ish; mandible pale brownish, darker terminally, paler at base; "iris dark brown"; legs and feet deep brown, the tarsi rather paler. Wing 3.10–3.45, tail 2.25–2.50, culmen .48, bill from nostril .35, tarsus .95–1, middle toe .65–.70, hind claw .40–.50. First, second, and third quills longest, and nearly equal (first, however, usually longest), fourth decidedly (.15 of an inch or more) shorter.

The six specimens collected by Dr. Stejneger differ more or less from one another in details of coloration and proportions. The minimum dimensions, as given above, are represented by a female (No. 89135, collector's No. 1231) from Copper Island. All the remaining specimens being males, there is much uniformity of size among them. The coloration varies much in intensity, notwithstanding the birds were all killed on nearly the same date. The deepest colored individual is No. 89134, from Copper Island. In this the lower parts are bright, though (except on breast) rather pale, yellowish buff, with a sulphury tinge, approaching white only on the abdomen and chin; the lower tail-coverts are a deep creamy buff, the longer with a distinct dusky streak near end. Along each side of throat extends quite a distinct though broken line of fine sagittate markings, extending almost if not quite to the chin. The palest example is No. 88992, from Bering Island. In this, the lower parts are buffy white, the breast and jugulum more distinctly buffy; the crissum is creamy white, or buffy white, and entirely immaculate; there is no trace of the line of dusky streaks along side of throat. Other specimens are variously intermediate, and there can be little doubt that the variation is, in part at least, purely individual.

There being no copy of the *Fauna Japonica* (*Aves*) accessible to me, I am unable to verify the conjectured identity of this species with the *Anthus japonicus* of Temminck & Schlegel. Even if not this species it is probably already described, but I have not been able to find any description at all applicable; and in view of the possibility of its proving new to science, I propose that it should bear the name of its talented discoverer.

Smithsonian Institution, *February* 13, 1883.

DESCRIPTION OF A NEW GENUS AND SPECIES OF ALCYONOID POLYP, FROM JAPANESE WATERS, WITH REMARKS ON THE STRUCTURE AND HABITS OF RELATED FORMS, ETC.

By ROBERT E. C. STEARNS.

The interesting form herein described was obtained by Mr. W. J. Fisher, while acting as naturalist to the Tuscarora Telegraph Sounding Expedition, under Commander George E. Belknap, in 1873. The specimens were purchased of Japanese fishermen at Enosima, by Mr. Fisher, who kindly presented them to the author. They now form a part of the collections in the United States National Museum at Washington.

All of the specimens (four) were dry and more or less imperfect. The chief characters of the form, however, are so well marked as to readily admit of identification from the following description.

Radicipes,* n. g.

Polyp-mass or cœnosarc linear, elongated, rooted; round, oval, or ovate in cross-section. Style or axis long, slender, attenuated, and tapering; calcareous and brittle; four sided or obtusely quadrangular to nearly round in cross-section; basal end furcate, ramified radiciform.

Radicipes pleurocristatus,† n. s.

Polyp-mass linear elongate attenuate, tapering; polypiferous portion about three-fourths to four-fifths of total length; the lowest fourth or fifth squarish round to round in cross-section and free from polyps: ovate to ovate elliptic in cross-section through center of polypiferous part; polyps arranged unilaterally in a single series, one above another along one edge or angle of the style; the sarcode of each polyp inclosing and sustained by numerous slender elongated spiculæ.

Axis or style long, slender, hard and bony, tapering simply to a fine tip; opposite or basal end forked, varicate and root-shaped.

The specimens before me vary from 20 inches to 3 feet or more in length, and from twelve-hundredths to sixteen-hundredths of an inch in diameter, measured at a point about half an inch above the root.

Remarks.—The most perfect of the four styles is 20 inches long with about 2 inches of the tip wanting, and twelve-hundredths of an inch in diameter near the base. The diameters of the others are, respectively, fourteen-hundredths, fifteen-hundredths, and sixteen-hundredths of an inch just above the base. The last specimen must have been over 3 feet in length, judging from the diameter of the axis at the point of fracture.

While the arrangement of the polyps as seen in such portions of the styles as still hold their dried remains intact, indicates the unilateral and uniserial system above described, there is some little evidence of a twisting of the soft parts around the axis, which is not unusual in forms of this class.

The polyps occur with much regularity to the number of six or eight to the inch or from twelve-hundredths to sixteen-hundredths of an inch apart from center to center.

The angularity of the style (though obtuse) and the one-sided arrangement of the polyps point to a close relationship with *Pavonaria* (*P. quadrangularis*) in one direction, and the root-shaped base closely connects the Pennatula tribe (*Pennatulacea*) with the *Gorgonacea*.

When the characters of the axial styles in the various pennatulid groups are compared, the form described by Mr. Fisher as *Virgularia ornata*‡ from specimens dredged by him in Hakodadi Bay, Japan (7

* Root-footed. † Side-crested.

‡ Proc. Cal. Acad. Sci., 1874, Vol. V, p. 418.

fathoms, muddy bottom), acquires additional interest. In this the basal end of the style is *broadly falciform and abruptly curved* at a nearly right angle to the line of the axis, a shape peculiarly well adapted for either permanent or prolonged anchorage in a muddy bottom, and in this respect certainly superior to, and advantageous over, the simpler based rods or styles in most of the species. *V. ornata*, it seems to me, fills the place of an intermediate and connecting link between what may be called the simple stalked pennatulids and the furcate-rooted species I have described in this paper. Such marked variation in the form of the styles seems to indicate a corresponding difference in habit.

It will hardly be questioned that the rooted form points to a sedentary habit, and a fixed and permanent local habitat; and the simple forms of axial rods, with such relevant data as we have at hand, imply, if not a positively and continuously active natatory capacity, certainly a less sedentary existence, more freedom, and greater activity of habit. As relating to the foregoing implication we may consider the following:

Bohadsch says that the Pennatulæ swim by means of their pinnæ, which they use in the same manner that fishes do their fins. Ellis says it "is an animal that swims freely about in the sea," "many of them having a muscular motion as they swim along;" and in another place he tells us that these motions are effected by means of the pinnules or feather-like fins; "these are evidently designed by nature to move the animal backward or forward in the sea, consequently do the office of fins." (Phil. Trans. abridg., xii, 42.) Pallas adopted, with some reservation (Misc. Zool., p. 177), the opinion of Bohadsch; * * * Cuvier tells us that they have the power of moving by the contractions of the fleshy part of the polypidom, and also by the combined action of its polyps; and to adopt the words of Dr. Grant, "a more singular and beautiful spectacle could scarcely be conceived than that of a deep purple *Pen. phosphorea*, with all its delicate transparent polypi expanded and emitting their usual brilliant phosphorescent light, sailing through the still and dark abyss by the regular and synchronous pulsations of the minute fringed arms of the whole polypi." And Bohadsch asserts that he has been a witness of this spectacle. But some authors, like Lamarck and Schweigger, reasoning from what is known regarding other compound animals, have denied the existence of this great locomotive power in a zoophyte placed so low in the scale as "contrary to every analogy, and not necessary to the existence or wants of the animal." To the foregoing, relating to the allied group Pennatulæ quoted from Johnston's British Zoophytes,* that author adds his opinion in these words: "And there is little doubt these naturalists are right, for when placed in a basin or plate of sea-water the *Pennatulæ* are never observed to change their position, but remain on the same spot, and lie with the same side up or down, just as they have been put in." To this I may say, by way of comment, that much depends on the length of time and under what condi-

* Volume 1, pp. 160, 161.

tions such experiments are made. What Johnston says might be applied with equal truth to some of the acephalous mollusca, like *Mya arenaria*, for instance, which though sedentary still possesses a certain degree of mobility, but nevertheless is so sluggish that one may wait and watch for some time without detecting any evidence of activity or voluntary motion. The protection or security of these low forms is through the secretive faculty; the more active hiding in the mud under stones or upon something which is the same color as themselves, or upon or amid objects of brighter colors by which their own is rendered obscure by contrast, or else seeking security by remaining motionless. It is not improbable that such animals may have periods or seasons of activity, and perhaps in their young or adolescent stages are much freer, else the geographical distribution of the species would be wholly mechanical exterior to and independent of the organism, and like many low aquatic forms be dependent upon currents and upon attachment to drifting objects, or to other and more mobile forms of animals. The activity of certain Pectens would hardly be presupposed by the closet student through the form and implied ordinary habits of these mollusks, nor from any analogies perceptible after a study of either the structure or habits of such species or groups as most closely approximate to the fanshells; yet these footless mollusks sometimes exhibit remarkable powers of locomotion, equaling in performance the more active cockle-shells (*Cardium*), which are provided with a powerful muscular foot, in its way a perfect leaping-pole.

The gigantic virgularian described by me in the proceedings of the Cal. Acad., in August, 1873 (*Verrillia Blakei**), "the fishermen say swims free and is so caught in their nets."† Mr. Chambers, who sent a specimen of this form to the British Museum, says:‡ "They move about rapidly in the water, and when brought to the surface move for a few seconds like a snake, then make a dart swift as lightning, and disappear." Dr. J. E. Gray, from whose paper the above is quoted, also says: "Mr. Clifton describes the Australian species as swimming rapidly in shallow water," and adds: "There seems to be no doubt that the Sea-Pens and Sea-Rushes do live in groups together, erect, and sunk in the mud, and that they are sometimes found swimming free in the sea; but the question is, are the free specimens those that have been disturbed by the waves and currents, and do they afterwards affix themselves in the mud, or are they vagrant specimens that live for a time and then die, or are eaten by fish, their struggling being mistaken for swimming?"

Various persons referring to *Verrillia* have reported it as swimming free among the dog-fish, &c.

A related form, probably one of those described by the late Dr. Gabb

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* *Verrillia Blakei*, now *Halipteris Blakei*.

† Dr. E. L. Moss, in Proc. Zool. Soc., London, 1873, p. 732.

‡ Nature, Nov. 6, 1873, p. 13.

under the names *Virgularia elongata** and *V. gracilis*,† was observed by Dr. W. H. Dall in Catalina Harbor, Catalina Island, Cal., darting or swimming just below the surface of the water, and his observation I regard as especially valuable and confirmatory as to the mobility of these animals. If they can move when compelled to do so, through being disturbed in an unusual manner, it is difficult to perceive why they may not sometimes move of their own instinct or volition, using this last word in a restricted sense. The reasons from analogy are in my judgment full as weighty on the side of mobility as on the other, and the testimony of those who have actually seen these animals in their native element, including intelligent and ordinary observers, sustains the implication conveyed by the forms of the axial rods. The most active of the groups are quite likely sluggish animals, generally fixed and sedentary; probably not able to continue actively in motion (*motion en masse*) for any great length of time.

As to the mobility of one group as compared with another, it would seem as if those forms wherein the axis is simplest, the pinnæ the most prominent, or the individual polyps the most numerous, might have an advantage over the others. As to the character of the motion, when the mass as a unit is detached and moving (*swimming*) which involves reciprocal and rather complex muscular action and implies a more elaborate muscular system than these animals possess, hardly conveys the proper idea. Whether the motion requires primarily the simple saturation or absorption of water by and through the general mass, through pores in the basal section or through alleged or suspected terminal orifices of the interdermal longitudinal canals, or *via oris*—namely, through the mouth of each individual polyp—the propulsory movement is undoubtedly due to a sudden act of the cœnosarc, a spasmodic and contractile effort by which the water is ejected and forced out *via oris* by the simultaneous co-operation of all the polyps in the mass. The movement would be better defined by the word "darting," which is used by the fishermen who have seen it.

Before closing, I should refer to what appears to be another important assisting factor in holding on to the bottom, in forms like *Verrillia*, and which is conspicuously exhibited in the species described by Mr. Fisher. I allude to the bulbous expansion which the *cœnosarc* in that species presents at a point just above the falciform termination of the style, and also to the elongated bulb of the basal end in *Verrillia*. Dr. Moss refers to this in his article heretofore quoted, and I am prepared to find it pertains to all of the simpler stalked forms. As will be perceived at a glance, the dilatation of this part materially assists in anchorage, and the contraction also readily admits of withdrawal.

In relation to the geographical distribution of these interesting forms, I may add in this connection the discovery of another habitat for *Ver-*

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* Proc. Cal. Acad., Vol. II, p. 167.

† *Id.*, Vol. III, p. 120.

rillia, by Dr. Dall, who reported it when he was last here as occurring on the cod-fishing banks of the Shamagin Islands, where it annoys the fishermen in deep fishing, by reason of their lines becoming entangled among the polyps. Dr. Dall presented the California Academy with several specimens of the styles obtained by him in this region. Before, it was reported from only one place—namely, Burrard's Inlet, Gulf of Georgia, British Columbia.

EXPLANATION OF PLATE VII.

Fig. 1, basal part of axial rod.

Fig. 2, section of polypiferous part, showing arrangement of the polyps.

NOTE.—It should be borne in mind that the drawings, rough, but characteristic, are made from dry specimens, and that the root prongs in all of the specimens are broken and much shorter than when perfect.

The figures are considerably enlarged.

REPORT ON A FRAGMENT OF CLOTH TAKEN FROM A MOUND IN OHIO.

By J. G. HUNT, M. D.

[Letters to Prof. S. F. Baird.]

PHILADELPHIA, *February* 21, 1881.

DEAR SIR: The fragment of cloth you sent me for examination, purporting to have been taken from a mound in Ohio, has proved not a little refractory. It was impossible to detect any structure until proper treatment rendered it translucent. I think it a mistake to call such cloth "charred"; it is not charred by the action of fire at all, or by slow chemical combustion otherwise accomplished. But it is rendered quite black and opaque, as all other perishable organic remains become when excluded, by burial or otherwise, from the changing conditions of atmospheric influence.

The contents of a mastodon's stomach I once examined were black and opaque, like this cloth, but were not "charred." Indeed, we lack a term to express this curious condition.

Those ancient weavers did not practice the art of coating textile fibers with heavy chemical combinations, as some modern commercial Christians are supposed to do.

You desire to know exactly what fiber this cloth is made of? Alas! My evidence is only negative. It is not cotton; nor hemp; nor flax. I think it is not any fiber now used for textile purposes. Though vegetable in its nature, it is not a fiber at all, but consists of the entire stem of the plant, or of large portions of it, no apparent attempt having been made to separate the fiber before manufacturing. I think the

Plate VII.

Radicipes pleurocristatus Stearns, n. g. & n. s. (description, page 97).
Fig. 1. Basal part of axial rod.
Fig. 2. Section of polypiferous part, showing arrangement of the polyps.

FIG. 2.

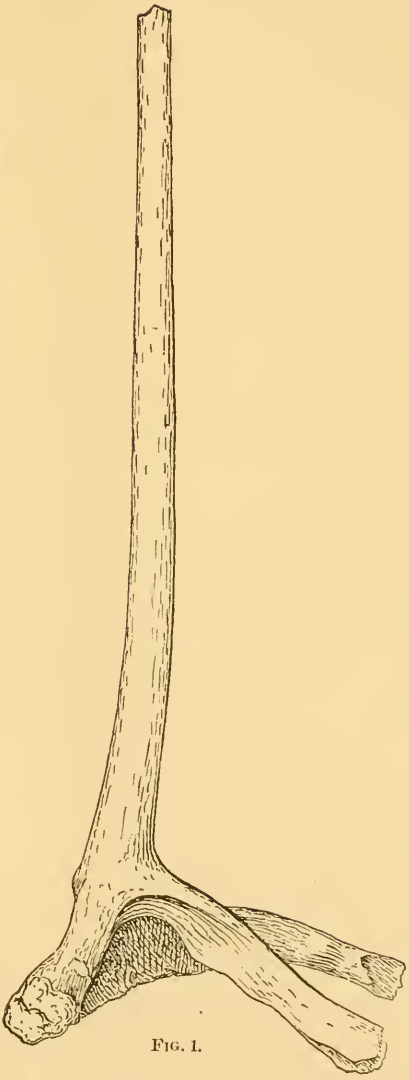

FIG. 1.

RADICIPES PLEUROCRISTATUS, Stearns.