

ART. XXXIV. — *Synopsis of the Cephalopoda of the Northeastern Coast of America*; by A. E. VERRILL. *Brief Contributions to Zoology from the Museum of Yale College.* No. XLVI. With Plates XII to XVI.

THE recent increase in the number of Cephalopods known to belong to this fauna is remarkable. Up to the year 1871, only three species were recorded. In 1872, an undetermined *Rossia* and *Octopus Bairdii* V. were discovered. Since that time fourteen additional species have been added, mostly by the writer, so that, at the present time, *eighteen species* are known from this coast. Four of these have been first discovered by the dredgings carried on by the U. S. Fish Commission, in charge of the writer. Six have been brought in by the Gloucester fishermen, from the Bank fisheries, among their valuable contributions to the collections of the U. S. Fish Commission and National Museum.

#### ARCHITEUTHIS.

In several former articles in this Journal,\* the writer has recorded the occurrence of fourteen† American examples of the gigantic squids belonging to this genus, and apparently representing two species. Since the last of these notices, eight additional specimens have been found on the coasts of Newfoundland and Nova Scotia. In a somewhat extended article on the large cephalopods, recently published,‡ the author has given all the available facts in relation to the later discoveries, and has redescribed, in much greater detail than before, and with numerous illustrations, the various specimens formerly noticed, of which portions, more or less important, have been preserved. In the present article, the recent specimens are enumerated in order to complete the series of notices for this Journal. Since the capture of the fine specimen of *A. princeps*, at Catalina Bay, in 1877 (our No. 14, see Plate XII), which was preserved nearly entire in the New York Aquarium, the following have been recorded:

#### No. 15.—*Hammer Cove specimen*, 1876.

In a letter from Rev. M. Harvey, dated Aug. 25, 1877, he states that a big squid was cast ashore Nov. 20, 1876, at Ham-

\* This Journal, vol. vii, p. 158, Feb., 1874; vol. ix, pp. 123, 177, Plates II-V, 1875; vol. x, p. 213, Sept., 1875; vol. xii, p. 236, 1876; vol. xiv, p. 425, Nov., 1877. Also, *American Naturalist*, vol. viii, p. 167, 1874; vol. ix, pp. 21, 78, Jan. and Feb., 1875.

† Of these, No. 6 proved to be the same as No. 3, and should be cancelled.

‡ *Transac. Connecticut Acad.*, vol. v, pp. 177-258, Dec. 1879. to Feb., 1880. Plates XIII to XXV.

mer Cove, on the southwest arm of Green Bay, in Notre Dame Bay, Newfoundland. When first discovered by his informant it had already been partially devoured by foxes and sea-birds. Of the body, a portion 5 feet long remained, with about 2 feet of the basal part of the arms. The head was 18 inches broad; tail, 18 inches broad; eye-sockets, 7 by 9 inches; stump of one of the arms, 3.5 inches in diameter.

*No. 16.—Lance Cove specimen, 1877 (Architeuthis princeps?).*

In a letter dated Nov. 27, 1877, Mr. Harvey gives an account of another specimen, which was stranded on the shore at Lance Cove, Smith's Sound, Trinity Bay, about twenty miles farther up the bay than the locality of the Catalina Bay specimen (No. 14). He received his information from Mr. John Duffet, a resident of the locality, who was one of the persons who found and measured it. His account is as follows: "On Nov. 21, 1877, early in the morning, a 'big squid' was seen on the beach, at Lance Cove, still alive and struggling desperately to escape. It had been borne in by a 'spring tide' and a high in-shore wind. In its struggles to get off it ploughed up a trench or furrow about thirty feet long and of considerable depth by the stream of water that it ejected with great force from its siphon. When the tide receded it died. Mr. Duffet measured it carefully, and found that the body was nearly 11 feet long (probably including the head); the tentacular arms, 33 feet long. He did not measure the short arms, but estimated them at 13 feet, and that they were much thicker than a man's thigh at their bases. The people cut the body open and it was left on the beach. It is an out-of-the-way place, and no one knew that it was of any value. Otherwise it could easily have been brought to St. John's, with only the eyes destroyed and the body opened." It was subsequently carried off by the tide, and no portion was secured.

*No. 17.—Trinity Bay specimen, 1877.*

Mr. Harvey also states that he had been informed by Mr. Duffet that another very large 'big squid' was cast ashore in October, 1877, about five miles farther up Trinity Bay than the last. It was cut up and used for manure. No portions are known to be preserved, and no measurements were given.

*No. 18.—Thimble Tickle specimen, 1878. Architeuthis princeps (?).*

The capture of this specimen has been described by Mr. Harvey, in a letter to the Boston Traveller, Jan. 30, 1879:

"On the 2d day of November last, Stephen Sherring, a fisherman residing in Thimble Tickle [near Little Bay Copper Mine, Notre Dame Bay], not far from the locality where the

other devil fish [No. 19] was cast ashore, was out in a boat with two other men; not far from shore they observed some bulky object, and, supposing it might be part of a wreck, they rowed toward it, and, to their horror, found themselves close to a huge fish, having large glassy eyes, which was making desperate efforts to escape, and churning the water into foam by the motion of its immense arms and tail. It was aground and the tide was ebbing. From the funnel at the back of its head it was ejecting large volumes of water, this being its method of moving backward, the force of the stream, by the reaction of the surrounding medium, driving it in the required direction. At times the water from the siphon was black as ink.

"Finding the monster partially disabled, the fishermen plucked up courage and ventured near enough to throw the grapnel of their boat, the sharp flukes of which, having barbed points, sunk into the soft body. To the grapnel they had attached a stout rope, which they had carried ashore and tied to a tree, so as to prevent the fish from going out with the tide. It was a happy thought, for the devil-fish found himself effectually moored to the shore. His struggles were terrific as he flung his ten arms about in dying agony. The fishermen took care to keep a respectful distance from the long tentacles, which ever and anon darted out like great tongues from the central mass. At length it became exhausted, and as the water receded it expired."

The body measured 20 feet from the beak to the extremity of the tail. The circumference of the body is not stated, but one of the tentacular arms measured 35 feet in length.

According to these measurements, this was the largest specimen yet found, it being nearly twice as large as No. 14.

*No. 19.—Three Arms specimen, 1878. Architeuthis princeps (?)*.

Mr. Harvey has also given an account of this specimen, in the same letter to the Boston Traveller, referred to under No. 18. This one was found cast ashore after a heavy gale of wind, Dec. 2, 1878, by Mr. William Budgell, a fisherman residing at Three Arms, South Arm of Notre Dame Bay, near Little Bay mines. It was dead when found, and was cut up and used for dog-meat. Mr. Harvey's account is as follows:

"My informant, a very intelligent person, who was on a visit in that quarter on business, arrived at Budgell's house soon after he had brought it home in a mutilated state, and carefully measured some portions with his own hand. He found that the body measured 15 feet from the beak to the end of the tail. \* \* \* \* \* The circumference of the body at its thickest part was 12 feet. He found only one of the short arms perfect, which was 16 feet in length, being five feet longer

than a similar arm of the New York specimen [No. 14], and he describes it as thicker than a man's thigh."

No. 20.—*Banquereau specimen*, 1879.

This consists of the terminal part of a tentacular arm, which was taken by Capt. J. W. Collins and crew, of the schooner "Marion," from the stomach of a large and voracious fish (*Alepidosaurus ferox*), together with the only specimen hitherto discovered of the remarkable squid, *Histioteuthis Collinsii* V. The fish was taken on a halibut trawl-line, N. lat. 42° 49'; W. long. 62° 57', off Nova Scotia, Jan., 1879. This fragment, after preservation in strong alcohol, now measures 18 inches in length. It includes all the terminal club, and a small portion of the naked arm below it.

No. 22.—*Brigus specimen*, 1879.

Mr. Harvey states that portions of another large squid were cast ashore near Brigus, Conception Bay, in October, 1879.

Two of the short arms, each measuring eight feet in length, were found, with other mutilated parts, after a storm.

No. 23.—*James's Cove specimen*, 1879.

From Mr. Harvey I have also recently received an account of another specimen, which was captured entire about the first of November last, at James's Cove, Bonavista Bay, N. F.

"Mr. Thomas Moores and several others saw something moving about in the water, not far from the stage. Getting into a punt, they went alongside, when they were surprised to see a monster squid. One of the men struck at it with an oar, and it immediately struck for the shore, and went quite upon the beach. The men then succeeded in getting a rope around it, and hauled it quite ashore. It measured 38 feet altogether. The body was about 9 feet in length, and two of its tentacles or horns were 29 feet each. There were several other smaller horns, but they were not so long. The body was about 6 feet in circumference."

This seems to have been a fine and complete specimen, about the size of the Catalina Bay specimen (No. 14). Unfortunately the fishermen, as usual, immediately destroyed it, and probably no portion was preserved.

*Architeuthis Harveyi* Verrill. (Harvey's giant squid).

Trans. Conn. Acad., v, p. 197, Plates xiii to xvii, Dec., 1879.

*Megaloteuthis harveyi* Kent, Proc. Zool. Soc. London, 1874, p. 178.

*Architeuthis monachus* Verrill, this Journal, vol. ix, pp. 124, 177, Pl. ii, iii, iv, 1875; vol. xii, p. 236, 1876; American Naturalist, vol. ix, pp. 22, 78, figs. 1-6, 10, 1875 (? non Steenstrup).

*Ommastrephes harveyi* Kent, Proc. Zool. Soc. London, 1874, p. 492.

## PLATE XIII.

The principal diagnostic characters of this species, so far as determined, are as follows: Sessile arms unequal in size, nearly equal in length, decidedly shorter than the head and body together, and scarcely as long as the body alone. Tentacular arms, in extension, about four times as long as the short arms: about three times as long as the head and body together. Caudal fin small, less than one-third the length of the mantle, sagittate in form, with the lateral lobes extending forward much beyond their insertions; the posterior end tapering to a long acute tip. Jaws with a smaller notch and lobe than in *A. princeps*. Suckers of the sessile arms (so far as seen) mostly with numerous acute teeth all around the circumference, all similar in shape, but those on the inner margin smaller than those on the outer, and sometimes obsolete in certain suckers. Sexual characters are not yet determined.

*Architeuthis princeps* Verrill. (Giant squid).

*Architeuthis princeps* Verrill, this Journal, vol. ix, pp. 124, 181, Plate v, 1875; American Naturalist, vol. ix, pp. 22, 79, figs. 25-27, 1875; Trans. Conn. Acad., v, pp. 210 to 217. Plates xvii to xx, Jan. and Feb., 1880.

*Ommastrephes (Architeuthis) princeps* Tryon, Manual of Conchology, p. 185, Pl. 85, 1879, (figures copied and descriptions compiled from papers cited).

## PLATE XII.

This species is distinguished from the preceding by the length and inequality of the short arms, of which the longest (ventral or subventral) exceed the combined length of the head and body by about one-sixth; by the denticulation of the suckers of the short arms, of which there are two principal forms, some having very oblique horny rings, with the outer edge very strongly toothed with broad, flat, acuminate teeth, and the inner edge slightly or imperfectly denticulated; the others having less oblique rings, with the acuminate denticles similar in form all around, though smaller on the inner margin; by the stronger jaws, which have a deeper notch and a more elevated tooth on the anterior edge; and by the caudal fin, which is short-sagittate in form, with the posterior end less elongated than in the preceding species.

*Sthenoteuthis megaptera* Verrill. (Broad-finned large squid).

Trans. Conn. Acad., v, p. 223, Pl. xxi, figs. 1-9, Feb., 1880.

*Architeuthis megaptera* Verrill, this Journal, vol. xvi, p. 207, 1878. Tryon, Manual of Conchology, vol. i, p. 187 (description copied from preceding paper).

The original specimen was found thrown ashore near Cape Sable, N. S. To this species is doubtfully referred a beak, taken on Sable I. Bank, in 280-300 fathoms, by Capt. Geo. A. Johnson and crew, of the schooner "A. H. Johnson."

The genus *Sthenoteuthis*, established to receive this species, differs from *Ommastrephes*, to which it is closely allied, in having, like *Architeuthis*, numerous small, smooth-rimmed suckers alternating with tubercles, on the proximal part of the 'club,' for the mutual adhesion of the long tentacular arms. The lateral arms are provided with very broad, thin marginal membranes. The caudal fin is very broad. Besides the type it also includes *S. Bartramii* (*Loligo Bartramii* Les.) from the Gulf Stream region, and probably *S. pteropus* (Steenst. sp.) from the Mediterranean and Bermuda.\*

*Ommastrephes illecebrosa* Verrill. (Short-finned squid).

*Loligo illecebrosa* Lesueur, Journ. Phil. Acad. Nat. Sci., ii, p. 95, Plate x, figs. 18-21 (incorrect figures). Gould, Invert. Mass., ed. I, p. 318, 1841.

*Ommastrephes sagittatus* (pars) D'Orbig., Céph. Acétab., p. 345, Plate 7, fig. 1, (after Lesueur). Binney, in Gould's Invert. Mass., ed. II, p. 510, 1870 (excl. syn.), Plate xxvi, fig. 341-4 [341 is imperfect], not Plate xxv, fig. 339. Tryon (pars) Man. Conch., I, p. 177, Pl. 78, fig. 342 (very bad, after Lesueur), Pl. 79, fig. 343, 1879 (not Plate 78, figs. 341, 345).

*Ommastrephes illecebrosa* Verrill, this Journal, vol. iii, p. 281, 1872; Report on Invert. Viney. Sd., etc., 1873, pp. 441, 634.

Long Island Sound (Verrill) to Cumberland Gulf (Kumlein). Abundant from Cape Cod to Newfoundland. Saybrook, Conn. (U. S. Fish Com.) Vineyard Sd., Mass., large in winter, small in May (V. N. Edwards).

The Mediterranean form, usually identified with the *var. b*, of *Loligo sagittata* Lamarck, 1799,† is closely related to our species, but if the published figures and descriptions can be relied upon, it can hardly be identical. The American form has a more elongated body, with a differently shaped caudal fin, which is relatively shorter than *O. sagittatus*, as given by European authors. The figure given by Verany is, however, an exception in this respect, for in that the body is represented about as long as in some of our larger specimens.‡

Of our species, I have measured large numbers of specimens, preserved in different ways, and also fresh, and have found no great variation in the form and relative length of the caudal fin, among specimens of similar size, nor do the sexes differ

\* A specimen from Bermuda is described in detail in Trans. Conn. Acad., vol. v, p. 228, but it lacked the 'clubs.'

† It seems more probable, however, that Lamarck's description applied, in part, to *O. Bartramii* (Les. sp.) of the Gulf Stream region. Blainville thus applied it.

‡ It should be remarked, however, that Lesueur's figure of *O. illecebrosa* shows the body too small and short in proportion to the size of the fin, and the fin wrong in shape, and occupying more than half the length of the mantle; the proportions of the arms are also erroneous. But Lesueur explains these defects by his statement that the figures were hasty sketches made for the sake of preserving the colors, and that he saved a specimen by which to correct afterwards his drawings and description, but the specimen saved turned out to be *L. pavo*, so that the original sketches were published without correction. Tryon's figure 342 is a reduced copy of one of Lesueur's, though not so credited.

in this respect. The two sexes are probably equally numerous, but in our collections the males usually predominate, and the largest specimens are usually males, though equally large females do occur. In 31 measured specimens, in alcohol, from various localities, and of both sexes, the average length from tip of tail to dorsal edge of the mantle was 6.96 inches; from tip of tail to insertion of fin, 2.59; average proportion of fin to mantle-length, 1:2.68. Among these the proportions varied from as low as 1:2.50, in some of the larger ones, (with mantle above 8 inches), up to 1:2.85, in the smaller ones, (with the mantle about 4 inches long). The caudal fin is about one-third broader than long, and its breadth is usually rather less than half the length of the mantle. In fresh specimens the tentacles can extend back beyond the base of the caudal fin. The portion of the tentacles bearing suckers is always less than half the whole length. The relative size of the suckers varies greatly in both sexes, perhaps in connection with the renewal of their horny rings, periodically.

In the *male* of our species the left ventral arm is strongly hectocotylized, nearly as in *Loligo*. Toward the tip the suckers of the outer row, for some distance, have their pedicels larger and longer, with swollen bases, while the suckers themselves gradually become smaller till they nearly or quite disappear, and then, close to the tip, they again become normal.

*Taonius pavo* Steenstrup. (Peacock squid).

*Loligo pavo* Lesueur, Journal Acad. Nat. Science Phila., ii, p. 96. Plate, 1821.  
*Loligopsis pavo* Ferussac and D'Orb., Céph. Acét., p. 321, Pl. 4, figs. 1-8, (after Lesueur). Binney, in Gould, Invert. Mass., ed. II, p. 309, (but *not* the figure, Pl. xxvi). Tryon, Man. Conch., i, p. 163, Pl. 68, fig. 252, Pl. 69, fig. 253, 1879, (figures copied from Lesueur and D'Orb.).

*Taonius pavo* Steenst., Oversigt Kgl. Danske Vidensk. Selsk. Forh., 1861, pp. 70 and 85.

Sandy Bay, Mass. (Lesueur). Newfoundland (Steenstrup).

No instance of the occurrence of this oceanic species on the New England coast has been recorded since the original specimen was described by Lesueur, in 1821.

*Taonius hyperboreus* Steenstrup. (Goggle-eyed squid).

*Leachia hyperboreus* Steenstrup, Kongelige Danske Vidensk. Selsk. Skrifter, 5te Række, iv, p. 200, 1856, (sep. copies, p. 16).

*Taonius hyperboreus* Steenst., Oversigt Kgl. Danske Vidensk. Selsk., Forhandling, 1861, p. 83. Verrill, this Journal, xvii, p. 243, 1879.

*Loligopsis hyperboreus* Tryon, op. cit., p. 162, (inaccurate translation, after Steenstrup).

Near the northern edge of the Gulf Stream, W. long. 55°, Jan., 1879 (Thomas Lee). Greenland (Steenstrup).

*Histioteuthis Collinsii* Verrill. (Webbed squid).

This Journal, xvii, p. 241. March, 1879. Tryon, op. cit., i, p. 166, 1879. (copied from preceding). Verrill, Trans. Conn. Acad., v, p. 234. Plates xxii and xxvi, Feb., 1879.

## PLATE XIV.

The only specimen known was obtained from the stomach of a large fish (*Alepidosaurus ferox*), taken by Capt. J. W. Collins and crew of the schooner "Marion," in deep water off Nova Scotia, N. lat. 42° 49'; W. long. 62° 57'.

*Rossia Hyatti* Verrill. (Hyatt's bob-tailed squid).

This Journal, vol. xvi, p. 208, Sept., 1878. Tryon, Man. Conch., i, p. 166, 1879, (description compiled from preceding).

## PLATE XV, figures 1 and 2.

This species has been taken in numerous localities, by the dredging parties of the U. S. Fish Commission, in 1877, 1878 and 1879, off Cape Cod; in Mass. Bay; off Cape Ann, in the Gulf of Maine; off Cape Sable, N. S.; and off Halifax, N. S. It occurs in 40 to 150 fathoms. Its relatively large eggs are laid in small clusters in the large oscules or cavities of several species of sponges. It has also been received through the Gloucester halibut fishermen, from the Banks, off Nova Scotia.

This species has a strong general resemblance to *R. glaucopis* Lovén, as figured in the admirable work of G. O. Sars, but the latter has shorter lateral arms, and the suckers of the sessile arms are in two rows, while they are four-rowed in our species.

*Rossia sublevis* Verrill. (Smooth bob-tailed squid).

*Rossia sublevis* Verrill, this Journal, xvi, p. 209, 1878. Tryon, Man. Conch., i, p. 160, 1879, (description compiled from preceding).

## PLATE XV, figure 3.

Taken by the dredging parties of the U. S. Fish Commission in the trawl-net, at numerous localities, in 1877, 1878 and 1879, in 50 to 140 fathoms, off Mass. Bay; in Mass. Bay; off Cape Cod; off Cape Sable, N. S.; and off Halifax. Also recently brought in by the Bank fishermen, of Gloucester.

*Sepiola leucoptera* Verrill. (Butterfly squid).

*Sepiola leucoptera* Verrill, this Journal, vol. xvi, p. 378, 1878. Tryon, Man. Conch., i, p. 158, 1879, (description copied from preceding, with remarks.)

## PLATE XV, figures 4 and 5.

Three specimens were taken by the U. S. Fish Com., in the trawl-net, 30 miles east from Cape Ann, Mass., 110 fathoms, August, 1878. One specimen was taken off Cape Cod, 123 fathoms, with the bottom temperature 41° F., August, 1879.

The last named specimen, (Plate xv, fig. 5) when fresh was about 31<sup>mm</sup> long, exclusive of the arms. In this the head, above, in front of the eyes, was white; back and the base of the fins thickly spotted with brown; posterior part of the back with an emerald-green iridescence. Sides of the body, below the fins, and posterior end of the body, silvery white. A large shield-shaped



ventral area of brown, with a bright blue iridescence, and bordered with a band of brilliant blue, occupies most of the lower surface. Fins transparent, whitish, except at base. Lower side of head, siphon and outer bases of arms, light brown. Eyes blue above, green below. The fins are large, nearly as long as the body.

*Loligo Pealei* Lesueur. (Long-finned squid.)

Journ. Acad. Nat. Sci. Philad., vol. ii, p. 92, Plate 8, 1821.

Férussac and D'Orbigny, Céph. Acét., p. 311, Pl. xi, figs. 1-5, Pl. xx, figs. 17-21.

Binney in Gould's Invert. Mass., ed. 2, p. 514, Pl. 25, fig. 340, (figure erroneously referred to *O. Bartramii*). Verrill, Report on Invert. Vineyard Id., pp. 440, 635 (sep. copies, p. 341), Pl. xx, figs. 102-105, 1877. Tryon, Man. Conch., I. p. 142, Pl. 51, figs. 134-140, (figs. from Fér. and D'Orb.)

*Loligo punctata* Dekay, Nat. Hist. N. Y., Mollusca, p. 3, Pl. 1, fig. 1, 1843, (young.)

South Carolina to Massachusetts Bay.

This is the *common squid* from Cape Hatteras to Cape Cod. In Long Island Sound and Vineyard Sound it is very abundant, and is taken in large numbers in the fish-pounds and seines. It is comparatively scarce north of Cape Cod. Large specimens were taken in the pounds at Provincetown, Mass., August, 1879. As in all other squids, the length of the caudal fin, in proportion to that of the body (mantle), increases with age, even after maturity. For this species, in specimens having the mantle from 4 to 5 inches long, the ratio of the fin to the mantle usually varies from 1:1.80 to 1:1.90; with the mantle 6 to 7 inches long, the ratio usually becomes 1:1.65 to 1:1.75; in the largest specimens, with the mantle 10 to 13 inches long, the ratio varies from 1:1.56 to 1:1.70. This variation is independent of sex, and is due mostly to the ordinary changes by growth. The ratio of the breadth of the caudal fin to the length of the mantle, in the larger specimens, ranges from 1:2.15 to 1:2.40, varying considerably according to the mode of preservation. The suckers in the two central rows of the tentacular club, are large and remarkably high; the rim is closely and sharply denticulated, one or three minute denticles alternating with the larger ones.

*Var. borealis* Verrill. Four specimens, taken in 1878, at Annisquam, Mass., on the north side of Cape Ann, and sent to me by Professor A. Hyatt, differ so decidedly from the typical ones that it seems desirable to give the form a distinctive name, as a variety or geographical race. Two are females, filled with eggs. When a larger series can be examined it may even prove to be a distinct species. They have the general form and appearance of the pale-colored *L. Pealei*, with the caudal fin broader than usual. Ratio of fin-length to mantle, 1:1.62; of fin-width to mantle-length, 1:1.82. Length of mantle, above, in one female, 7.30 inches; of caudal fin, 4.5; to end of longest sessile

arms, 10·7. The anterior dorsal lobe of the mantle-edge is larger and longer than usual, and the 'pen,' while having the general form of that of *L. Pealei*, tapers more gradually anteriorly, and has a narrower, more tapered, more acute and stiffer anterior tip. But the most obvious peculiarity is the unusual smallness of the suckers, both of the tentacles and short arms, which are little more than half as large as those of typical *L. Pealei* of the same size. The largest of the median suckers of the tentacular club are only 2<sup>mm</sup> in diameter of aperture; the largest of those on the 3d pair of arms, 1·5<sup>mm</sup>. The rims of the suckers are white, and their denticulation is similar to that of the typical form, but finer.

*Loligo pallida* Verrill. (Pale long-finned squid).

Report on Invert. Viney. Sd., in Rep. U. S. Com. Fish and Fisheries, i, p. 635, [341], Pl. xx, figs. 101, 101a, 1873. Tryon, op. cit. p. 143, Pl. 52, figs. 141, 142, (des. and figs. copied from preceding).

This is closely allied to *L. Pealei*, and may finally prove to be only a geographical variety of it, but among the very numerous specimens, of both forms, that I have already examined, I have not found intermediate ones. The principal differences are the larger and flatter median suckers of the tentacular clubs, which also have darker colored and more strongly denticulate rims; the larger suckers of the sessile arms; a stouter body in both sexes; a larger and broader caudal fin, the ratio of the breadth of the fin to the mantle-length, in the larger specimens (with mantle 7 to 9 inches long), being from 1 : 1·80 to 1 : 1·95, while in *L. Pealei*, of corresponding size, the ratio is 1 : 2·15 to 1 : 2·30.

This form has been received, hitherto, only from the western part of Long Island Sound, where it is abundant, with the schools of *menhaden*.

*Parasira catenulata* Steenstrup.

*Octopus tuberculatus* Risso (?), Hist. nat. de l'Eur. merid., iv, p. 3, 1826 (t. D'Orbig.)

*Octopus catenulatus* Férussac, Poulpes, Pl. vi, bis, ter., 1828 (t. D'Orbig.)

*Philonexis tuberculatus* Fér. and D'Orbig., Céph. Acét., p. 87, Pl. vi, bis, ter.

A fine specimen of this interesting species was taken in Vineyard Sound, Mass., by Mr. V. N. Edwards, in 1876.\* It was not known previously from the American coast, and has been regarded as peculiar to the Mediterranean. The total length of this specimen is 8 inches; of mantle, 2; circumference of body, 6; length of dorsal arms, from eye, 5·4; of second pair, 3·7; of third pair, 3·30; of fourth pair, 5·30. Color, above, deep violet; beneath, yellowish. The remark-

\* This is the same specimen that was referred to under *Octopus granulatus*, in this Journal, xvi, p. 210, 1878. The specimen had been mislaid, and at that time was not to be found. It was recorded from memory, and only an imperfect examination of it had been made when received.

able tubercles of the ventral surface, mostly have five ridges converging to each, rarely six. In all other respects it agrees with the figures of Férussac and D'Orbigny. According to Targioni-Tozzetti, *P. catenulata* is distinct from *P. tuberculata*. If so, our species should bear the former name.

*Octopus Bairdii* Verrill. (Baird's Octopus.)

This Journal, vol. v, p. 5, Jan., 1873; American Naturalist, vol. vii, p. 394, figs. 76, 77, 1873; Amer. Assoc. for Adv. Sci. for 1876, p. 348, Pl. 1, figs. 1, 2, 1874. G. O. Sars, Mollusca Regionis Arcticæ Norvegiæ, p. 339, Pl. 33, figs. 1 to 10. (♀) Pl. xvii, figs. 8<sup>a</sup> to 8<sup>d</sup> (dentition and jaws), 1878. Tryon, Man. Conch., i, p. 116, Pl. 32, figs. 37, 38 (description and figures from the papers by A. E. V.)

In addition to the localities previously given, this species has been taken in numerous localities off the coasts of Massachusetts and Nova Scotia, by the dredging parties of the U. S. Fish Commission, in 1877, '78 and '79. It is common in 50 to 150 fathoms, both on muddy and on hard bottom. Both sexes occur, the females less frequently. The sexes show but little difference, except the hectocotylized third right arm of the male.

The Gloucester fishermen have brought in several specimens from the banks, off Nova Scotia and Newfoundland.

Professor G. O. Sars has taken it, off the Norwegian coast, in 60 to 300 fathoms.

*Octopus piscatorum* Verrill. (Fishermen's Octopus.)

This Journal, vol. xviii, p. 470, Dec., 1879.

Two specimens of this species, both females, have been obtained. The first was from LeHave Bank, off Nova Scotia, 120 fathoms, taken by Capt. John McInnis and crew, of the schooner "M. H. Perkins," Oct., 1879; the second was taken by Capt. David Campbell and crew, of the schooner "Admiral," near the Grand Bank, in 200 fathoms, Dec., 1879.

This species resembles *O. Grönlandicus*, of which the males alone have been described, and may prove identical.

*Octopus obesus* Verrill. (Stout Octopus.)

This Journal, vol. xix, p. 137, Feb., 1880.

One male, taken in 160 to 300 fathoms, east of Sable Island, N. S., by Chas. Ruckly, of the schooner "H. A. Duncan."

*Octopus lentus* Verrill. (Soft Octopus.)

This Journal, vol. xix, p. 138, Feb., 1880.

One specimen only, a female, presented by Capt. Samuel Peeples and crew, of the schooner "H. M. Perkins." It was taken near LeHave Bank, N. S., in 120 fathoms.

*Stauroteuthis syrtensis* Verrill. (Webbed devil-fish.)

This Journal, vol. xviii, p. 468, Dec., 1879.

## PLATE XVI, figs. 1 to 5.

The only known specimen of this curious species was taken in N. lat.  $43^{\circ} 54'$ ; W. long.  $58^{\circ} 44'$ , about 30 miles E. of Sable Island, N. S., in 250 fathoms, by Capt. Melvin Gilpatrick and crew, of the schooner "Polar Wave," Sept., 1879.

## EXPLANATION OF THE PLATES.

## PLATE XII.

*Architeuthis princeps* V. (No. 14). General figure; from the recently preserved specimen; restored, in part, in accordance with the measurements of the freshly caught specimen;  $\frac{1}{3}$  natural size. Drawn by the author.

## PLATE XIII.

Figure 1.—*Architeuthis Harveyi* (No. 5). Head and arms,  $\frac{1}{3}$  natural size, from a photograph of the specimen when freshly caught. The back of the head rests upon an oar so as to cause the beak to protrude, while the arms hang down in a reversed position. The diameter of the bathing tub was 38.5 inches: *a*, left, and *a'*, right ventral arms; *b*, left, and *b'*, right arms of the third pair; *c*, left, and *c'*, right arms of the second pair; *d'*, right dorsal arm, mostly concealed behind the others; *e*, left and *e'*, right tentacular-arms, folded several times over the oar; *i* to *iv*, the 'club'; *i* to *ii*, the 'wrist'; *ii* to *iii*, the part bearing large suckers; *iii* to *iv*, the terminal division; *o*, the beak.

Figure 2.—Part of the body and caudal fin of the same specimen.  $\frac{1}{3}$  natural size, from a photograph made at the same time with the preceding; *u*, mantle cut open; *t*, tip of tail; *b*, right and *l*, left lateral lobes of caudal fin.

## PLATE XIV.

*Histioteuthis Collinsii* Verrill. Side-view of the head and arms; from the preserved specimen,  $\frac{1}{4}$  natural size. Drawn by J. H. Emerton.

## PLATE XV.

Figure 1.—*Rossia Hyatti*. Dorsal view, enlarged  $1\frac{1}{2}$ .

Figure 2.—The same. A young specimen, enlarged  $1\frac{1}{2}$ .

Figure 3.—*Rossia sublevis*. Ventral view, enlarged  $1\frac{1}{2}$ .

Figure 4.—*Sepiola leucoptera*. Young, ventral view, enlarged 3 diameters.

Figure 5.—The same. A larger specimen, taken in 1879, enlarged  $1\frac{1}{2}$ .

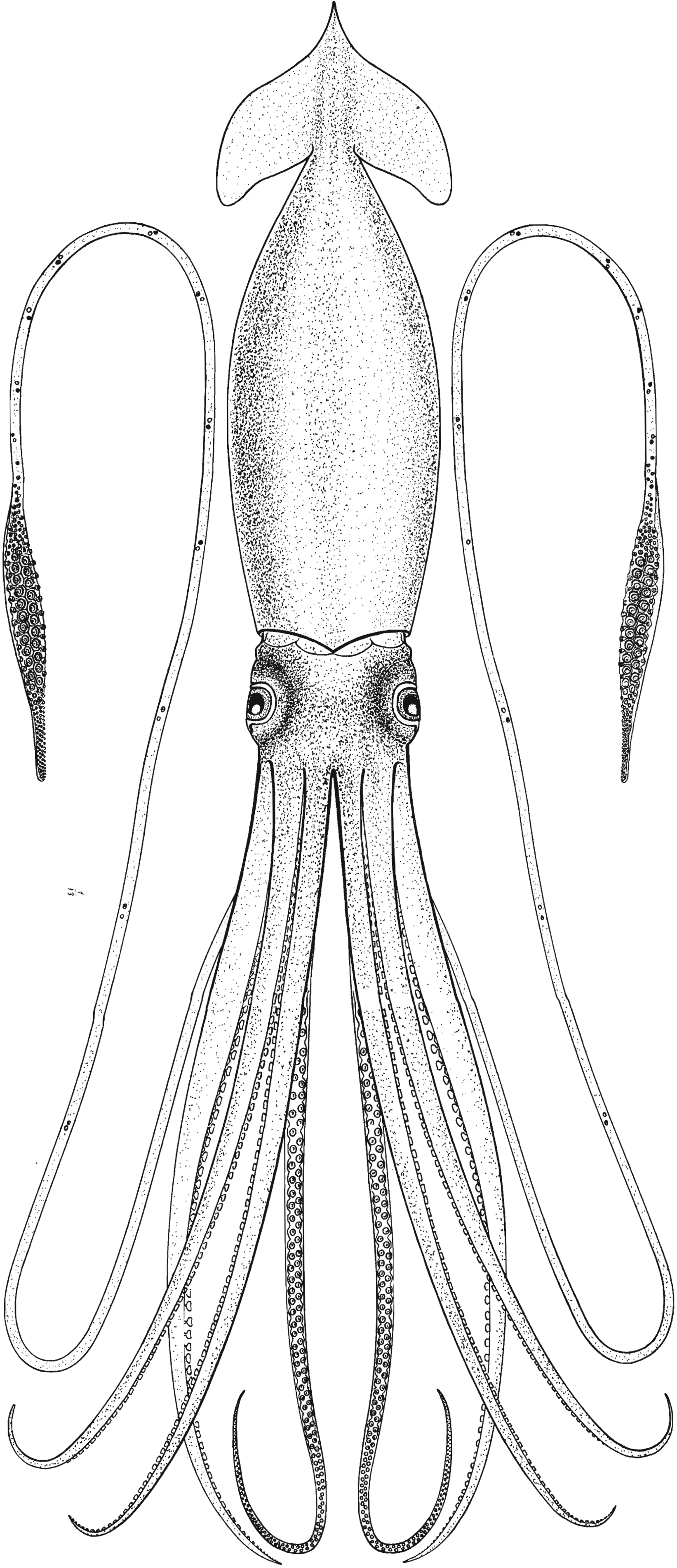
## PLATE XVI.

Figure 1.—*Stauroteuthis syrtensis*. Dorsal view,  $\frac{3}{10}$  natural size.

Figure 2.—The same. Lower side of head; *s*, siphon; *e*, eye; *a*, the pore.

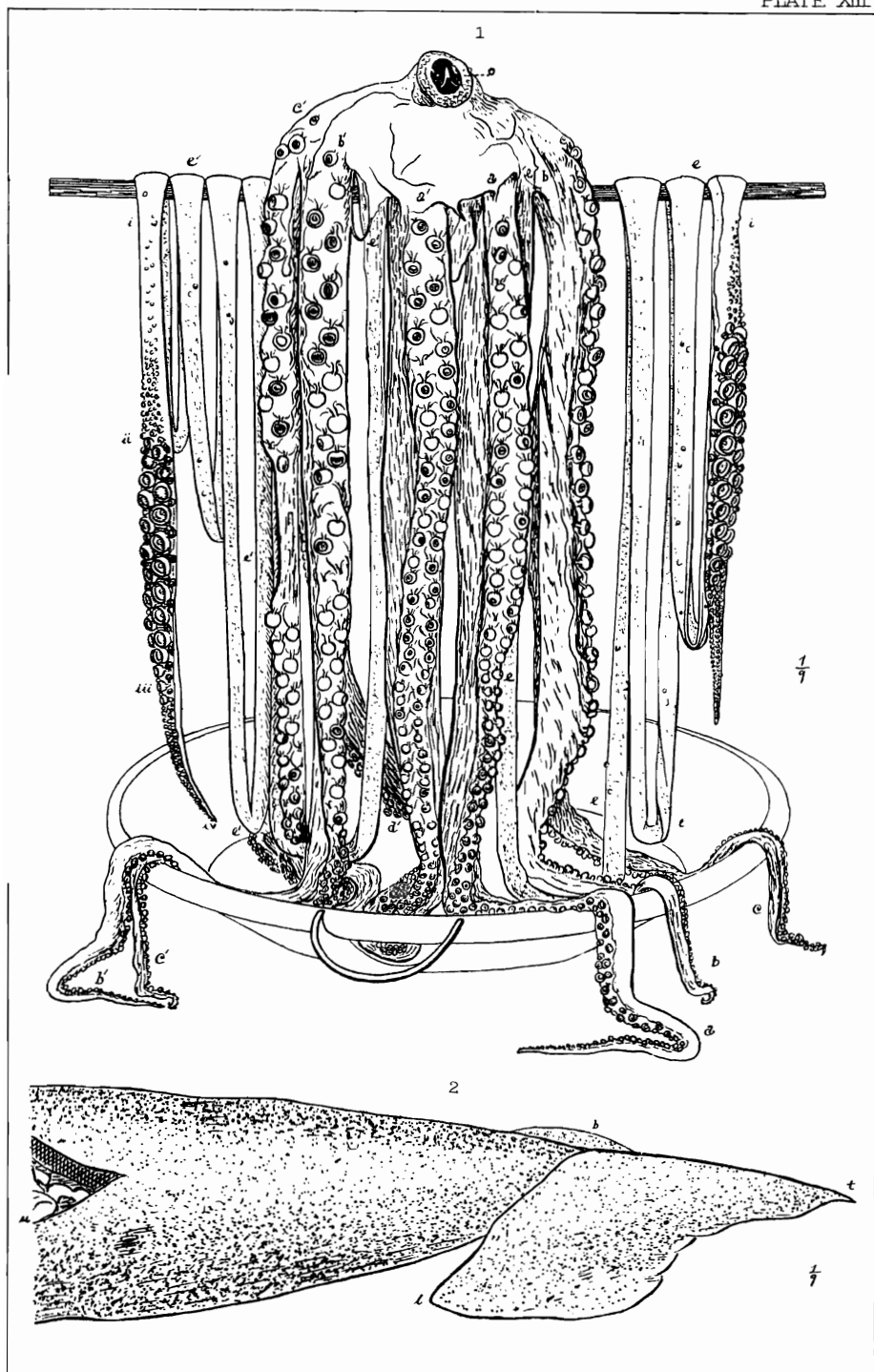
Figure 3.—The same. The siphon, turned back.

Figures 4 and 5.—The upper and under jaws of the same, enlarged  $2\frac{3}{4}$  diameters.



$\frac{1}{12}$

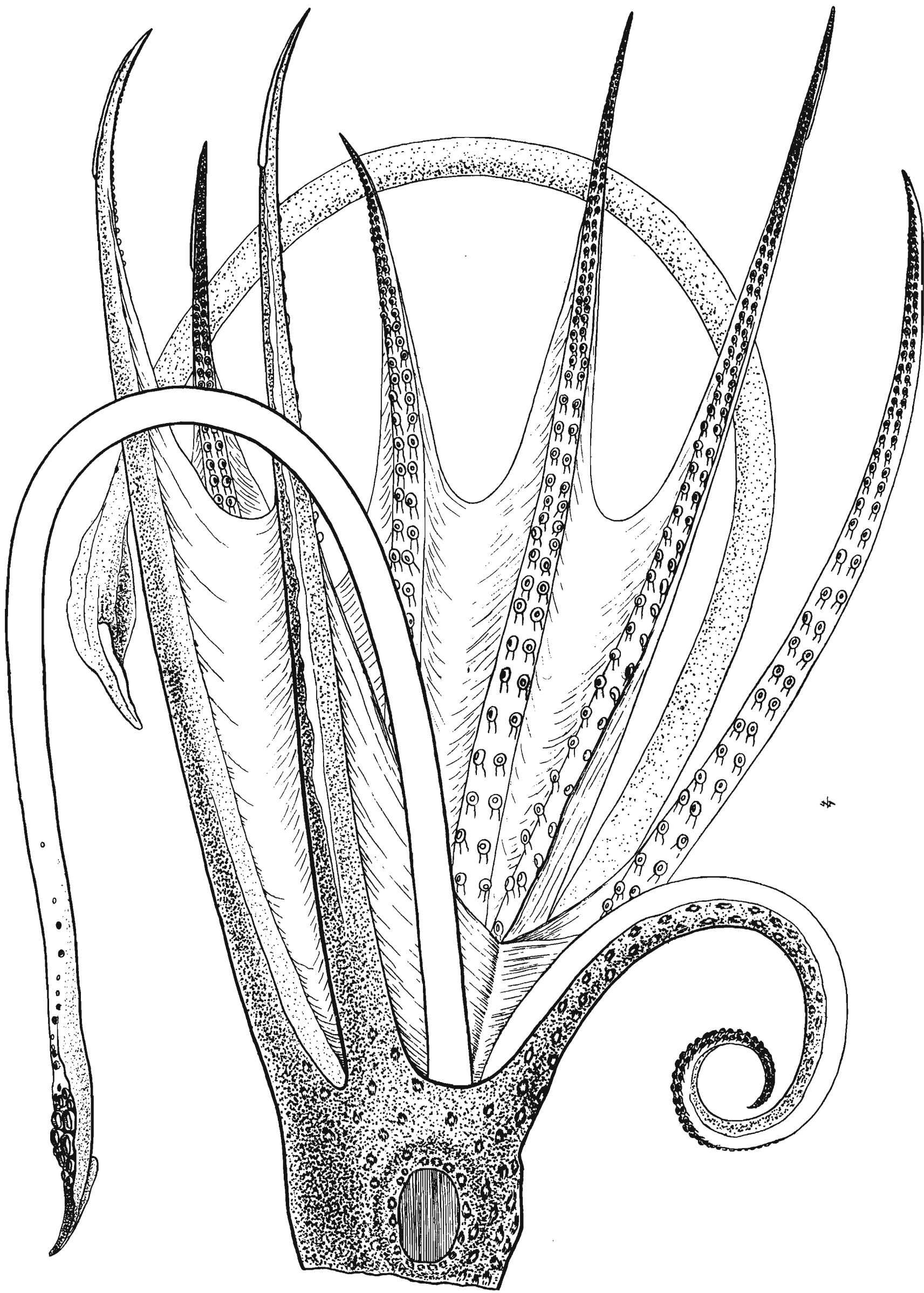
ARCHITEUTHIS PRINCEPS VERRILL



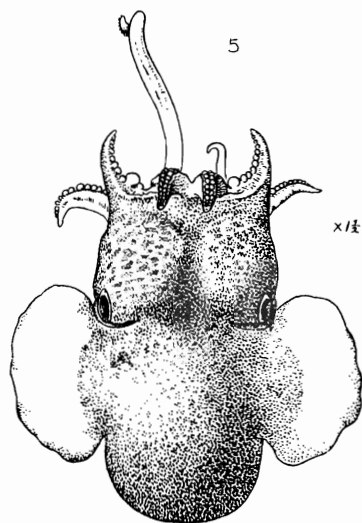
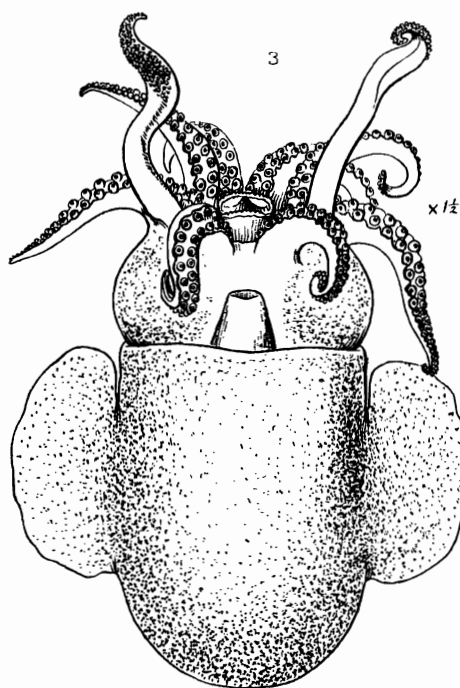
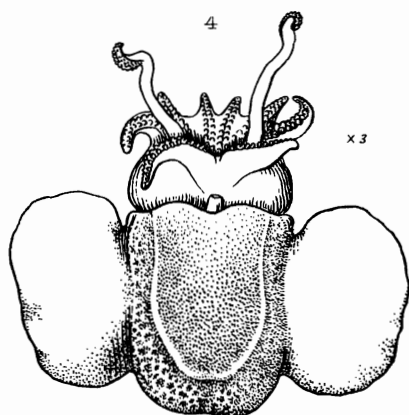
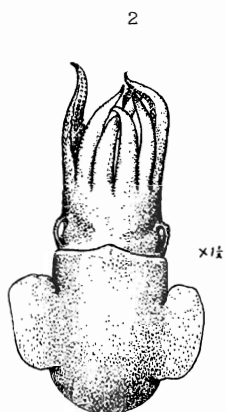
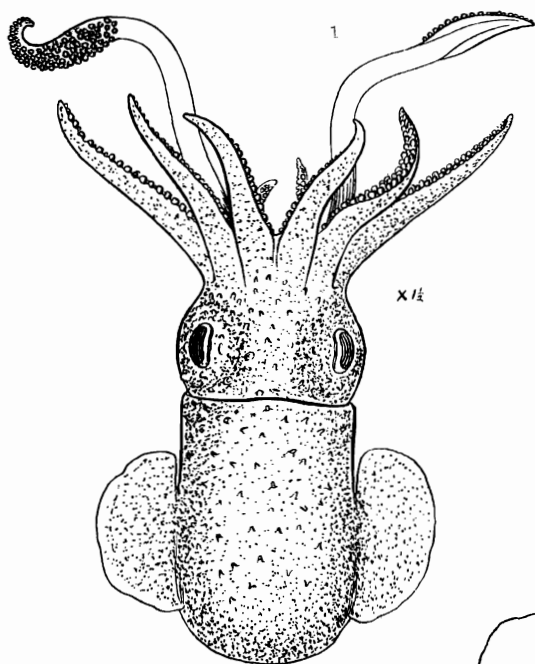
A. E. Verrill & J. H. Emerton

Photo Lith. Punderson & Co. and New Haven, Ct.

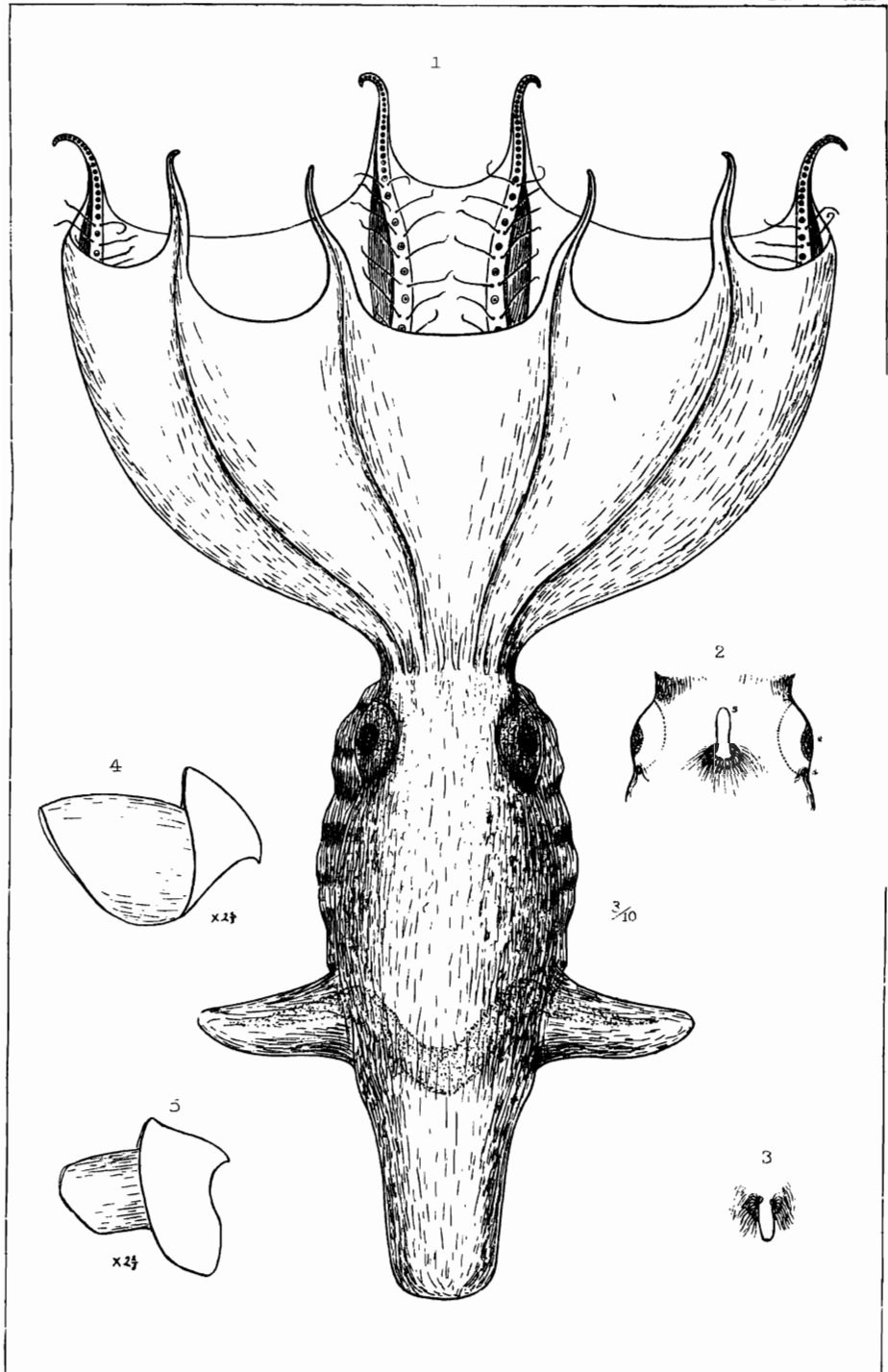
ARCHITEUTHIS HARVEYI VERRILL



HISTIOEUTHIS COLLINSII VERRILL







1. E. Verrill from nature

Photo Lith. Punderson & Co. and New Haven, Ct.

*SYNTHROCHUS SYRTENSIS* VERRILL