncle to a primary lateral branch, a short distance below the distal end of a joint and adnate to the base of a smaller branch which forms the hydrophore, giving rise to a cluster of the numerous ovoidal sporosacs. These isolated gonophores are small, slender, narrowly ovoidal, proximally tapered and distally rounded, canary-yellow, with a shining surface, about 1 millimeter long with a maximum width diameter of about 0.4 millimeters.

The ovoidal sporosacs, which in the present colony are more numerous than the developed hydranths, arise in clusters of two, three, four, or much more rarely, six to eight, globular-ovoidal bodies, usually in various sizes and stages of development, each attached proximally by a filament, these threads forming a fascicle that extends within the lumen of the hydrophore. Not infrequently the degenerated tentacles of a hydranth occur at the base of such a cluster of sporosacs.

Order: LEPTOMEDUSAE

Family: AEQUORIDAE

Genus: AEQUOREA Péron and Lesueur

Aequorea coerulescens (Brandt)

Plates 5 and 6

TYPE: Brandt's type was taken in the Pacific Ocean, about Lat. 35° N., Long. 144° W., by Mr. C. H. Mertens, whose exquisite colour plates of this species apparently furnish the only colour record published. The type material is deposited in the Zoological Museum at St. Petersburg (Leningrad), Russia.

DISTRIBUTION: This exceedingly rare medusa is known only from the type locality, a fragmentary specimen from the Maldives, insufficient for positive identification (Bigelow, 1904), and one "large" specimen, 60 millimeters in diameter, from the "Albatross" station 4652, 100 fathoms to surface, and one specimen, 12 millimeters in diameter, from station 4655, 300 fathoms to surface, off Agudas Point, Peru, and the two specimens taken by Mr. Vanderbilt at Valparaiso, Chile.

MATERIAL EXAMINED: Two specimens, taken at Valparaiso, Chile, February, 1935, by the "Alva."

TECHNICAL DESCRIPTION: The larger specimen has a total diameter of 225 millimeters, a central mouth diameter of 75 millimeters and a radius of 75 millimeters for the area between the outer margin of the mouth and the circumferal margin. The smaller specimen has a total diameter of 225 millimeters, a central mouth diameter of 60 millimeters and a radius of 55 millimeters for the bell area between the outer margin of the mouth and the circumferal margin. These specimens are extremely interesting not only because of their great size, the larger one being 3.75 times the size of the largest one hitherto recorded (Bigelow, 1909), but because they establish the first Chilean record for a medusa for which the southernmost record has heretofore been off Agudas Point, Peru, (about 82° Long. W., 5° Lat. S.), thus extending our fragmentary knowledge of the Leptoline Medusae fauna of the tropical west coast of South America. It is significant that both

recent records of this exquisite medusa are within the range of the Humboldt Current. The gelatinous disk is a thick, plano-convex, with a diameter equal to one-third of the total diameter. Gastro-vascular system: The stomach is from one-third to one-half of the total diameter of the medusa, well developed in both specimens, although somewhat torn in the smaller specimen. The lower gastric wall is well developed in the larger specimen, with slight contraction, the mouth rather widely open. The lips, or oral prominences, appear to be about one-third as many as there are canals in the larger specimen. These vary in size, obviously due to the degree of contraction existent, from approximately the ratio Brandt (1838) illustrated in the type, to some slightly larger and others, smaller.

CANALS: The canals of the larger specimen are shown in pl. 6 and are of comparatively one size. The majority of the canals of the smaller specimen are moderately stout, approximately subequal, with others quite slender; there being no definite arrangement nor alteration of different sizes, such as is represented in Brandt's plate. In the present smaller specimen these canals show as thick or thin, in ratio to the degree of contraction existent, in part, and in part, to the position and light in which they are visible through the gelatinous substance. Critical examination of the uninjured canals show these to be approximately subequal. In the larger specimen these radial canals are all about equal and show in varying degree a puckered repetitional sinuate contour. The gonads are well developed.

OCTOCYSTS: These are very numerous, frequently double octocysts occur; all are closely crowded among the tentacles.

TENTACLES: These are almost entirely absent in the larger specimen, which is imperfect marginally, except for a space of about 12 millimeters width. About half of the circumferal margin is present in the smaller specimen where a fairly constant repetition of four to six tentacles per radial section between two canals occurs; these tentacles are of different sizes due to growth stages, the longest ones not exceeding 18 millimeters in the contracted state, the majority being 10 to 12 millimeters long; all are very slender. The tentacular bulbs are long, laterally compressed, only moderately dilated, of subovoidal form, or appearing in contour as irregularly oval, more narrowed distally than proximally. Each tentacular bulb communicates at the base on the inner side with

a conspicuous excretory papilla. The tentacular bulbs are distinctly darker, approaching a bluish black. In the larger specimen, the canals and gonads show a deep ivory yellowish tone; while in the smaller specimen these merely show as opaque creamy lines through the gelatinous bell.

COLOUR: The bell is opalescent, transparent gelatinous, somewhat crystalline. Canals with gonads show deep ivory yellow, otherwise they show an opaque creamy line.

REFERENCES: *Mesonema coerulescens*, BRANDT, J. F., Mem. Sci. Math., St. Petersburg, 1838, p. 360, pl. 5, (colour plate by Mertens).

Aequorea coerulescens, BIGELOW, H. B., Mem. Mus. Comp. Zool., 1909, vol. XXXVII, pl. 4, fig. 4, and pl. 35, figs. 3-8.

Order: CALYCOPHORAE
Family: SPHAERONECTIDAE
Subfamily: Muggiinae
Genus: DOROMASIA Chun
Doromasia picta Chun

TYPE: Dr. Chun's type series was secured in the Canary Islands; it included a good series of living specimens. The depository is not stated.

DISTRIBUTION: A deep-sea species found in the warm regions of the Atlantic Ocean and in the tropic Pacific, Malaysia and Indian Ocean.

MATERIAL EXAMINED: The "Alva" specimens are twelve in number, with five additional partially destroyed specimens; the largest one is 26 millimeters long. They were taken in 250 fathoms, off Puerto Cabras, bearing 270° true, 7 miles distant, Fuerte Ventura, Canary Islands, February 18, 1932.

COLOUR: Transparent milky with touches of yellow on the internal organs.

LIFE HISTORY: Imperfectly known.

CHONDROPHORAEFamily: **PORPITIDAE**Genus: **PORPEMA** Haeckel**Porpema prunella** (Haeckel)

TYPE: Dr. Ernst Haeckel, professor of Zoology in the University of Jena, found this species in 1888, on the young stages only, taken by the "Challenger" at station 222, north of New Guinea, in the Pacific Ocean and also at station 288, in the South Pacific, in 2600 fathoms and deposited in the British Museum of Natural History.

Dr. H. B. Bigelow (1911) described the adult forms from an extensive series of specimens taken by the "Albatross" in the tropical eastern Pacific, at stations 4685 and 4686, and deposited in the United States National Museum and the Museum of Comparative Zoology.

DISTRIBUTION: This species, originally reported from the Pacific Ocean, north of New Guinea, at the surface, and more recently taken by the "Albatross," in the tropical eastern Pacific, off the west coast of Peru, about Long. 95°, Lat. 21° S., in quantity, was taken by the "Alva" north of the Marquesas Islands, in a 150 fathoms-to-surface haul. The record is of interest, being a station intermediate between the widely separated earlier records.

MATERIAL EXAMINED: A corm practically denuded of tentacles and gonozooids, this corm diameter being 2.5 millimeters preserved specimen; a second corm 2 millimeters wide; another corm with the bell broken but with several tentacles attached, also a few gonozooids, this corm about 2.5 millimeters wide; three more corms with broken bells, two separate pieces of tentacle base, also a separate contracted gonozooid, all taken in plankton, haul from 150 fathoms to surface, north of Nuka Hiva Island, Marquesas Islands, August 11, 1931.

REFERENCES: *Porpalia prunella*, HAECKEL, E., Jena Zeit. f. Naturwiss. Berlin, 1888, p. 30; Rept. Voy. H. M. S. "Challenger" Zool., 1888, vol. XXVIII, p. 58, pl. 48.

Discalia medusina, HAECKEL, E., loc. cit. A, p. 20; loc. cit. B, p. 46, pl. 49, figs. 1-6.

Porpita globosa, SCHNEIDER, K. C., Zool. Anz., Bd. XXI, 1898, p. 195, *partim*.

Porpema prunella, BIGELOW, H. B., Mem. Mus. Comp. Zool. vol. XXVIII, 1911, p. 325, pls. 25, 26, 27, pl. 28, figs. 11, 15 (excellent description, based on an extensive series of adult forms).

SCYPHOMEDUSAE

Order: SEMAEOSTOMEAE

Family: PELAGIDAE

Genus: PELAGIA Péron and Lesueur

Pelagia noctiluca (Forsk.)

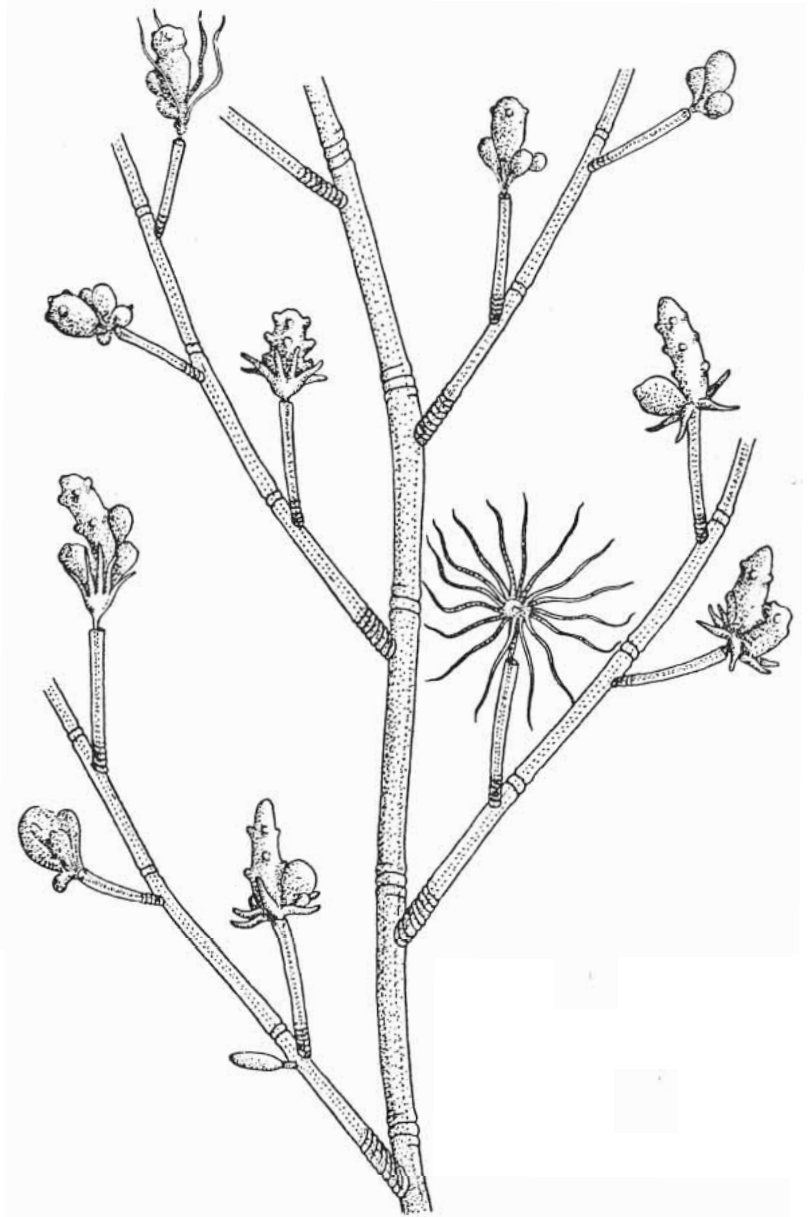
TYPE: Forskal's type came from the Mediterranean Sea and was deposited in the Copenhagen Museum.

DISTRIBUTION: This very beautiful medusa is pelagic in the open seas of a very wide area of the Mediterranean and the warm regions of the Atlantic Ocean. Curiously it is sometimes locally abundant in the Mediterranean for several successive seasons and then, without apparent cause, vanishes for several seasons. It has been extensively studied at the Bay of Naples where it is especially abundant in summer but the larger specimens of it are seldom recorded there in winter.

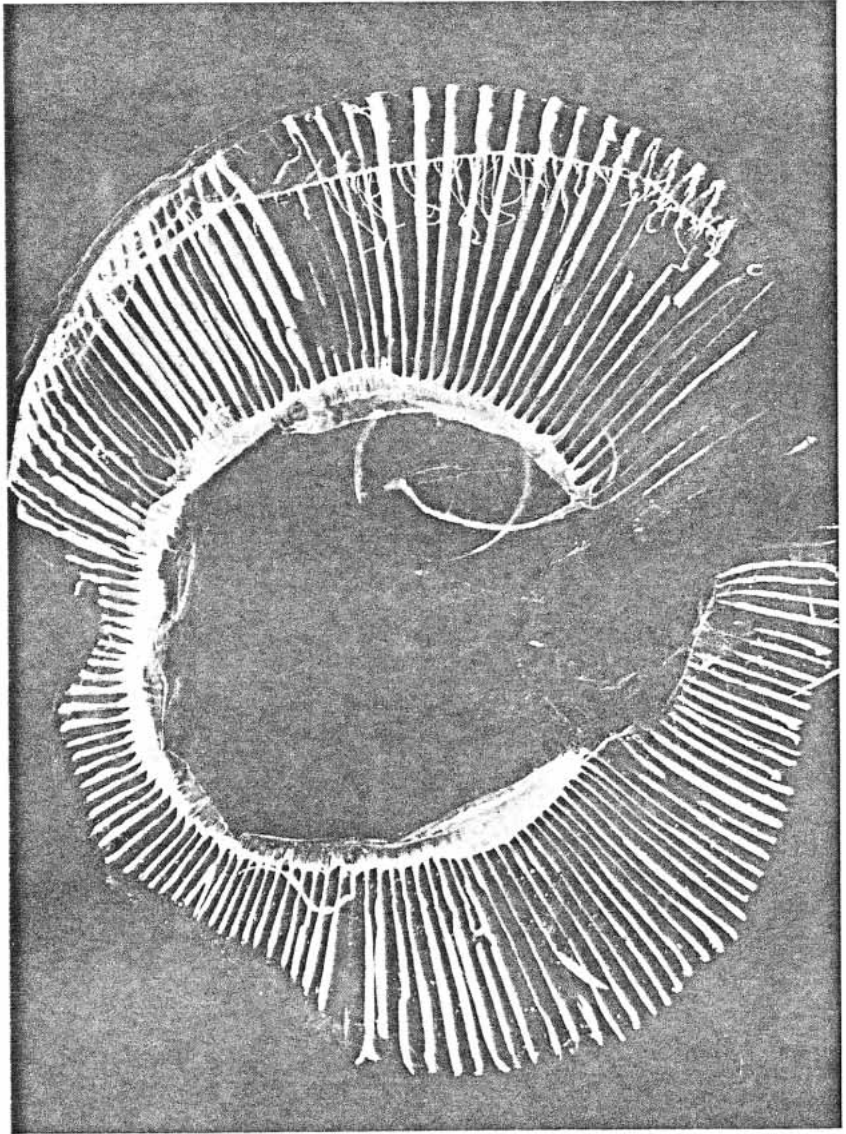
MATERIAL EXAMINED: One young specimen, taken in 250 fathoms, off Fuerte Ventura, Canary Islands.

LIFE HISTORY: The development of this species is most unusual, being direct, without a sessile larval stage. It has been exhaustively studied by Krohn (1855), Kovalevski (1873), Hamann (1883), Goette (1893), Hyde (1894) and Mechnikov (1886).

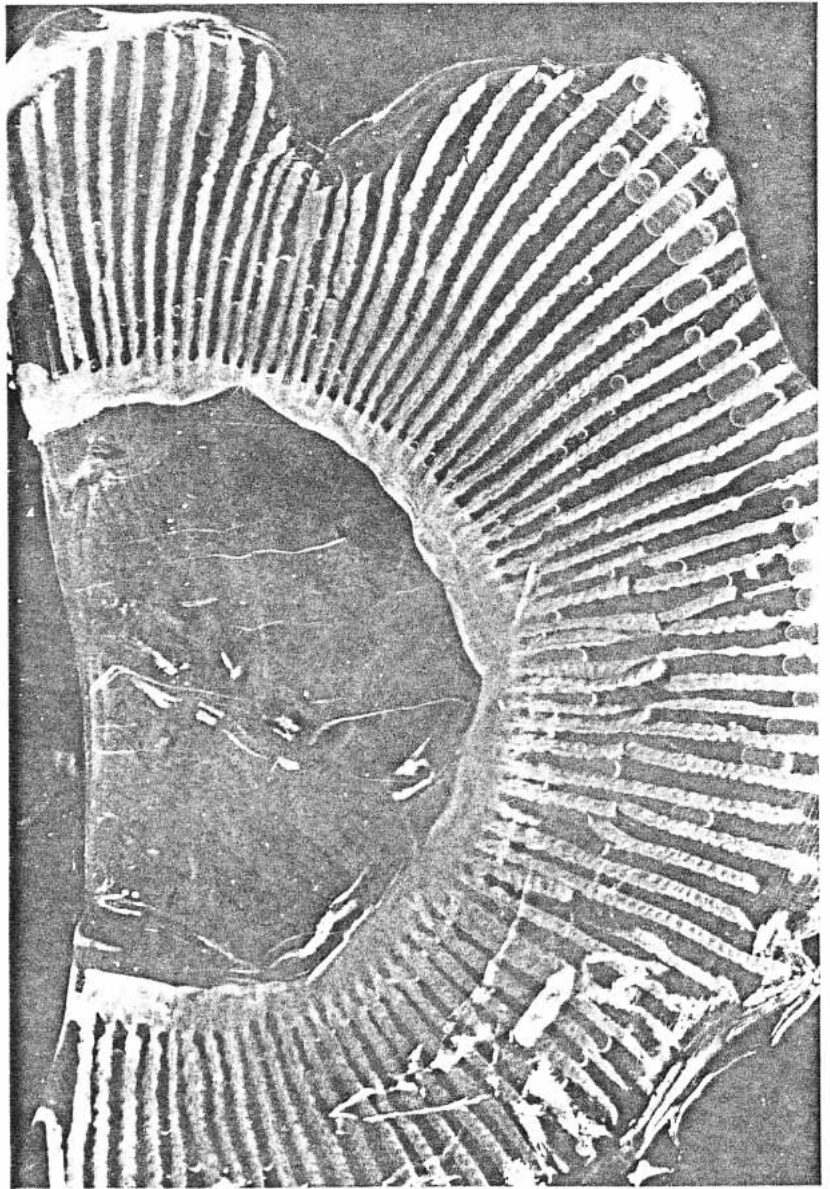
The structure of the gonads was examined critically by the two Hertwigs (1878) and the development of the gonads by Hamann (1883). These organs first appear in the entoderm of the subumbrella as four interradial, elongate ridges. The entoderm develops



Corydendrium splendidum Boone, type, a portion of the colony showing the branching hydrocaulus, supporting hydranths in the various stages of development found, also the sporosacs; one of the rare, isolated gonophores, is shown on the lower left primary ramus.



Aequorea coerulescens (Brandt), the smaller specimen taken in Valparaiso Harbor, Chile, about one-half of natural size, photographed from the dorsad of disk.



Aequorea coerulescens (Brandt), slightly more than one-half of the larger specimen, taken in Valparaiso Harbor, Chile; about one-half of natural size, photographed from the dorsad of disk.