and the horny ring has a corresponding notch; the outer or back portion is much swollen and produced downward and backward, and here the horny ring is correspondingly broad. The aperture is nearly circular, but is rather shorter from front to back than transversely. In this and some of the other suckers of similar size, the entire circumference of the margin is furnished with rather large sharp denticles which are strongly inclined inward and considerably larger on the outer than on the inner margin. There are about thirteen of the large teeth, occupying rather more than half the circumference; these are broad at base, bevelled off to an acute edge on the sides, and somewhat acuminate, with sharp tips. Those on the middle of the outer border point inward to the center of the sucker, but those along the sides point rather obliquely to the front margin. The front margin is occupied by about seventeen smaller, unequal, acute, denticles, those in its center the smallest and most regular; these are acute-triangular and their points are directed more upward than those of the opposite edge. The horny rings are light yellow (when dried they are white and osseus), their denticles yellowish white, and often silvery white and lustrous at tip and along their edges, especially when dried. The suckers smaller than the above have fewer of the larger outer teeth, and usually fewer and less perfectly formed teeth along the front margin. Those that have the aperture 7^{mm} or less in diameter usually have the front margin of the ring only irregularly fissured, with the intervals minutely denticulate or crenulate, while the outer half of the margin may bear nine or ten large and well-developed denticles, with broad stout bases and sharp edges and tip; the edges of these teeth along the middle are usually convex, and then the outline is incurved to the acute point. One of the smaller suckers examined has the aperture about $4{\cdot}5^{mm}$ in diameter, with the same form as the larger ones; this has about six large, sharp, denticles, like those above described, on the outer half of the margin of the rings, while the front margin is nearly entire and smooth. The smallest one (*j*) is similar, with but four distinct, large denticles, with another imperfect, lobe-like one, on one side, and with a smooth front margin.

The three largest suckers, (Plate XVII, fig. 9), supposed to be from near the base of the ventral arms, have about 45 marginal denticles, of nearly uniform size, and less incurved than in those above described. In these the back side of the horny ring is less expanded, and therefore the suckers were less oblique than in the smaller ones. The largest of these (*a*) had the aperture 20^{mm} in diameter.

Measurements of suckers of short arms (millimeters).

	a.	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*h.*	*i.*	*j.*
Transverse diameter, outside,	24	21	20	20	17	16	16	10	9·5	8
Diameter of aperture, inside,	20	10·5	9	9	8·5	8	7	5	4·5	3·5
Breadth of horny ring, back side,	10	----	11	12	11	11	11	---	7	5
" " " front side,	5	----	3·5	3	3	2·5	3	---	2	1·5
Number of large denticles,	23	13	12	12	9	12	10	7	6	4
Number of small denticles,	22	17	10	17	12	15	----	---	----	----

The long tentacular-arms agree very closely with those of *A. Harveyi* (No. 5) in form and in the arrangement of the suckers on the 'club.' When fresh they measured 914·4^{cm} (30 feet) in length with a circumference of about 12·7^{cm} (5 inches), except at the enlarged club, which was 20·32^{cm} (8 inches) in the middle. But when first examined by me they had shrunk to 731·5^{cm} (24 feet) in length, and the circumference of the slender portion was 9 to 10^{cm}; that of the club was 15·24^{cm} (6 inches). At that time the 'club' was 77·47^{cm} (30·5 inches) long; that portion bearing the larger suckers was 48·26^{cm} (19 inches); the wrist or portion bearing the smaller and partly smooth-rimmed suckers and tubercles was 15·24^{cm} (6 inches) long; the terminal portion, bearing small denticulated suckers was 22·86^{cm} (9 inches); the breadth of the front of the club was 7·62^{cm} (3 inches). The terminal portion had a strong carina-like membrane or crest along the back, and was here 5^{cm} (2 inches) wide, from front to back.

The large suckers (Plate XVII, figs. 1, 1*a*) of the tentacular-arms are nearly circular in outline, and are broad, depressed, little oblique, constricted just below the upper margin, and then swelled out below the constriction to the base. The calcareous ring is strong, white, and so ossified as to be somewhat rigid and bone-like. The margin is surrounded by numerous (about 45 to 50) nearly equal, acute-triangular teeth, sometimes separated by spaces equal to their breadth, at other times nearly in contact at their bases; their edges are so bevelled as to be sharp; while there is a triangular thickening in the middle of each, at base. A wide, deep and concave groove extends entirely around the rim a short distance below the margin; below this the lower part of the rim is somewhat expanded and irregularly plicated, varying in width. The largest ring studied by me measures 31^{mm} in its greatest diameter externally; the aperture is 26^{mm} and 23^{mm} across its longer and shorter diameters;* greatest

* This specimen is somewhat warped, by drying, so that the aperture is not so circular as when fresh.

height or breadth of rim, 11^{mm}; least height, 8^{mm}; breadth of groove, 1·5 to 2^{mm}.

The marginal suckers (Plate XVII, fig. 10), alternating with the large ones on the 'club,' are very oblique, with the rings strong and very one-sided, the height of the back being more than twice that of the front margin. The aperture is not circular, the outer portion of the margin being incurved or straight. The groove below the margin is narrow and deep, especially on the sides, but only extends around the front and sides, being entirely absent on the outer third of the circumference. The denticles are about 22 to 24, slender, acute, not crowded, the most of them being separated by spaces greater than their breadth at base. The outer ones are strongly incurved; those along the sides are curved forward obliquely toward the front margin, while those on the front margin point upward and sometimes rather outward. The denticles are of nearly equal length, but those of the front margin are both more slender and more acute; they all have sharp bevelled edges and a thickened median ridge or tubercle. The largest ring examined was 14^{mm} in diameter, height or breadth of back side of rim, 8^{mm}; of front side, $3·5^{mm}$.

The small suckers, covering the last division of the club, are very similar to the marginal ones last described, except that they are much smaller and more delicate, with a narrower and less oblique rim. The denticles of the inner margin are very acute and point obliquely outward and upward. Greatest diameter of the one described, 6^{mm}; height of back side of rim, 4^{mm}; of front side, $1·5^{mm}$.

The small terminal group of smooth-rimmed suckers, seen in No. 5, were not noticed, but they were not looked for specially.

To this species I have also referred the specimen (No. 13) from Grand Bank, Fortune Bay, (see page 188, where the general measurements are given). Fortunately, Mr. Simms was able to obtain the jaws in pretty good condition, and also one of the largest suckers of the tentacular-arms. These specimens were forwarded to me by the Rev. M. Harvey. They had been dried, and the jaws, which were still attached together by the ligaments, had cracked somewhat, but all parts were present, except the posterior end of the palatine lamina, which had been cut or broken off. Although these jaws had undoubtedly shrunken considerably, even when first received, they were afterwards put into alcohol and have since continued to shrink, far more than would have been anticipated, so that, at present, the decrease in some of the dimensions amounts to 20 per cent., while even

the harder portions have decreased from 5 to 10 per cent. from the measurements taken when first received by me.* When first received in 1875, the upper mandible measured 111^{mm} in total breadth (front to back); 88^{mm} from tip of beak to anterior end of palatine lamina; 20^{mm} from tip of beak to the bottom of the notch. The lower mandible measured 96^{mm} in total length; 80^{mm} from tip of beak to inner end of alæ; 19^{mm} from tip to bottom of notch.

At the present time (Jan., 1880), the breadth of the upper mandible is about 90^{mm}; from tip of beak to anterior end of palatine lamina (at junction with anterior edge of alæ) 89^{mm}; tip of beak to bottom of notch, 19^{mm}; breadth of palatine lamina, 58^{mm}; beak to posterior end of frontal lamina, 90^{mm}; beak to posterior lateral edge of alæ, 43^{mm}; notch to end of anterior edge of alæ, 33^{mm}; notch to end of hardened or black portion of same (proper cutting edge), 17^{mm}; transverse breadth at notches, 16^{mm}. The lower mandible measures, in length, 82^{mm}; beak to inner end of alæ, 67; to bottom of notch, 18; breadth, alæ to mentum, 78; end of alæ to outer side of gular lamina, 84; inner side of gular to mentum, 50; breadth of gular, 44; breadth of alæ, anterior to posterior edge, laterally, 29; tip of beak to posterior ventral end of mentum, 33; tip to posterior lateral border of alæ, in line with cutting edge of rostrum, 45^{mm}; posterior lateral border of alæ to end of gular, 40; depth of notch, 3; breadth of tooth, 8; notch to end of cutting or hardened edge of alæ, 20; to inner end of alæ, 55; breadth transversely, across teeth, 16^{mm}, (see also table of measurements of jaws).

The beak of the upper mandible is sharp, strongly and regularly curved, most so near the tip; a radial ridge runs from the notch to the lateral border of the alæ; the anterior or cutting edges of the alæ are somewhat convex and irregularly crenulate. The lower mandible has a sharp beak, with a slight notch close to the tip; the cutting edges of the rostrum are otherwise nearly straight; the notches at the base are deep and narrow V-shaped. The teeth are rather prominent, obtuse, slightly bilobed at the summit; the one on the right side of the mandible is more prominent than the other, owing to the fact that the edge of the ala, beyond it, is more concave in outline. There is also a broad and slightly prominent lobe in the middle of the

* There is no reason to suppose that the shrinkage has been any more in this case than in the others, but I have not had an opportunity for making comparative measurements from the same specimens when recently preserved, and again after long preservation in alcohol, except in one other instance (No. 5), in which a similar shrinkage was evident.

anterior edge of the alæ. The sides of the rostrum are strongly excavated toward the base and around the notches, and radially striated. The jaws are dark brown, becoming blackish toward the tips.

Comparative measurements of jaws (in inches).*

	A. Harveyi.			A. princeps.				
	No. 4.	No. 5. Rec.	No. 5. Later.	No. 1.	No. 10.	No. 13 Fr'sh	No. 13. Pres'd.	No. 14.
Upper mandible:								
Length, beak to end of palatine,	3·55	--	3·85	--	5·	--	3·75 +	5·25
Greatest breadth, palat. to frontal,	2·49 +	2·84	2·60	--	3·50 +	4·50	3·54 +	3·88
Greatest transverse diameter,	--	--	1	--	1·45	--	1·15	--
Inner end of alæ to dorsal end of frontal,	--	--	2·50	--	3 +	--	2·95 +	3·75
Tip of beak to same,	2·37 +	--	2·55	--	3·40 +	--	3·17	3·62
Tip to anterior end of palatine lamina,	--	2·06	--	--	--	3·57	--	--
Tip to bottom of notch,	·63	·69	·61	--	·75	·81	·75	·75
Notch to end of anterior edge of alæ,	--	--	1·10	--	1·15	--	1·30	1·50
Transverse breadth at notch,	·60	--	--	--	--	--	·63	--
Transverse breadth between edges of alæ,	--	--	--	--	--	--	1	·69
Breadth of palatine lamina,	--	--	1·70	--	2·32	--	2·30	--
End of palatine to edge of frontal lamina,	--	--	2·20	--	3·15	--	--	3·50
Beak to posterior edge of alæ, laterally,	--	--	1·40	--	1·95 +	--	1·70	--
Lower mandible:								
Total length, beak to end of gular,	--	3·44	3	--	3·63	3·89	3·24	3·75
Mentum to inner end of alæ,	2·60 +	--	2·55	--	--	--	3·08	--
Total breadth, gular lamina to end of alæ,	--	--	2·65	--	--	--	3·32	3·88
Breadth of gular lamina,	--	--	1·50	--	1·75	--	1·74	--
Anterior edge of alæ to end of gular lamina,	--	--	2·45	--	3·15	--	2·68	3·25
Tip of beak to end of mentum, medially,	--	--	·85	1·30 +	1·68	--	1·31	--
Tip to end of gular lamina, medially,	--	--	1·85	--	2·37	--	2·40	--
Breadth of alæ (laterally),	1·18	--	·93 +	--	1·50	--	1·15	1·62
End of gular lamina to alæ, laterally,	--	--	1·50	--	1·60	--	1·58	1·75
Tip of beak to bottom of notch,	·62	·69	·60	·67	·80	·77	·71	·87
Tip to post. edge of alæ, laterally,	1·67	--	1·50 +	--	2·20	--	1·78	--
Tip to inner end of alæ,	2·33	2·63	2·10 +	--	--	3·45	2·67	--
Tip to inner angle of gular lamina,	1·20	--	1·18	--	1·85	--	1·28	--
Notch to inner angle of alæ,	1·92	--	1·77	--	--	--	2·17	2·75
Depth of notch,	·12	--	·12	·15	·15	--	·12	·13
Breadth of tooth in front of notch,	·30	--	--	·35	·32	--	·32	·38
Spread of jaws, between teeth,	--	--	--	--	·60	--	·64	--

* Nos. 1 and 10 had been dried for many years; all the others had been preserved in alcohol: Nos. 4 and 13 for several years; No. 5 about one year; No. 14 for only a few days. The amount of shrinkage is considerable in those preserved long in alcohol, or dried.

Comparative measurements of Architeuthis Harveyi and A. princeps (in inches).

	No. 5, A. Harveyi.		No. 2. A. Harveyi.		No. 14. A. princeps.	
	Fresh.	Pres'd.	Fr'h.	Pres'd.	Fr'h.	Pres'd.
Total length, to tips of short arms,	166?	--	--	--	246	212
Total length, to tip of tentacular-arms,	382?	--	--	--	480	372
From base of arms to tip of tail,	92?	--	--	--	114	86
From base of arms to origin of fins,	75?	--	--	--	95	67
Head, from base of arms to mantle (above),	10?	--	--	--	14?	12
Body, edge of mantle to tip of tail (above),	82	--	--	--	100?	74
Tip of tail to insertion of fin,	18?	17	--	--	--	19
Breadth of caudal fin,	22	16	--	--	33	28
From end of body to outer angle of fin,	27?	23	--	--	--	24·5
Front edge of fin, outer angle to side of body,	2--	6·5	--	--	--	10
Circumference of body,	66	--	--	--	84	66
Circumference of head.	--	--	--	--	48	
Length of tentacular-arms,	88	161	348?	--	360	289
Length of sucker-bearing portion,	30	30	30	27	36	30·5
Length of dorsal arms (1st pair),	72?	--	--	--	--	81+
Length of lateral arms (2d pair),	72?	--	--	--	--	100+
Length of lateral arms (3d pair),	72?	--	--	--	--	76+
Length of ventral arms (4th pair),	72	--	--	--	132	126
Circumference of 1st pair of arms, at base,	7	--	--	--	--	9
Circumference of 2d pair of arms, at base,	8	--	--	--	--	9·50
Circumference of 2d pair, 3 ft. from base,	--	--	--	--	--	7·50
Circumference of 3d pair, at base,	10	8	--	--	17	11·25
Circumference of 3d pair, 3 ft. from base,	--	--	--	--	--	9
Circumference of 4th pair, at base,	9	7·5	--	--	--	10
Circumference of 4th pair, 4 ft. from base,	--	--	--	--	--	8·5
Circumference of tentacular-arms,	3·75	2·75	4	3½–4¼	5	4
Circumference of terminal club of same,	--	4·5	6	6	8	6
Diameter of largest sucker of tentacular-arms,	--	1·15	1·28	1·25	1·25	1
Diameter of largest sucker of sessile arms,	1	·84	--	--	1	1
Aperture of latter,	--	·68	--	--	·80	·80
Details of tentacular-arms:						
Length of 'club' or expanded portion,	31	30	30	27	--	30·5
Of part of club bearing 24 largest suckers,	15	14	18	14	--	19
Of 'wrist' or part with group of small suckers,	7	7	--	--	--	6
Of terminal part, with small suckers,	9	9	--	9	--	9
Breadth of 'club' in middle,	--	1·5	2·5	2·5	--	3
Breadth of wrist,	--	1·6	2·6	1·5	--	3
Breadth of slender middle portion,	--	1·15	--	--	--	1·5
Breadth of tip (from front to back),	--	1·75	--	1·5	--	2
Circumference of club,	--	4·5	--	5·5	--	6
Circumference of wrist,	--	5	--	6	--	6
Circumference of middle portions of arm,	2¾–3½	2¼–3¼	--	3½–4¼	--	3½–4
Distance between pedicels of large suckers,	--	1·15	1·68	1·44	--	
Distance between pedicels diagonally,	--	1	1·32	1·31	--	
Details of suckers of 'club:'						
Largest suckers, diameter in middle,	1·25	1·15	1·28	1·24	1·25	
Largest suckers, diameter of horny ring,	--	·92	--	--	1·15	1·15
Diameter of facets around suckers,	--	1	--	1·40	--	1·25
Largest suckers, height from attachment,	--	1	--	--	--	·75
Largest suckers, length of pedicels,	--	·40	--	--	--	·50
Largest suckers, height of ring,	--	·32	--	--	--	·42
Secondary suckers, next to wrist, diameter,	--	·24	--	--	--	·44
Marginal suckers, diameter of rings,	--	.40	--	·48	--	·60
Marginal suckers, height of rings, outer side,	--	·28	--	--	--	·35
Sessile suckers of wrist, diameter,	--	·12	--	·28	--	--
Suckers of terminal section, diameter,	--	$\frac{1}{4}$–$\frac{1}{16}$	--	--	--	--

The dried sucker from the tentacular-arm appears to have been one of the largest, (Plate XVII, fig. 11). At the present time the transverse diameter of the ring, outside, is 28^{mm}; diameters of the edge, 24 and 22^{mm}; greatest breadth of the ring, including denticles, $9{\cdot}5^{mm}$; least breadth, on inner side, $6{\cdot}5^{mm}$. There are 48 marginal denticles, which are nearly the same in size and form, all around. They are narrow, triangular, acute, with the edges bevelled sharp, and with a central, thickened, triangular ridge on the outside. The ring is white, hard, smooth, and osseous in appearance.

Of the other specimens enumerated in the first part of this paper, it is probable, judging from the proportions given, that Nos. 16, 18, and 19 also belonged to *A. princeps.* Nos. 18 and 19 appear to have been much larger than any of the examples of which portions have been preserved, and it was very unfortunate that the persons who secured them did not know their value, for they were both found within a few miles of the settlement at Little Bay Copper Mine, on the south arm of Notre Dame Bay, and could easily have been taken to St. John's.

Additional note on the suckers of Architeuthis Harveyi.

After printing the description of *A. Harveyi* some additional loose sucker-rims, from specimen No. 5, were found. Among these are some of the second or oblique kind, described as existing on the sessile arms of *A. princeps.* Therefore the remarks (on p. 201), in respect to the supposed absence of suckers on the former, will no longer hold good. These suckers of the second kind differ, however, from the corresponding ones of *A. princeps* in having, on the outer margin, more numerous, more slender and sharper teeth, which taper regularly from base to tip and are not so flattened. The larger of these sucker-rims (*i*) are $14{\cdot}5^{mm}$ in diameter, across the base; aperture, 9^{mm}; height at back, 7^{mm}; in front, 2^{mm}; number of large denticles on outer margin, 10 to 14; the inner margin, except in the smaller ones, is either finely toothed or distinctly crenulated, and there are usually one or more irregular, broad, sharp, lobes or imperfect teeth on the lateral margins. The teeth of the outer margin are regular, strongly incurved, tapering from the base to the very sharp tips, and sharply bevelled on the edges. A smaller one (*j*) 11^{mm} across the base, and 4·5 across the aperture, with height of back, 6^{mm}, has five regular sharp teeth on the outer margin; two broad irregular ones on each side, while the front edge is nearly entire.

With these there were also some of the largest and least oblique

of the suckers, some of them (*e*, *g*) slightly exceeding the largest of those described on p. 201, but showing no distinct variation; others (*h*) are completely intermediate between the two principal forms, having very oblique rims, with a small aperture, but distinctly denticulate all around, the denticles on the inner margin being distinctly smaller than on the outer.

The following table of measurements will supplement those on page 201.

Measurements of sucker-rims from short arms (millimeters).

	e.	*f.*	*g.*	*h.*	*i.*	*j.*
Diameter, at base,	21	19	20·5	16	14·5	11
Diameter of aperture,	17	16	16·5	9·5	9	4·5
Height or breadth of ring, at back,	8	7·5	7·5	9·5	7	6
" " " front side,	3	3	3	3	2	1·5
Number of distinct denticles,	50	48	49	34	14	7

Sthenoteuthis, gen. nov.

(Type *Architeuthis megaptera* Verrill.)

This group is instituted to include certain species of squids, remarkable for the large size and high development of their organs of locomotion, especially of the caudal fin and siphon, and for the presence of a broad, thin web along the lower side of the lateral arms, outside the suckers.

The tentacular-arms are, like those of *Architeuthis*, very long, slender, and provided, at the base of the club, with smooth-rimmed suckers alternating with rounded tubercles, for the mutual adhesion of the two arms; the central part of the club is, as in *Architeuthis*, provided with two central rows of large serrated suckers, and a row of smaller marginal ones, on each side, of different form, alternating with them. The lateral arms have a well-developed median crest, (most developed on the third pair) along the outer side; on the lower inner angle there is a thin, membranous web, often more than twice as wide as the arm, along the whole length, much more highly developed than in typical *Ommastrephes*, in which a narrow marginal membrane occurs. On the ventral arms the inner face is broader than on the others, and the two rows of suckers are wider apart. The suckers on all the sessile arms are strongly denticulated on the outer side of the rim, with smaller or obsolete teeth on the inner side.

Caudal fin very large, rhomboidal. Internal bone or pen similar to that of *Ommastrephes*.

Odontophore with seven rows of teeth, median tooth with three

large denticles; inner lateral teeth with two unequal points; two outer laterals simple, slender. Eyes as in *Ommastrephes.*

This group is related on one side to *Architeuthis*, on the other to *Ommastrephes.* The armature of the tentacular-arms will distinguish it from the latter, and the large caudal fin and broad membrane of the sessile arms from the former.* The dentition of the type is peculiar, so far as known. In addition to the typical species, this genus will doubtless include several species with marginal webs, that have hitherto been referred to *Ommastrephes;* but they are mostly too indefinitely described and figured to show the special characters referred to. Thus, *O. pteropus* Steenstrup belongs to this genus, if a specimen from Bermuda, now in my possession, be correctly identified.†

Sthenoteuthis megaptera Verrill.

Architeuthis megaptera Verrill, Amer. Journ. Science, vol. xvi, p. 207, 1878. Tryon, Manual of Conchology, vol. i, p. 187 (description copied from preceding paper).

PLATE XXI, figures 1–9.

Much smaller than the species of *Architeuthis*, the total length of the body and head being but nineteen inches. Body relatively short and thick. Caudal fin more than twice as broad as long, the length about half that of the body. Its form is nearly rhombic, with the lateral angles produced and rounded, and the posterior angle very obtuse, the posterior edge, as preserved, being slightly concave.

The ventral anterior edge of the mantle is concave centrally, with a slight angle to either side, about ·75 inch from the center; from these angles it is again concave to the sides; on the dorsal side the edge advances farther forward than beneath, terminating in a slightly prominent, obtuse angle in the middle of the dorsal edge. The external ear consists of a slightly elevated, transverse lamina, with three thicker and much more elevated laminæ which extend forward, on the head, one in the median line of the eye, with one above and one below it, the lower one longest and least elevated, curving downward beneath the head. The two upper ones are broadly rounded at top. Behind the transverse fold there is a deep, irregularly crescent-shaped fossa. The eye-sockets are large, oblong, and furnished with distinct

* According to the statement of Gervais, *Architeuthis dux* has similar membranes.

† *S. Bartramii* (*Ommastrephes Bartramii* (Leach) D'Orb.) also belongs to this genus, but is a more slender species. It has the characteristic smooth suckers and tubercles on the wrist of the 'club,' and a very broad caudal fin. It lives in the region of the Gulf Stream.

lid-like margins. The eyes are large, prominent, oblong, and naked; the anterior portion is swollen laterally on both sides. The short arms are trapezoidal, the dorsal ones somewhat shorter (about 1·25 inch) and smaller than the others, which are nearly equal in length, the second pair being stouter than the rest, and a little longer. The dorsal arms have a slightly prominent membrane along the outer angles; the subdorsal or upper lateral arms are narrowed to an acute edge or crest on the outer angle, but on the inner angle have a broad, thin, marginal membrane, outside the suckers. The lower lateral arms are similar in size and form, and also have a very broad, lateral, marginal membrane, next to the suckers, on the lower side. The ventral arms are more slender and a trifle longer, and have narrower marginal membranes. The tentacular-arms are slender, elongated, expanded toward the tip, and have suckers arranged much as in the gigantic species, even to the smooth-edged suckers and opposing tubercles, proximal to the large suckers, as I have described them in *A. Harveyi.* The sucker-bearing portion is margined by a membrane on each side.

The small proximal suckers of the tentacular-arms occupy about $44{\cdot}5^{mm}$ (1·75 inches) at the commencement of the terminal club; they are about $1{\cdot}5^{mm}$ in diameter, circular, regularly cup-shaped, with a nearly even, smooth rim; they are raised on slender pedicels. Alternating with these are smooth rounded tubercles, which are also on pedicels and slightly larger than the intervening suckers. There are four suckers and four tubercles in the row along the inner margin; along the outer margin there are fewer, smaller suckers, but without horny rings; if they originally had such rings they were probably smaller than the others. The large suckers (Plate XXI, fig. 9), forming the two central rows on the terminal club, are furnished with a somewhat oblique, dark brown ring, very strongly and sharply toothed around the outer portion of the edge, and usually with one tooth larger and longer than the rest, on the middle of the outer margin; inner margin with much smaller, very acute teeth, of unequal size. The teeth are gold-colored at tip.

Larger suckers of the sessile arms are very oblique, with the rim strong, dark brown, bearing large, strong, sharp, much incurved, unequal teeth on the outer side of the rim; the inner margin is entire. The ventral arms bear about 44 similar suckers, exclusive of the minute ones close to the end; the largest ones are situated beyond the middle of the arm. The lateral arms bear about the same number of large suckers, with numerous minute ones at the tip. The

dorsal arms bear, each, about 30 suckers, exclusive of the small terminal ones.

The 22d sucker of the left ventral arm (Plate XXI, figs. 8, 8*a*), has a strong, somewhat elliptical rim, with 7 strong and very acute incurved teeth on the outer side, and with the opposite margin on the inner side smooth for more than a third of the circumference. The median tooth on the outer margin is decidedly larger and longer than the others, and abruptly bent inward above its base. It is elongated and gradually tapered to the very acute tip, but thick and channelled externally at its base. To the right and left of this are three similar, but smaller, unequal teeth, all strongly curved inward toward the inner margin, (not convergent to the center). Of these the second from the central tooth, on each side, is the largest, and the third is the smallest. Between the latter and the smooth inner edge there is a small rounded lobe, or blunt tooth. Peduncle broad toward the rim, tapering rapidly to the slender base. Outer sides of rim much higher than inner. Greater diameter, 10^{mm}; lesser, 7^{mm}; greater interior diameter, 7^{mm}; total height, 13^{mm}; longest tooth, $2{\cdot}5^{mm}$.

The exposed portion of the upper mandible is black; the point is strongly curved, acute, with a smooth cutting edge, separated from the inner lobe by a deep, acute notch; inner lobe or edge of alæ thin, broadly rounded, with a slightly rounded, uneven edge. Length of mandible, 29^{mm}; distance from bottom of notch to tip, 10^{mm}; internal breadth between lobes, 8^{mm}.

The lining membrane of the palate (Plate XXI, fig. 2), is pale, translucent, covered with rather large, whitish, translucent teeth, variable in form and size, but mostly rather broad at base and tapering to an obtuse tip; some are more slender and acute. No granules were detected on the membrane.

The odontophore (Plate XXI, figs. 3–7), was too much injured to show its general form, but it appeared to resemble that of *A. Harveyi.* The lateral membrane was broad in the middle, translucent, white. No plates outside the lateral teeth could be detected. The teeth all have slender, acute tips. The median teeth have three points of equal length; the inner lateral ones have two points, the outer one considerably shorter and smaller than the other; the two outer lateral teeth are simple, long, acute, the outermost rather narrower at base and somewhat longer.

Total length, 109^{cm} (43 inches); length of body and head, $48{\cdot}2^{cm}$ (19 inches); length of body from dorsal edge of mantle, $35{\cdot}56^{cm}$ (14 inches); from ventral edge, $33{\cdot}16^{cm}$ (13 inches); of head from edge

Measurements of Sthenoteuthis megaptera and S. pteropus (in inches).

	S. megaptera. N. Scotia.	S. pteropus. Bermuda.	S. megaptera? Sable I.Bk.
Length, tip of tail to end of dorsal arms,	25·5	27·5	
" tip of tail to end of 3d pair	--	29·5	
" to end of tentacular-arms,	43	--	
" to base of arms,	19	20·5	
From base of arms to mantle,	5	6·25	
Tip of tail to edge of mantle (above),	14	14·75	
" " " (below),	13	14·5	
Tip of tail to center of eye,	--	18·5	
Length of caudal fin (tip to insertion),	6	6·75	
Breadth of caudal fin,	13·5	11·25	
Breadth between lateral insertions,	2·33	2	
End of body to outer angle of fin,	7	7·25	
Front edge of fin, from outer angle to insertion,	6·5	5·5	
Circumference of body,	12·5	11·5	
Breadth of body,	5	4·75	
Breadth of head,	4	3+	
Diameter of eye-opening (longitudinal),	1·25	1·75	
" " (transverse),	·75	1·25	
Length of tentacular-arms,	24	--	
Length of dorsal arms, (1st pair,)	6·5	7·25	
" subdorsal " (2d pair,)	8	8·75	
" subventral " (3d pair),	8·5	9·25	
" ventral " (4th pair.)	8	9·25	
Breadth of 1st pair of arms, at base,	·75	·75	
" 2d "	1·12	·80	
" 3d "	1·00	·90	
" 4th "	1·00	·90	
" tentacular-arms,	·33–·50	40–75	
" terminal club of same,	·75	--	
Length of siphon, in middle,	--	2·5	
Breadth of siphon, at base,	--	2	
Breadth of aperture of siphon,	--	1	
Details of tentacular-orms:			
Length of 'club,' or expanded part,	6·5	--	
" part bearing large suckers,	3·25	--	
" 'wrist,' bearing smaller suckers,	1·25	--	
" tip, with small suckers,	1·50	--	
Breadth of 'club,' in middle,	·75	--	
" middle of arm,	·50	--	
Details of suckers:			
Diameter of largest suckers of tentacular-arms,	·40	--	
" rims of same,	·32	--	
" largest suckers of dorsal arms,	--	·28	
" rims of same,	--	·20	
" largest suckers of 2d pair,	--	·40	
" rims of same,	--	·28	
" largest suckers of 3d pair,	--	·32	
" rims of same,	--	·24	
" largest suckers on ventral arms,	·40	·30	
" rims of same,	·32	·22	
Jaws:			
Upper mandible—total length,	1·16	1·68	1·25
" " tip of beak to bottom of notch,	·40	·40	·34
" " tip to dorsal edge of frontal lamina,	--	1·32	·98
" " breadth between anterior lobes of alæ,	·32	·32	·25
" " breadth of palatine,	--	·84	·70
Lower mandible—total length,	--	1·16	·91
" " depth, end of alæ to mentum,	--	1·12	·87
" " beak to notch,	--	·44	·31

of mantle to base of arms, 12·7^{cm} (5 inches); length of long tentacular-arms, 55·8 and 60·9^{cm} (22 and 24 inches) respectively; of first (dorsal) pair of arms, 16·5^{cm} (6·5 inches); of second pair, 20·3^{cm} (8 inches); of third pair, 21·6^{cm} (8·5 inches); of fourth pair, 20·3^{cm} (8 inches); length of caudal fin, 15·24^{cm} (6 inches); breadth, 34·3^{cm} (13·5 inches); transverse distance between insertions of caudal fins, 5·9^{cm} (2·33 inches); breadth across body in middle, 12·7^{cm} (5 inches); circumference of body, 31·7^{cm} (12·5 inches); length of eye-opening, 3·2^{cm}; its breadth, 1·9^{cm}; length of sucker-bearing portion of tentacular-arms, 16·5^{cm} (6·5 inches); of portion bearing large suckers, 8·25^{cm} (3·25 inches); breadth, 1·9^{cm} (·75 inch); length of terminal portion, 3·8^{cm} (1·5 inches); diameter of naked or peduncular portion, ·8 to 1·25^{cm}; breadth of dorsal arms at base, 1·9^{cm}; of second pair, 2·57^{cm}; of third pair, 2·54^{cm}; of fourth pair, 2·54^{cm}; diameter of largest tentacular suckers, 9^{mm} to 10^{mm}; of their rims, 7 to 8^{mm}; diameter of largest suckers of ventral arms, 10^{mm} (·40 inch); of their rims, 7 to 8^{mm}.

Color, in alcohol, reddish or purplish brown, speckled with darker brown, on the dorsal surface of body; upper side of head and outer sides of arms thickly covered with specks of purplish brown; inner surfaces paler, much as in the common small squids; sides yellowish brown, under surfaces yellowish brown, tinged with purplish.

This unique specimen was cast ashore, during a severe gale, near Cape Sable, N. S., several years ago, and was secured for the Provincial Museum at Halifax by J. Matthew Jones, Esq. It is preserved entire, in alcohol, and is still in good condition.

I refer doubtfully, to this species, an entire beak, with the odontophore, presented by Capt. Geo. A. Johnson and crew, of the schooner "A. H. Johnson." It was taken at Sable Island Bank, Nova Scotia, in 280–300 fathoms, Sept., 1878. This beak has the exposed parts black; the internal laminæ reddish brown. The upper mandible is sharp and strongly incurved, with a small narrow notch at its base, from which runs a raised lateral line; beyond the notch the anterior edge of the ala is convex and slightly uneven. The lower mandible has a small notch below the incurved tip; below this, the cutting edge is slightly concave to the basal notch, which is narrow on the right side, but broader and V-shaped on the left; beyond the notch the alar tooth is narrow, prominent and truncate on the right, but broader and blunt on the left. Opposite the notch and tooth the side of the beak is strongly excavated. Total length of upper mandible, 31^{mm}; height, palatine to frontal, 24; tip to bottom of notch, 8·5; tip to dorsal edge of frontal laminæ, 24·5; breadth between anterior lobes

of alæ, 6·2; breadth of palatine, 17·5. Total length of lower mandible, 23^{mm}; height, mentum to inner end of alæ, 22; tip to notch, 7·8; tip to end of mentum, 8·2; tip to dorsal end of gular, 16; transverse breadth at alar teeth, 7^{mm}. (See Plate XXVI).

The odontophore is similar to that of *S. megaptera*, but the lateral denticles of the median and inner lateral teeth are relatively shorter, and these, with some other differences, render it doubtful whether this beak can belong to that species. The odontophore is 4^{mm} broad; the teeth are all sharp, rather slender, pointed, and pale amber-color. A slight, smoothish, marginal ridge borders the dentigerous zone on each side, but is scarcely divided into distinct plates. The median teeth have three sharp, rather slender denticles, the median about a third longer than the lateral; the inner lateral teeth have a long point, with the acute outer denticle much shorter; the teeth of both outer rows are long, considerably incurved, acute, the outer ones the more slender.

Sthenoteuthis pteropus Verrill.

Ommastrephes pteropus Steenstrup?

PLATE XXVI.

A large squid, $74·8^{cm}$ (29·5 inches) long from tail to tip of longest sessile arms, similar in size and form to the preceding, and closely allied to it, has been sent to me by Mr. G. Brown Goode, who collected it at Bermuda. It is probably the *Ommastrephes pteropus* of Steenstrup, but I have seen no full description of the latter, and figures only of the mandibles.

Our specimen is entire, except that it has lost the 'clubs' of the tentacular-arms. It is in fair condition, though considerably contracted by long preservation in too strong alcohol. The head, however, has been pulled out from the mantle to an unnatural extent, so as to increase the total length from 3 to 4^{cm}, at least. The ventral arms do not show any of the sexual modifications characteristic of the male squids, and, therefore, it is doubtless a female.

Most of the measurements are given in the table with those of *S. megaptera;* some of the more general are as follows: length from end of body to tip of dorsal arms, $69·8^{cm}$ (27·5 inches); to edge of mantle, dorsally, $37·5^{cm}$ (14·75 inches); to base of dorsal arms, 52^{cm} (20·5 inches); to center of eye, 47^{cm}; to lateral insertion of fin, length, 17^{cm} (6·75 inches); to outer angle of fin, along posterior edge, $18·4^{cm}$ (7·25 inches); breadth of fins transversely, $28·5^{cm}$ (11·25 inches); outer angle to lateral insertion, along front edge, 14^{cm} (5·5 inches); between

lateral insertions, 5^{cm} (2 inches); breadth of body, $11{\cdot}9^{cm}$; circumference of body, $29{\cdot}2^{cm}$ (11·5 inches).

The body is stout, acuminate posteriorly; the anterior border of the mantle, beneath, is even, and not distinctly emarginate in the middle.

The caudal fin is large, broad, transversely rhomboidal, but neither so broad nor so large proportionally as in *S. megaptera.* The siphon is very large and broad, (63^{mm} long by 50 broad), with a large aperture, 25^{mm} wide. The eye-balls are very large, elongated, measuring, although somewhat collapsed, about 42^{mm} long by 31^{mm} broad. The eye-openings, as distended, are large, oblong, elliptical, with a broad sinus, and slightly thickened edges.

The arms are stout and rather long, the third and ventral pairs being nearly equal in length; those of the second pair are about $12{\cdot}5^{mm}$ shorter than those of the third; the dorsal ones about 63^{mm} shorter than those of the second. The dorsal arms are $18{\cdot}4^{cm}$ long, trapezoidal in form, the outer face convex and about $1{\cdot}9^{cm}$ broad; the lateral and inner faces, $1{\cdot}2^{cm}$; along the inner angles there is a narrow membrane, outside the suckers. Those of the second pair are $24{\cdot}7^{cm}$ in length; their transverse breadth is about 2^{cm}; from inner face to outer angle, $1{\cdot}9^{cm}$; along the outer angle, in these, is a thick acute-edged crest, widest in the middle of the arm; along the lower inner angle, outside the suckers, there is a broad and very thin membrane, $2{\cdot}5^{cm}$ or more in width; along the upper inner angle, is a similar membrane, about $\cdot 6^{cm}$ wide.

The arms of the third pair are 26^{cm} long, (31^{cm} from center of eye to tip of arms); they are compressed, $2{\cdot}25^{cm}$ broad at base; on the outer angle, along the middle, there is a very prominent crest, so that, in this part, the distance from inner face to outer angle, is 4^{cm}; along the lower-inner angle there is a very broad, thin, delicate web, where widest at least 5 to 7^{cm} (2 to 2·75 inches) wide, (it is considerably torn and may have been still wider); it is widest beyond the middle of the arm; on the upper-inner angle the corresponding membrane is about $0{\cdot}6^{cm}$ wide. Transverse, thick, fleshy ridges run out from between the suckers a short distance on these membranes, and then fade out. The ventral arms are $2{\cdot}25^{cm}$ broad at base, and trapezoidal; they have a smaller crest along the outer angle, and a narrow membrane along each inner angle.

All the sessile arms bear similar suckers, all of which are provided with 7 to 13 large, very acute, incurved teeth on the outer margin of the very oblique, horny rings, and with much smaller, sometimes rudimentary ones on the inner margin, much as in *S. megaptera.*

The largest of all the suckers are near the middle of the second pair of lateral arms, from the sixth to the sixteenth, and especially from the ninth to the fourteenth; the diameter of the ninth is 10^{mm}, the edge of its rim, 8^{mm}. On the dorsal arms the eighth to the thirteenth are the largest; the diameter of the ninth is 7^{mm}; edge of horny rim, 5^{mm}. On the third pair the eighth to the fourteenth are largest; the diameter of the tenth is 8^{mm}; its rim 6^{mm}. On the ventral arms the fourteenth to the twentieth are largest; the diameter of the fifteenth is $7{\cdot}5^{mm}$; its rim $5{\cdot}5^{mm}$. On the ventral arms the rows of suckers are more separated than on the others, its inner face being wider. On the lateral arms, toward the base, the two rows are nearer together, while the suckers of each row are distant, so that they almost form one irregular row, at first. The suckers are all very oblique, with the horny rims very low or narrow in front, and very high on the outer side; these rings are dark brown, but the teeth have a golden luster.

The thick fleshy margin, outside the denticulated edge of the horny ring, is completely covered all around, by a series of thin, bracket-shaped, horny plates, light brown in color, arranged radially and movable with the membrane to which they are attached for the most of their length; both the outer and the inner ends are free and turned upward, like a small tooth or denticle; those of the inner end are mostly acute, and form a circle of minute movable denticles, nearly in line with the large teeth of the horny ring, five to ten occupying the intervals between the large teeth of the largest suckers; those plates that stand opposite the teeth of the horny ring are shorter than the others, and often broader, and have no denticle on the flat or upcurved inner ends, which fit to the form of the base of the tooth in front of them; the outer ends are abruptly bent upward and often inward, forming a denticle or flattened hook, usually rounded at the end. These marginal plates vary greatly in width and form, even on the same sucker, according to position, and small, imperfectly developed, wedge-shaped ones are interpolated between the larger ones, around the periphery.

One of the largest suckers (the twelfth of the second pair of arms) has 22 teeth on the horny ring; of these five are small, but sharp, on the middle of the inner border; nine, on the outer border, are largest; and four, on each side, are intermediate in size. The median tooth on the outer margin is largest, and the one next to it, on each side, is a little smaller than the second one from it. The thirteenth sucker of the ventral arms has, on its rings, eighteen denticles; of these nine

are very large, with the median more decidedly the largest, and the one on each side of it is shorter as compared with the next; six, on the inner margin, are minute, and these are connected, by one or two somewhat larger ones, at each end of the inner border, with the larger series.

The stumps of the tentacular-arms are flattened, oval, and smooth, measuring about 10 by 18^{mm}, near the base; their length is about 28^{cm} (11 inches), which is doubtless less than half their original length.

The exposed parts of the jaws are black and polished; the laminæ are reddish brown, with broad, thin, yellowish-white margins. The upper mandible has a long sharp rostrum, with regularly curved cutting edges, and a small, well-defined, V-shaped notch, from which a short groove runs backward, beyond which there is a slight ridge; anterior edge of alæ, beyond the notch, forming no distinct lobe or tooth, but slightly convex, and irregularly crenulate; posterior lateral borders of alæ with a broad sinus in the middle; palatine lamina long and thin, with sinuous posterior margins; frontal lamina broad, extending well backward.

The total length of the upper mandible is 42^{mm}; tip to posterior end of frontal, 33^{mm}; to notch, 10^{mm}; greatest breadth (or height), from palatine to end of frontal, 30^{mm}; transverse breadth, across frontal, 15^{mm}; transverse breadth, across anterior edges of alæ, 8^{mm}.

The lower mandible has a strongly incurved beak, with the cutting edges rather suddenly incurved at about the proximal third, and a well-developed, broad, V-shaped notch at base, beyond which there is a slightly prominent, broad tooth; alæ broad, the inner ends broader than the middle, well-rounded; mentum short, with a broad dorsal emargination; gular lamina short, the inner edges incurved.

The total length of the lower mandible is 29^{mm}; tip of beak to end of mentum, 10^{mm}; to ventral end of gular, 21^{mm}; to bottom of notch, 11^{mm}; to inner ends of alæ, 24^{mm}; breadth, from inner ends of alæ to mentum, 28^{mm}; breadth of gular lamina, 17^{mm}; breadth of alæ, $12{\cdot}5^{mm}$; greatest transverse breadth, across alæ, 32^{mm}; transverse breadth, across anterior edges of alæ, at teeth, 11^{mm}.

These jaws agree pretty nearly, in form and size, with those of *O. pteropus*, figured by Steenstrup, but the latter have a deeper notch in the upper mandible, with a more evident lobe beyond it, while the lower mandible has a broader and less triangular notch.

The buccal membrane is large, thin, prolonged into seven acute angles or lobes, of which the upper is in the median plane, opposite

the interval between the dorsal arms; the six others are opposite the three other pairs of sessile arms. The inner surface of this membrane is covered, near the periphery, with small rounded papillæ; externally it is connected to the arm by seven membranous bridles, corresponding to the seven angles; of these the dorsal one forks, one branch going to the inner margin of each dorsal arm; the upper lateral ones join the marginal membrane of the upper angle of the upper lateral arms; the lower lateral ones join the lower marginal membrane of the third pair of arms; the ventral ones join the marginal membrane outside of the sucker-bearing face of the ventral arms. In front of the bases of each of the dorsal and tentacular arms there is a large opening to the space beneath this membrane.

The beak is closely surrounded by a thick, prominent, lobed and wrinkled, fleshy collar, with papillæ on its inner surface; outside of this there is a smooth, sharp-edged, erect collar, less prominent than the inner one.

The odontophore is similar to that of *Ommastrephes;* it is sharply bent upon itself anteriorly, with the ventral end less than half as long as the dorsal; the dentigerous zone is yellowish brown in color and bordered laterally by a thin ridge formed by a row of small plates; the lateral membrane is broad, thin, and pale yellow, running straight across, from the ventral end, at right angles to the dorsal portion, and then folding back upon itself, joins the dorsal part of the odontophore farther back, near its middle; beyond this point it is very narrow and rolled in. Length of the dorsal portion, 19^{mm}; of the ventral, 9; breadth of the dentigerous zone, anteriorly, 5^{mm}; breadth of marginal membrane, anteriorly, 7^{mm}.

The median teeth are broad, with three stout points, the middle one nearly twice as long as the lateral; the inner lateral teeth are much longer, with one long stout point and a short denticle on the outer side, below the middle; the two outer rows have simple, long, and rather stout, curved teeth, those of the outermost row a little longer and narrower than the others. The teeth differ decidedly from those of *S. megaptera* in the shortness of the lateral denticles of the median and inner lateral teeth; moreover all the teeth are stouter and less acute.

The pen resembles that of *Ommastrephes;* it is long, widest anteriorly, bordered by strong ribs, obtusely pointed at the anterior end, gradually narrowing to the very narrow slender portion, about three inches from the posterior end, beyond which there is a thin margin, which expands into a lanceolate form, widest at 1·25 inches from the

end; the terminal portion forms a short, hollow hood, formed by the infolding of the margin, and marked by slender, divergent, raised lines, stronger laterally, and with a dorsal keel. The central rib begins at the anterior end, increases in size to the middle region, then narrows to the slender part, where it forms a slender, prominent rib, only visible dorsally, and then becoming confluent with the lateral ribs, extends as a sharp keel to the end. The lateral ribs commence at about ·75 inch from the anterior end, and each at first consists of three riblets; farther back another appears on the outside margin but is separated only by a slender groove, and toward the slender part of the pen they all coalesce into a single rib on each side, which nearly meet in the middle line ventrally, where they are separated by a slender groove, which disappears farther on. Total length of pen, 349^{mm} (13·75 inches); greatest breadth, 22·5^{mm} (·90 inch); length of posterior cone or hood, ·9^{mm} (·35 inch); breadth of posterior expansion, 15^{mm}.

This specimen was collected at Bermuda, by Mr. G. Brown Goode, and now belongs to the Museum of Wesleyan University, Middletown, Conn. Mr. Goode informs me that it was picked up on the north shore of the island, in December, 1876, and that it was regarded by the inhabitants as a novelty or great rarity, and was noticed as such in the local newspapers.

Histioteuthis D'Orbigny, 1839.

Histioteuthis Férussac & D'Orbigny, Histoire naturelle des Céphalopodes Acétabuliferes, p. 226.

This genus is remarkable for having the six upper, sessile arms united together nearly to their tips by a thin elastic membrane or web. The ventral arms are also united together for a part of their length and their common web is joined to the great web, in the median line, by a bridle-like membrane. The tentacular-arms are very long, and have expanded clubs, with a broad dorsal keel. As in *Architeuthis* and *Sthenoteuthis*, they are furnished with a series of small smooth-rimmed suckers, alternating with tubercles, on the proximal part of the club and adjacent part of the arm, for the purpose of uniting the arms together, at will, but in the following species a row of such suckers and tubercles also extend along one side of the club, opposite part of the large central suckers. The large suckers are serrated, and alternate in two rows; two rows of large marginal suckers exist on one side and two rows of much smaller ones on the other. At the extreme tip of the arm there is a cluster of small smooth-edged suckers, as in *Architeuthis*.

The mouth is surrounded by a broad buccal membrane, with six angles or lobes, but without suckers. The body is relatively short, with short bilobed caudal fins. The eyes are large, and have distinct lids. The dorsal bone or pen is thin, short, lanceolate, and somewhat quill-shaped, with long, lateral expansions.

The species, so far as known, are brilliantly colored, having occellated spots on raised verrucæ, in addition to the ordinary coloration of squids.

The two foreign species, hitherto described, are both from the Mediterranean.

Histioteuthis Collinsii Verrill.

American Journal of Science, vol. xvii, p. 241, March, 1879. Tryon, Manual of Conchology, i, p. 166, 1879 (description copied from the original).

PLATES XXII and XXVI.

A large and handsome species, with the broad, thin, dark brown web, extending between and nearly to the ends of the six upper arms. The outer surface of the head and arms is covered with large, slightly raised warts or tubercles, which are dark blue with a whitish center, specked with brown; three rows extend along the ventral arms and two along the others; a circle of these surrounds the eye-lids, but the edges of the eye-lids are narrowly bordered with dark brown. Color, between the warts, pale purplish brown, with small, raised, dark brown spots, reddish specks, and white granules; web and inner surface of arms uniform dark reddish or purplish brown; suckers yellowish white, their pedicels specked with brown; tentacular-arms light orange-brown. Eyes mutilated; their lids form a large simple, rounded opening.

Tentacular-arms slender, about two feet long and expanding near the end into a broad, long-oval, sucker-bearing portion or 'club,' which is bordered by a membrane, widest on the upper edge; it ends in a tapering tip, on the back of which there is a thin, crest-like membrane or keel, enlarging proximally to its end, where it forms a rounded lobe. The most expanded portion of the 'club' bears six rows of suckers, with finely serrate horny rings; the two central rows contain much the largest suckers, four or five in each; the more central of these two rows contains four suckers, larger than the rest, and of these the two median are largest; outside of these two median rows, are two regular marginal rows of nearly equal, medium-sized, serrate suckers, on the upper edge; and along the lower edge of the club there is one row of few, similar, but smaller ones; outside of these there is an incomplete