hyphal strands within the epidermis (Fig. 5). Several epidermal cells in a row are involved and a large stroma is formed. These epidermal cells enlarge in size and very soon the upper wall ruptures exposing the conidial stroma (Fig. 4). The conidia (Fig. 3) are produced in abundance acrogenously and these are ovate to spherical, thin-walled, hyaline, measuring 4.5–6 by 4–4.5μ.

The infection patch presents a whitish appearance when the conidia are abundant. As it turns grayish white with black patches, no more conidia can be observed and the stroma becomes large and pulvinate. Though the material was immature early indications of the development of asci were seen in few cases, and further studies are being made to study the ascigerous stage.

As already reviewed by Bitancourt and Jenkins (1943), *Elsinoë viticola* was described by Raciborski from Java and has so far not been collected again in the same or any other locality in spite of repeated search. The type collection of *E. viticola* has been critically examined by Arnaud (1925) and Bitancourt and Jenkins (1943), but on the particular material sectioned all failed to notice any ascigerous stage. Our knowledge of the ascus and ascospores is based therefore on the descriptions given by Raciborski. In the sections through the stroma of *E. viticola* collected by Raciborski, Bitancourt and Jenkins found other saprophytes such as *Phyllosticta* sp., and only hyaline hyphae typical of *Elsinoë* could be made out. *Sphaceloma* stage of the fungus was so far unknown.

The present collection of the fungus on *Tetrastigma sulcatum* from Mysore is the first record to be made outside the type locality in Java. It is also of interest because attempts to recollect the fungus in the type locality since Raciborski's record of it have been unsuccessful (cf. Bitancourt and Jenkins, 1943). Another Elsinoaceae on Vitaceae described from the Eastern Hemisphere is *Elsinoë cissi* Jenkins and Bitancourt (1946) on *Cissus* sp. from Uganda.

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ZOOLOGY.—*A revision of some Actiniaria described by A. E. Verrill.*[1] Oskar Carlgren, Zoological Institution, Lund, Sweden. (Communicated by Waldo L. Schmitt.)

Through the kindness of the Smithsonian Institution and the American Museum of Natural History, I have been able to revise certain species of Actiniaria described by Verrill. Except for *Sagartia leucolena*, all specimens examined were identified by him.

Edwardsia sulcata Verrill

In 1864 (p. 29) Verrill described a species, *Edwardsia sulcata*, the body of which was provided with 12 distinct longitudinal furrows. Andres (1883, p. 317) referred it to the genus *Halcampa*. The presence of the 12 furrows indicates that there may have been 12 mesenteries the whole length of the body. Taken for granted that the description made by Verrill is correct, his species can not be ranged in the genus *Edwardsia*. The holotype is probably lost, but in the collection of the Smithsonian Institution there is a specimen labeled "*Edwardsia sulcata?* Gloucester Mass. Verrill id." [identified]. This specimen is an *Edwardsia* with well-developed physa and eight deep, longitudinal furrows. The nemathybomes are collected in the middle line between the furrows but fairly irregularly in each compartment. It is probable that this displacement is caused by the very strong contraction of the body, but in any case the nemathybomes are apparently not scattered. I counted 14 tentacles, and there are probably never more than 16. The retractors (Fig. 1*a*) are strong, rather restricted with about 20 folds, several of them branched. The parietal muscles (Fig. 1*b*) are strong, though their distribution on the body wall is impossible to determine owing to the strong contraction and poor preservation of the specimen. The

[1] Received June 6, 1949.

nematocysts of the nemathybomes are partly 84.6–104.3 by about 7μ, partly 52.2–67.7 by 4.2μ; those of the tentacles 21–26.8 by 2.8–3.5μ (basitrichs); those of the filaments partly 24–28.2 by 4.5–7μ (microbasic *p*-mastigophors), partly 19.7–22.6 (25.4) by 2.5–2.8 (3.5)μ (basitrichs).

Drillactis pallida (Verrill)

Edwardsia paltida Verrill, 1879, p. 198.
Halcampa pallida (Verrill) Andres, 1883, p. 317.
Drillactis pallida (Verrill) Verrill, 1922, p. 133G, pl. 21, figs. 4, 4a.

Unfortunately the cotype examined by me is rather badly preserved. The actinopharynx is everted and the tentacles pressed together, and therefore it is very difficult to decide whether the smaller tentacles are situated inside the larger or vice versa. I have made cross sections of the lower and upper part of the very long body. There are probably no nemathybomes. Since the mesenteries are arranged as in *Edwardsia*, the microcnemes are present only in the uppermost part of the body. Fig. 2 shows sections of a macrocnema (*a*) and of a parietal muscle (*b*) in the upper region of the body. The muscle folds of the retractor are few, the outer and inner branched; the parietal muscle is fan-shaped, weak, its distribution on the body wall considerable. In the lower part of the body the retractors of the directives are weaker than those of the other macrocnemes. The nematocysts of the column are 8.5–14 by about 1.5μ (basitrichs); those of the tentacles 14–19 by 2–2.5μ (basitrichs); those of the actinopharynx partly 10–12.7 by 2–2.5μ often a little curved, partly 17–22.6 by 2.5–3 (3.5)μ (both basitrichs); those of the filaments partly 10–14 by 2.2–2.8μ (basitrichs), partly 8.5–13 by 3.5μ (probably microbasic *p*-mastigophors—the filaments are badly macerated).

The genus is certainly nearly related to *Nematostella*, but an examination of fresh material is necessary in order to clear up their relation to each other. It is not identical with *Milne-Edwardsia akkeshi* Uchida, a species that may be referred to a new genus, *Metedwardsia* (Carlgren, 1947, p. 1).

Cladactella manni (Verrill)

Bunodactis manni Verrill, 1899c, p. 218.
Tealiopsis manni (Verrill), Verrill, 1922, p. 110G.
Cladactella manni (Verrill), Verrill, 1928, p. 22, fig. 3, a, c, pl. 4, fig. c.

I have examined a specimen, certainly the same one of which a photo is reproduced on plate 4c of Verrill's paper of 1928. Verrill (1928, p. 22) has given a good description of the exterior and some notes about the inner organization. His statement that the species is devoid of a sphincter is, however, erroneous; the species has a well-developed diffuse sphincter (Fig. 3*a*). The longitudinal muscles of the tentacles and the radial muscles of the oral disc (Fig. 3*b*) are ectodermal. There are considerably more mesenteries at the base than at the margin. The retractors of the mesenteries are very weak, forming low folds in the inner parts of the mesenteries. The parietobasilar muscles form a distinct projection on the stronger mesenteries. The nematocysts of the vesicles are 15.5–18.3 by 2.5–3μ (basitrichs); those of the tentacles 17–21 by 2.5–2.8μ (basitrichs); those of the actinopharynx 24–28 by 2.5–2.8μ (basitrichs); those of the filaments partly 19.7–28.2 by 3.5–4.2μ (basitrichs), partly 15.5–18.3 by 3.5–4.2μ (microbasic *p*-mastigophors).

The genus *Cladactella* may be characterized as follows: Pedal disc broad. Column cylindrical, entirely covered with round or elliptical vesicles very closely set. Fosse rather shallow. Sphincter well developed, diffuse, rather broad. No marginal spherules, no pseudospherules. Tentacles up to about 96, of moderate length, conical, imperfectly retractile. Longitudinal muscles of tentacles and radial muscles of oral disc ectodermal. Two well-developed siphonoglyphs and two pairs of directives. Numerous perfect pairs of mesenteries. Considerably more mesenteries at the base than at the margin. Retractors diffuse, very weak, parietobasilar muscles well developed. Distribution of the gonads imperfectly known but they are seemingly borne on the imperfect mesenteries and on many of the perfect ones. Cnidom: spirocysts, basitrichs, and microbasic *p*-mastigophors.

The genus is nearly related to *Phlyctenactis* (*Cystiactis*), but that genus has mesogloeal muscles in the tentacles and oral disc.

Diadumene leucolena (Verrill)

Sagartia leucolena Verrill, 1866, p. 366; 1873, p. 329, pl. 38, fig. 284; 1898, p. 495; 1899c, p. 208, fig. 29.
Cylista leucolena (Verrill) Andres, 1883, p. 365; Parker, 1900, p. 755, fig. 17; Hargitt, 1914, p. 243, pl. 43, fig. 8, pl. 44, fig. 11.

Two specimens collected by Hargitt and ex-

amined by me are undoubtedly *Sagartia leucolena* Verrill. I have sectioned parts of a specimen and examined the nematocysts. The species is, however, no *Sagartia* but a *Diadumene*. The column is indistinctly divisible into a longer scapus and a shorter capitulum. There is no sphincter. The tentacles are divisible into catch tentacles and common ones. I cannot decide the number of the former, because they are not distinctly distinguished from the latter, but they are histologically differentiated inasmuch as their tips are provided with the characteristic nematocysts. According to Hargitt the inner tentacles move in the same characteristic manner as those of *Diadumene cincta* (Carlgren, 1929, p. 110). Hargitt writes (1914, p. 243–244), "It was not unusual to find at certain times that one or even several of the tentacles of the inner series might become more or less specialized at times, apparently serving as tactile organs, being greatly extended and vigorously vibrated in various directions." The longitudinal muscles of tentacles are ectodermal. There are, as in Hargitt's specimen, six pairs of perfect mesenteries typically arranged. The retractors (Fig. 4) of the perfect mesenteries are rather strong, the parietobasilar muscles weak. There are more mesenteries distally than proximally. The nematocysts of the column are partly 12.7–19 by about 2μ (basitrichs), partly 12.7–19.7 by 3.5–4.2μ (microbasic amastigophors); those of the tips of the catch tentacles partly 22.6–28.2 by 6.3–7μ (atrichs, common) partly 17.6–24.7 by 3–4.2μ (holotrichs, common), partly 19.7–26.2 by 4.5μ (*p*-mastigophors or amastigophors); those of the outer tentacles partly 15.5–18.3 by 2–2.8μ (basitrichs), partly 21–24 by 4–4.5μ (probably *p*-mastigophors); those of the actinopharynx partly 14.8–18.3 by about 2μ (basitrichs), partly 21–24 by 3.5–4.5μ (microbasic *p*-mastigophors); those of the filaments partly 8.5–14.1 by 3.5–4μ (*p*-mastigophors), partly 24–28.2 by 4.2–5μ (microbasic amastigophors); those of the acontia partly 26.8–39.5 (commonly 36.5–38) by 7–8.5μ (microbasic *p*-mastigophors), partly 13–16.2 by about 1.5μ (basitrichs). I have not found any macrobasic amastigophors in the few outer tentacles examined, but this is not significant since these nematocysts are rare and do not occur in all common tentacles of *Diadumene cincta*. An examination of a multitude of tentacles may probably show their existence in *leucolena*.

Sagartia spongicola Verrill

Sagartia spongicola Verrill, 1883, p. 47, pl. 6, fig. 3; 1885, p. 534, pl. 7, fig. 200; McMurrich, 1898, p. 238, pl. 2, figs. 3, 4.

I have examined three specimens from Marthas Vineyard. All show an irregular arrangement of the mesenteries indicating that the species may propagate asexually. In two specimens there are nine pairs of perfect mesenteries among which four pairs of directives arranged d.1, d.1, d.1, d.1.1; in the third six perfect pairs, three directives and alternating with these three common pairs. The retractors of the perfect mesenteries are very strong, often circumscribed, sometimes the retractors belonging to the same pair have a somewhat different appearance (Fig. 5*b*). The parietobasilar muscles are well developed, forming a distinct projection on the mesenteries. The imperfect mesenteries are weak as shown in Fig. 5*c*, representing a mesentery of the second cycle from the same slide as the retractors. Probably these mesenteries lack filaments, but owing to the bad preservation of the specimens it is difficult to say if it is really so. The sphincter (Fig. 5*a*) is not strong, showing a distinct tendency to transverse stratification. The longitudinal muscles of the tentacles are ectodermal. The nematocysts of the column are partly 10–12.7 by 1.5–2.2μ (basitrichs), partly 19.7–28.2 by 2.8–3.5μ, partly 31–39 by 4.2–5.6μ (both probably basitrichs). The identification, however, of the nematocysts is not sure because they are very opaque. Moreover there are nematocysts of uncertain type 17–21 by about 4.2μ somewhat broader in their basal end; those of the tentacles 24–28.9 by 3–3.5μ (basitrichs); those of the actinopharynx partly 26.8–32.4 by 2.8–3.5μ (basitrichs), partly 15.5–22.6 by 4.2μ (microbasic *p*-mastigophors); those of the filaments partly 12.7–16.9 by 2.2–2.5μ (basitrichs), partly (12.7) 15.5–19.7 by 3.5–4.2μ (microbasic *p*-mastigophors); those of the acontia 33.8–39.5 by 3–4μ (basitrichs). Already Verrill's statement (1883) that "there are a few small, pit-like openings on the sides, which appear to be pores (cinclidae)" and that "some specimens show small verrucae [papillae] near the summit" indicates that the species may belong to another genus than *Sagartia*. The species is a hormatiid. As the tentacles seem to be some more numerous, or in any case not fewer than the mesenteries at the base, the species may be a *Stephanauge*, though it differs from other known species of the genus inasmuch as it has

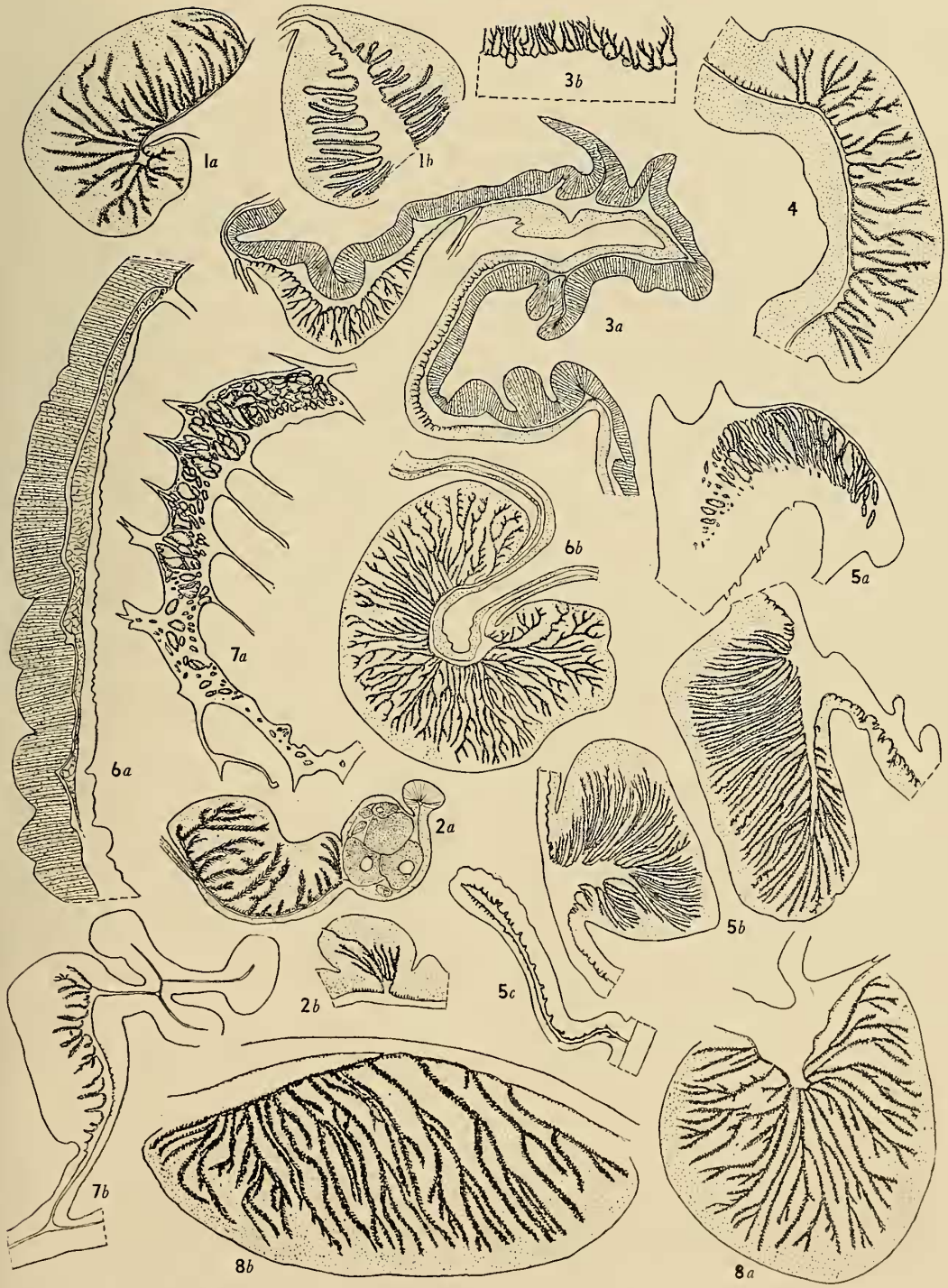

FIG. 1.—*Edwardsia sulcata* Verrill: *a*, Retractor; *b*, parietal muscle. FIG. 2.—*Drillactis pallida* (Verrill): *a*, Retractor and macroneme; *b*, parietal muscle. FIG. 3.—*Cladactella manni* (Verrill): *a*, Sphincter; *b*, radial muscle of oral disc. FIG. 4.—*Diadumene leucolena*, retractor. FIG. 5.—*Sagartia spongicola* Verrill: *a*, Sphincter; *b*, two retractors; *c*, mesentery of second cycle. FIG. 6.—*Sagartia modesta* Verrill: *a*, Sphincter; *b*, retractor. FIG. 7.—*Adamsia sociabilis* Verrill: *a*, Sphincter; *b*, retractor. FIG. 8.—*Bunodosoma grandis* (Verrill): *a*, *b*, Sphincters.

considerably stronger retractors, weaker sphincter, and an irregular arrangement of the mesenteries. Verrill (1897) has examined seven specimens of this species. The mesenteries of two specimens show a hexamerous arrangement, those of two other specimens are arranged on a heptamerous plan and three specimens on an octamerous. The directives are two but irregularly set in one specimen, three in five specimens, and four in one specimen. This variability is certainly joined with asexual propagation.

McMurrich (1898, p. 238) gave considerable information as to the anatomy of this species, but he was not sure about its systematic position.

Sagartia modesta Verrill

Sagartia modesta Verrill, 1866, p. 337; 1873, p. 330, 738; 1899b, p. 146, fig. 19; Andres, 1883, p. 193; Parker, 1900, p. 755, fig. 16; Hargitt, 1914, p. 240, pl. 42, figs. 5, 6, pl. 43, fig. 7.

I have examined two specimens from Newport, R. I., of which one is expanded and about 5 cm long and 2 cm broad, and the other strongly contracted. The pedal disc is well developed. The smooth column is probably divisible into a thicker scapus and a thinner short capitulum. Verrill's note also indicates such a division. He says: "When partly contracted, a distinct fold of the surface near the upper margin sometimes projects above the disc." The uppermost part of the column is also considerably thinner than the other parts. The margin is tentaculate. The mesogloeal sphincter (Fig. 6*a*) forms small meshes and occupies most of the mesogloea. It is situated nearer the ectoderm than the endoderm. On slides it seems fairly well developed but in relation to the length of the body it is weak and occupies only about one-seventieth of the length of the body in the expanded specimen. I have more closely examined the larger specimen. Owing to the strong contraction of the tentacles, it is very difficult to count them, but it seems to me that there is about the same number of tentacles and mesenteries at the base, or that the tentacles are somewhat more numerous. There are 42 pairs of mesenteries present at the base; about 2 cm from the margin only 51 mesenteries (6 + 6 + 12 + 1½ pairs). Apparently the development of mesenteries takes place about simultaneously from the margin and from the limbus. There are two pairs of directives, the two first cycles of mesenteries are perfect (as indicated by the contracted specimen). The retractors are present only on the perfect mesenteries. Those on the mesenteries of the first cycle (Fig. 6*b*) reach almost to the base, those of the second cycle disappear about 2 cm from the margin. The other mesenteries are very weak. The perfect mesenteries are fertile. The nematocysts of the column are 10–11.5 by 2.5μ (basitrichs, rare); those of the tentacles 12.7–17 by 2–2.5μ (basitrichs); those of the actinopharynx partly 21–24 by about 2.8μ (basitrichs), partly 21–25 by 3.5–4.5μ (microbasic *p*-mastigophors); those of the filaments partly 15.5–24 by 2.2–2.5μ (basitrichs), partly 21–24 by 8.2μ (microbasic *p*-mastigophors); those of the acontia partly 14–19.7 by about 2.5μ (basitrichs), partly 26.8–33.8 by 4–5.5μ (microbasic *p*-mastigophors or amastigophors).

The position of this species is difficult to decide. Several of the larger nematocysts in the acontia are exploded, but all shafts seem to be wholly destroyed. The shaft of the unexploded capsules is about three-fourths of the length of the capsules, which indicates that the capsules are microbasic *p*-mastigophors. But the amastigophors may rarely have a rather short shaft. Thus, I can not say if these capsules are *p*-mastigophors or amastigophors. The weak sphincter, the division of the column seemingly into a scapus and capitulum make it likely that the species is an Aiptasiid but in such a case it can not be referred to any genus previously known. Verrill who gives only a figure of it, 1899 (p. 146) calls it *Sagartia* (*Psammactis*) *modesta* but without any diagnosis of the new genus. On the other hand, if the capsules are amastigophors, which is hardly acceptable, the species may go to *Actinothoë*.

Adamsia sociabilis Verrill

Adamsia sociabilis Verrill, 1882, p. 225, 314, 315; 1883, p. 45, pl. 8, figs. 2, 3; 1885, p. 534, pl. 8, fig. 26.

Several specimens of this species are examined. Unfortunately they usually are very contracted, the interior is badly preserved and the filaments and reproductive organs are loose from the mesenteries. Owing to that, it was impossible to find any acontia. The sphincter is mesogloeal and well developed (Fig. 7*a*); the retractors of the stronger mesenteries consist of a few but rather high folds (Fig. 7*b*). The nematocysts of the column are 19.7–25.4 by (3.5) 4.2μ (basitrichs); those of the tentacles 9.2–15.5 by 2.5–2.8μ (basi-

trichs); those of the actinopharynx partly 19.7–25.4 by about 3μ (basitrichs); partly about 14 by 4μ, rare (microbasic *p*-mastigophors); those of the filaments partly 11.3–14.8 by 2.2–2.5μ (basitrichs), partly 11.3–13.4 by 3.5–4.2μ (microbasic *p*-mastigophors). Possibly the species is an *Adamsia*.

Bunodosoma grandis (Verrill)

Cladactis grandis Verrill, 1869, p. 472.
Phymactis grandis (Verrill) Stephenson, 1922, p. 285.
Eucladactis grandis (Verrill) Verrill, 1899a, p. 49.

I have examined several individuals from the Pearl Islands. The specimens are of very different size from 0.3 by 0.4 cm up to 3 by 4 cm. The projections of the column are rather thinly set in the smallest specimens, but in individuals of a height and breadth of 1 cm they stay extraordinarily close. Although all their ectoderm is fallen away, so that I can not give any information of its nematocysts, there is no doubt that we have to do with vesicles as they are not adhesive. They are narrow and rather long and show the appearance given by Verrill (1899, fig. 14, a–c). The fosse is well developed, the sphincter rather weak, circumscribed. I have in figures 8*a*, *b*, drawn the sphincter of two smaller individuals (1.5 broad and 0.8–1 cm high). As the ectoderm of the vesicles also at the margin is lost it was impossible to decide whether marginals are present, but in the fosse of two examined specimens the ectoderm is partly preserved. Here I have found numerous nematocysts undoubtedly atrichs. Thus the species is a *Bunodosoma*. The retractors are broad, bandlike, forming high folds. The parietobasilar muscles are situated on a shelf. The nematocysts of the marginal spherules are 35.2–45.1 by 4.2–5μ (atrichs); those of the tentacles 22.6–25.4 by 3μ (basitrichs); those of the actinopharynx 26.1–29.6 by 3.5–4μ, very numerous (basitrichs); those of the filaments partly 21.1–25.4 by 4.2–4.5μ (microbasic *p*-mastigophors), partly 13.4–17 by about 2.8μ (basitrichs).

The species is neither identical with a specimen from the Gulf of California nor with any other species of *Bunodosoma*, which all have larger vesicles. The number of tentacles in *grandis* is considerably greater than in other species of the genus.

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PROCEEDINGS OF THE ACADEMY

432d Meeting of Board of Managers

The 432d meeting of the Board of Managers, held in the Cosmos Club, November 14, 1949, was called to order at 8:15 p.m. by the President, F. H. H. Roberts, Jr. Others present were: H. S. Rappleye, N. R. Smith, Alan Stone, W. W. Diehl, F. M. Defandorf, W. N. Fenton, W. F. Foshag, F. A. Weiss, W. A. Dayton, Margaret Pittman, H. W. Hemple, O. B. French, F. M. Setzler, and, by invitation, H. E. McComb, J. L. Shereshefsky, and F. C. Kracek.

The President announced the appointment of the following to the Committee for the Academy Journal: L. V. Judson (chairman), W. N. Fenton, F. C. Kracek, Paul H. Oehser, J. A. Stevenson, Alan Stone, and H. S. Rappleye (ex-officio).

The Committee on Membership submitted the names of six individuals for resident membership in the Academy and five for nonresident.

The Chairman of the Committee on Grants-in Aid for Research, Dr. Shereshefsky, reported as follows:

Members of the Committee on Grants-in-Aid have unanimously recommended that $150 be granted to Edward C. Raney, associate professor of zoology and fishery biology of Cornell University, to assist him in a study of the distribution of the fishes of Virginia. Of this sum it is estimated that $90 will be used in drafting, engraving, and printing of a stream map of Virginia and the remainder for services in plotting the distribution of over 150 species of fishes found in the State.

The Committee also recommends a grant of $250 to Dr. Angus M. Griffin and Miss Jeanne C. Moan, both of the department of bacteriology, School of Medicine, George Washington University, to assist them in obtaining the necessary materials for the completion of a study of induced variations in the group of coliform organisms. The applicants state that this grant will enable them to repeat some preliminary observations on the intestine type *Escherichia coli* and the *Aerobacter aerogenes*, and also to complete this study.

The Chairman called attention to the fact that the Academy had at its disposal $596.50. In subtracting the recommended grants from this amount, there will remain a balance of $196.50.

The Board unanimously accepted the recommendations made by the Committee.

The Nominating Committee, consisting of the Vice-Presidents of the Academy, reported that it had met at the Cosmos Club on October 17, 1949, Francis E. Johnston, presiding. Others present were: W. N. Fenton, F. D. Rossini, J. B. Reeside, Jr., F. A. Weiss, C. A. Betts, F. B. Silsbee, R. S. Dill, A. O. Foster, H. W. Hemple, H. G. Dorsey, O. B. French. F. M. Setzler acted as Secretary but took no part in the balloting. The nominees selected for the offices to be filled by balloting of the membership in December were as follows:

For President-Elect..... Nathan R. Smith
For Secretary..... Frank M. Setzler
For Treasurer..... Howard S. Rappleye
For Board of Managers to serve January 1950 to January 1953 (two to be elected)—Howard P. Barss, Clifford A. Betts, Harold E. McComb, A. T. McPherson.

The Secretary reported the following deaths: Sigurd Orla-Jensen, Royal Technical College, Copenhagen, Denmark, on June 24, 1949 (honorary, elected November 8, 1924); George Tully Vaughan, Washington, D. C., on April 26, 1948 (elected January 17, 1901; on retired list February 15, 1943); William J. Humphreys, formerly of the Weather Bureau, on November 11, 1949 (elected May 17, 1906; on retired list December 31, 1935).

The President reported that, as recommended in the report of the Committee on Policy and Planning presented to the Board on September 19, 1949, he had met with the Committee on Membership to discuss various problems in connection with increasing membership in the Academy. He indicated the desirability of appointing subcommittees on membership in various Govern-