AUSTRALASIAN ANTARCTIC EXPEDITION

1911 - 1914.

UNDER THE LEADERSHIP OF SIR DOUGLAS MAWSON, D.Sc., B.E.

SCIENTIFIC REPORTS.

SERIES C.--ZOOLOGY AND BOTANY.

VOL. IV. PART 2.

CEPHALOPODA

BY

S. STILLMAN BERRY, A.M., Ph.D.,

REDLANDS, CALIFORNIA.

WITH FIVE PLATES AND THIRTY FIGURES IN THE TEXT.

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CEPHALOPODA.

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INTRODUCTION.

Through the courtesy of Mr. Charles Hedley, of the Australian Museum, Sydney, and its Director, Mr. R. Etheridge, there was placed in my hands for study the collection of cephalopods obtained in the course of the scientific explorations carried on by the Australasian Expedition to the Antarctic in the ship "Aurora," in the years 1911 to 1914, under the leadership of Sir Douglas Mawson. These form the subject of the present report.

The collection is rather a small one, yet in point of numbers comprises one of the most extensive series of cephalopods which has been obtained in Antarctic waters. For one reason and another none of the previous expeditions to this region of the globe have been very fortunate along this line, so that even in its entirety the known fauna offers few outstanding features other than a striking predominance of octopods. While this seems partly to have been due to the relative ease with which these forms may be trapped, the more agile decapods escaping the methods available to even the better-equipped exploring expeditions, a further reason probably lies in the fact that, as pointed out later on, the Antarctic is the metropolis of the genus *Moschites*.

Consequently the rather formidable bibliography of Antarctic cephalopods resolves itself into a somewhat monotonous catalogue of fragments, stomach contents, penguin ejecta, and scattered specimens, with little to suggest any broad facts of distribution or other generalizations, or to furnish much of a basis for further investigation. It should not be anticipated that the material now brought together for consideration serves in any way to revolutionize this state of affairs, for, like the previous collections it represents but a nibble here and a nibble there, though it is happily from regions (off the coasts of Adelie Land and Queen Mary Land) from which, heretofore, nothing has been known, and the very fair number of well-preserved specimens gives at least a hint of what to expect when a special effort is made to secure these animals, using both apparatus and methods adapted to the end in view. However, we may still affirm that the fauna shows no evident relation to that of the Arctic save a superficial resemblance or *facies*, due, no doubt, to the similarity in physical environment. In

passing, it may be noted as an interesting fact that, so far as I can discover, not a species of cephalopod is known to be truly bipolar in distribution. In the same connection comparison should be made with the conclusions of Thompson ('98).

For maps, collecting data, and other relevant details useful in connection with the facts of the present paper, the student is referred to the two fascinating volumes of "The Home of the Blizzard" (Mawson, :15), wherein Dr. Mawson and his collaborators treat of the difficulties of Antarctic exploration and the various phases of their remarkably many-sided expedition in a most illuminating way.

HISTORICAL SURVEY.

Though so little is known of the Antarctic fauna, the records of cephalopods are sufficiently numerous and scattered that a brief summary may be useful. Adopting the 60th parallel as an arbitrary boundary, except where there seems good reason to include slightly extra-limital records, the following list is thought to be practically complete. Full citations of the reports quoted will be found in the bibliography.

1874. "Challenger." (Hoyle '85, '85A, '86.)

Eledone rotunda Hoyle n. sp., 1,950 fathoms, Lat. South 53° 55′, Long. East 108° 35′.

1898–99. "Belgica." (Joubin :03.)

Fragments only.

1904. "Français" (Charcot Expedition). (Joubin :05, :06.)

Eledone charcoti Joubin n. sp., beach, Booth Wandel Island.

Eledone turqueti Joubin n. sp., 25m., off Booth Wandel Island.

1901–02. "Discovery." (Hoyle :07.)

Larval Histioteuthid, Lat. South 54° 01¼′, Long. East 170° 49′.

Fragments.

1898. "Valdivia." (Chun :10.)

Taonius pavo (Lesueur), from stomach of albatross, Lat. South 58° 52′, Long. East 43°.

Crystalloteuthis glacialis Chun n. sp., 1,500m., Lat. South 59° 16′, Long. East 40° 13′.

Teuthowenia antarctica Chun n. sp., 2,000m., Lat. South 55° 57′, Long. East 16° 14′.

1903–04. "Scotia." (Hoyle :12.)

Stauroteuthis species, 2,425 fathoms, Lat. South 66° 40′, Long. West 40° 35′, Weddell Sea.

Moschites charcoti (Joubin), 10 fathoms, Scotia Bay, South Orkneys.

Onychoteuthis ingens Smith, Scotia Bay, South Orkneys; also from stomach of Ross's seal, off the South Orkneys.

Bathyteuthis abyssicola Hoyle, Lat. South 71° 22′, Long. West 18° 15′, off Coats Land.

Galiteuthis suhmi Hoyle, Lat. South 68° 32′, Long. West 12° 49′, Weddell Sea.

RESUMÉ OF THE PRESENT COLLECTION.

As it came into my hands, the Australasian collection contained, besides the usual large array of indeterminable fragments taken from the stomachs of various vertebrates, some 14 preserved animals, most of them in a very good state of preservation. Two, though clearly neither conspecific nor congeneric with any of the remainder, are not specifically determinable. A third, a small shallow-water *Polypus* from the Tasmanian coast, is named only with considerable doubt, and should be included only by sufferance in an Antarctic report. The remaining 11 specimens are all octopods and referable to five species, four of them members of the genus *Moschites*. After as careful study as the literature alone will permit in the total absence of comparative material, all of these species are thought to be new, and are herein described under the following names:—

Stauroteuthis mawsoni n. sp.

Moschites albida n. sp.

" *adelieana* n. sp.

" *auroræ* n. sp.

" *harrissoni* n. sp.

A more or less critical comparison with previously described forms will be given in the consideration of each species as dealt with.

Most of the drawings used to illustrate this paper are from the careful pen of Mr. E. Russell Lord-Wood, of Redlands, California. For the four drawings of funnel organs, however (figs. 6, 10, 14, and 21), acknowledgment is due to my friend, Mr. Robert N. Wenzel, of Stanford University.

Class CEPHALOPODA.

Order DIBRANCHIATA.

Suborder OCTOPODA.

Family Cirroteuthidæ.

Genus Stauroteuthis *Verrill*, 1879.

1.—Stauroteuthis (?) mawsoni *n. sp.*

(Pl. X., fig. 1.)

Description :

Body relatively firm, smooth, almost sepioliform; strongly compressed dorso-ventrally, well rounded below, but only very slightly arched above the fins. Fins very large, almost as long as the mantle at their base, where they are firmly attached, thence

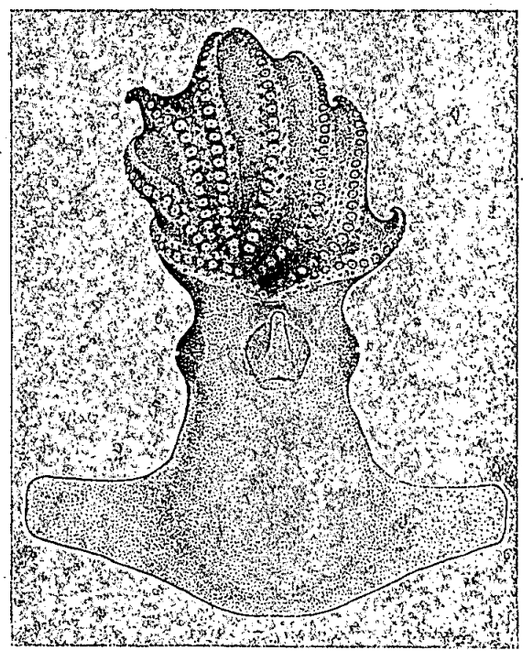

Fig. 1.—*Stauroteuthis mawsoni.*

Type × 3.

tapering slightly to their somewhat truncate and squared extremities. Each separate fin almost as wide as the body; anterior margins nearly straight and extending practically at right angles to the longitudinal axis of the body; posterior margins tending obliquely backward until they become continuous with one another around the posterior region of the mantle by means of a conspicuous broad flat fold of the integument, traces

of a much narrower but similar fold extending from the anterior margins toward the eyes. Pallial aperture very narrow, nearly circular, and closely encompassing the small short funnel.

Head about as wide as the body and not well delimited from it.

Arms about equal in length to the head and body taken together; unequal, the formula quite distinctly 1, 2, 3, 4. Each bears along its oral face a single series of small, closely placed, discoid suckers, flanked on either side by a series of short, blunt, cylindrical, papilliform cirri, which commence at the second or third sucker from the base, continuing

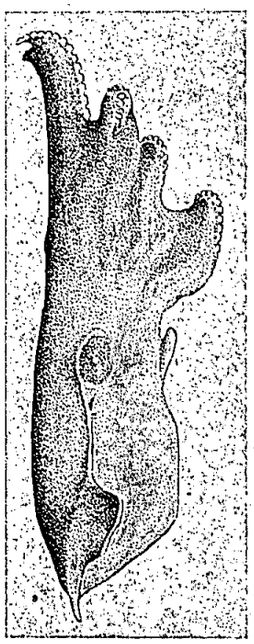

Fig. 2.—*Stauroteuthis mawsoni.*
Lateral view. × 3.

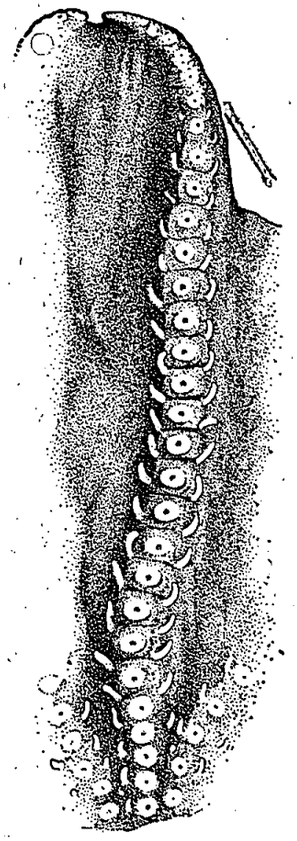

Fig. 3.—*Stauroteuthis mawsoni.*
Oral aspect of left dorsal arm. × 7.

in alternation with the suckers nearly to the tips of the arms. Umbrella thin and delicate, but ample, especially between the dorsal arms, which it connects nearly to their extremities; slightly less extensive between the dorsal and second arms and laterally, becoming emarginate between the arms of the ventral pair nearly half way to the base. The umbrella is attached to the arms in the ordinary way and there is no intermediate web. Suckers little elevated, apertures minute, the rims wide and flattened, with rather indistinct traces of radial fluting. (Text fig. 4.)

Color in alcohol a pale brownish cream; the eyes and oral aspect of the umbrella slate colored; while the few remaining fragments of the original integument are of a dark reddish hue.

Measurements:	mm.
Total length	32
Edge of posterior fold to base of dorsal arms	15
Width of body	9
Width across fins	28
Width of single fin	8
Median length of fin	6·5
Maximum width of posterior fold	3
Width across neck	8
Width across eyes	9
Length of funnel	3·5
Length of dorsal arms	17

Type.—Cat. No. C. 40886 of the Australian Museum [S.S.B. 447].

Type Locality.—Station II., Lat. South 66° 55′, Long. East 145° 21′, 288-300 fathoms, ooze bottom, off the Mertz Glacier Tongue, Adelie Land; bottom temp. −1·8° C.; December 28th, 1913; one specimen, in company with *Moschites adelieana.*

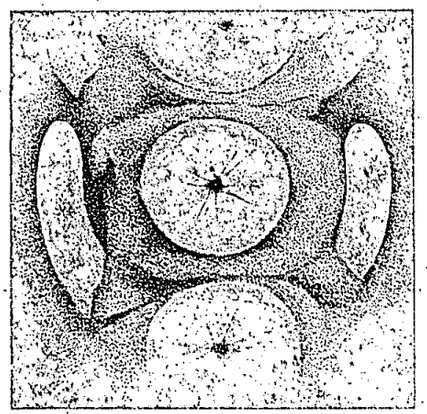

Fig. 4.—*Stauroteuthis mawsoni.*
Sucker 11 of right dorsal arm. × 36.

Remarks.—As the single specimen seems doubtless a very young one, there has been some natural hesitation about naming and describing it, but the possession of the curious posterior fold, a very singular feature in this group of cephalopods, and the excellent preservation of the creatures seem decisive for the wisdom of this course. The longer body, much larger fins, and more anterior position of the eye amply distinguish this specimen from the Kermadec Island juvenal identified with his *S. meangensis* by Hoyle ('86, p. 65, pl. 9, figs. 12, 13), and I have encountered nothing else in the literature suggesting the necessity of special comparison.

Careful removal and dissection of the entire buccal mass of this animal have failed to reveal the presence either of an odontophore or of any structure thought to be homologous with the same, though the minute size and very brittle consistency of the parts in question unfortunately preclude absolute certainty in the matter. A certain special significance is thus afforded the specimen in the consideration of the writer, as it is the first Cirroteuthid he has encountered in which he has been unable to detect a radula, an organ the absence of which was formerly supposed to be a family peculiarity.

Not wishing further to mutilate a type specimen, I have forborne any dissection of the dorsal cartilage. Hence the reference of the species to the genus *Stauroteuthis* must remain for the present somewhat provisional.

In the specific name adopted it becomes a pleasurable courtesy to dedicate this curious and interesting creature to the leader of the Expedition, Sir Douglas Mawson.

Family POLYPODIDÆ.

Genus POLYPUS *Schneider*, 1784.

2.—? POLYPUS DUPLEX (*Hoyle*, 1885).

? 1885. *Octopus duplex* Hoyle, Ann. & Mag. Nat. Hist., (5), v. 15, p. 226.

? 1886. " Hoyle, Rep. Ceph. " Challenger," p. 90, pl. 7, fig. 5.

Material.—A single immature female, taken by the " Aurora " in 65 fathoms, off Maria Island, Tasmania, December 12th, 1912 [S.S.B. 448].

Fig. 5.—*Polypus* (*duplex* ?).

Radula.

Remarks.—This specimen is rather small for positive determination, but is in fair accord with the description of Hoyle's *O. duplex*, from Twofold Bay, Australia. The following are the more important of the observed discrepancies :—

(1) The specimen shows only one instead of three tubercles over each eye.

(2) Though for the most part smooth, there are places where the dorsum shows faint traces of papillation.

(3) I find no evidence of the existence of " an interrupted ridge . . . . . along the ventro-lateral margin of the body."

(4) The color is a dark slate grey above, giving way laterally and ventrally to a light brownish cream.

As a possible future aid in confirming or rejecting the identification, a portion of the radula is illustrated in text fig. 5.

Measurements :	mm.
Total length	100
Tip of body to dorsal base of umbrella	32
Length of body (dorsal)	24
Width of body	19
Width of neck	10
Width across eyes	14
Length of funnel	9
Mouth to tip of right dorsal arm	64
Mouth to tip of left dorsal arm	64
Mouth to tip of right second arm	71
Mouth to tip of left second arm	72
Mouth to tip of right third arm	68
Mouth to tip of left third arm	66
Mouth to tip of right ventral arm	71
Mouth to tip of left ventral arm	68
Length of umbrella between dorsal arms	16
Length of umbrella between ventral arms	17

Genus MOSCHITES *Schneider*, 1784.

A list of the described species of this genus, with an indication of their known distribution, is as follows :—

1. *M. cirrhosa* (Lamarck, 1799) . . . . . Norway to Mediterranean.
2. *M. moschata* (Lamarck, 1799) . . . . . Mediterranean.

— M. aldrovandi (Rafinesque, 1814) = *M. cirrhosa.*

— M. ventricosa (Grant, 1827) ..... = *M. cirrhosa.*

— M. pennantii (MacGillivray, 1843) = *M. cirrhosa.*

— M. genei (Vérany, 1851)..... = *M. cirrhosa.*

3. *M. verrucosa* (Verrill, 1881) ..... 466–1,255 fath., off East Coast of United States.*

— *M. halliana* (de Rochebrune, 1884) = *M. cirrhosa* ? **

4. *M. rotunda* (Hoyle, 1885) ..... 1,950 fathoms, Southern Ocean, Lat. South 53° 55′, Long. East 108° 35′ (also off Valparaiso ?).

5. *M. brevis* (Hoyle, 1885) ..... 600 fathoms, off Monte Video.

6. *M. charcoti* (Joubin, 1905)..... Antarctic (beach, Booth Wandel Island; 10 fathoms, Scotia Bay, South Orkneys).

7. *M. turqueti* (Joubin, 1905)..... Antarctic (25 fathoms, off Booth Wandel Island).

8. *M. nigra* (Hoyle, 1910) ..... Angra Pequeña, South-west Africa.

9. *M. challengeri* (Berry, 1916) ..... 630 fathoms, off the Kermadec Islands.

To the above are now added the following Antarctic forms :—

10. *M. albida* n. sp. ..... 1,700 fathoms, off Wilkes Land.

11. *M. adelieana* n. sp. ..... 300 fathoms, off Adelie Land.

12. *M. auroræ* n. sp. ..... 120–325 fathoms, off Queen Mary Land.

13. *M. harrissoni* n. sp. ..... 270–358 fathoms, off Queen Mary Land.

The genus is in certain respects a difficult one, and not even its European representatives have been thoroughly worked out until very recently. Its metropolis, however, appears to be not the Mediterranean, as formerly believed, but the Antarctic, where the group would seem nearly or wholly to replace the otherwise cosmopolitan genus *Polypus*. An explanation of the apparently complete absence of the latter genus from the waters surrounding the Antarctic Continent, when it is so abundantly represented in the entire South Pacific, Australian, South African, and South American regions, is difficult to seek.

* The Pacific records of this species appear to me exceedingly dubious.

** I follow Naef's treatment of the European forms, but cannot find that he mentions *M. halliana.*

A key to the seven species of *Moschites* having an austral distribution is here appended. Though probably too artificial to be of permanent value, it may prove temporarily useful.

KEY TO THE ANTARCTIC SPECIES OF MOSCHITES.

1. Body smooth or only faintly papillose; no permanent warts or tubercles.

2. Body smooth; without a peripheral fold.

3. Umbrella very short; eyes enormous, practically adnate; funnel organ W-shaped ..... *adelieana.*

3¹. Umbrella well developed; eyes moderately large and prominent, but not adnate.

4. Arms relatively short, but about twice as long as body; coloration dark ..... *rotunda.*

4¹. Arms relatively long, four times the length of the body; funnel organ broad, V-shaped; abyssal species of pale coloration ..... *albida.*

2¹. Body faintly papillose, or with low scattered papillæ.

5. A subperipheral fold present; surface with low, scattered papillæ; arms short, about two and a half times the length of the body; umbrella short; funnel organ duplex, with separate U-shaped components ..... *harrissoni.*

5¹. No subperipheral fold; surface faintly papillose or nearly smooth; arms very short, less than twice the length of the body; suckers of ventral arms biserial ..... *turqueti.*

1¹. Body heavily papillose and with distinct supraocular tubercles; arms short, about twice as long as body.

6. Two tubercles above each eye and a few others scattered over body; papillæ of general surface small; a distinct subperipheral fold present; eyes large; umbrella well developed; funnel organ duplex, the components V-shaped ..... *auroræ.*

6¹. One low tubercle over each eye; papillæ of general surface large and coarse; no peripheral fold present (?); eyes moderate.... *charcoti.*

3.—Moschites albida *new species.*

(Pl. X., figs. 2 and 3 ; Pl. XI., fig. 4.)

Description :

Body firm, slightly compressed and with a faint longitudinal groove below, but nearly round from the dorsal aspect, being a little broader than long. Mantle opening extending somewhat over a third of the distance around the head, terminating at a point below, but distinctly in front of the eye aperture.

Head extremely short and broad, but narrower than the body, from which it is very poorly if at all delimited. Eyes moderately large, but not greatly swollen.

Funnel short and stubby, but not very broad at the base, whence it extends a little over a third of the distance to the umbrella margin. Funnel organ large, with a very rugose or plicate surface in preserved material, having a general outline like that of a very broad-limbed V, and covering almost the entire wall of the funnel cavity (text fig. 6).

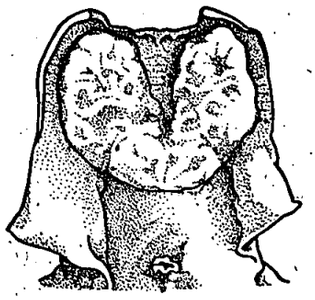

Fig. 6.—*Moschites albida.*

Funnel of type. × 2.

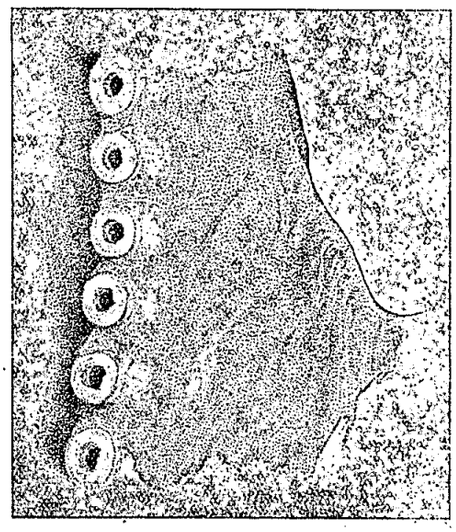

Fig. 7.—*Moschites albida.*

Suckers 9-14 of right dorsal arm. × 3.

Arms roughly subequal, their length not quite four times that of the body or three times that of the head and body taken together ; very stout, little attenuate. Suckers uniserial (text fig. 7), the small deep cups having the appearance of closer ranking toward the tips of the arms than near the mouth. The number of suckers to be counted by the unaided eye is about 57 on the right third arm. Umbrella rather thin, but well developed, especially at the sides where it extends for more than a third the length of the arms ; its least development occurs between the arms of the ventral pair.

Hectocotylus unknown.

Surface everywhere smooth, the few wrinkles present being obviously due to contraction consequent to preservation. Integument colorless, thin, delicate, very loosely adherent, and hence easily delaminated from the subjacent tissues, especially between the arms.

Color of the alcoholic specimen, everywhere a livid greyish-white, the eyeballs showing slaty purple through the supervening tissues.

Mandibles stout and black, their general outline as in the figure (text fig. 8).

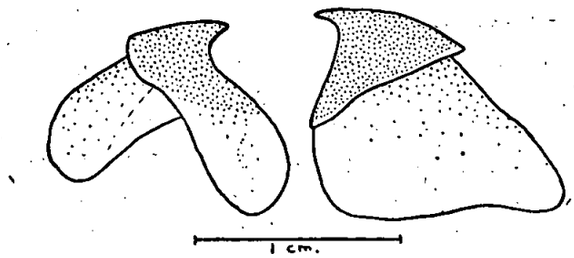

Fig. 8.—*M. albida.*

Mandibles.

Radula relatively delicate and transparent, taking stain (an aqueous solution of potassium bichromate) with difficulty. Rhachidian teeth more or less hat-shaped, broadly flaring at the base, and with sharp, simple, regularly tapering points. First laterals weak, blunt, squarish, their outer angles more conspicuously developed than their inner. Second and third laterals better developed, their large teeth resembling one another in size and in their nearly triangular outline. (Text fig. 9.)

Measurements :	mm.
Total length	170
Length of body (dorsal)	35
Tip of body to base of dorsal arms	45
Width of body	40
Width of neck	29
Width across eyes	31
Length of funnel	12
Mouth to tip of right dorsal arm	105
Mouth to tip of left dorsal arm	129
Mouth to tip of right second arm	127
Mouth to tip of left second arm	124
Mouth to tip of right third arm	127
Mouth to tip of left third arm	111
Mouth to tip of right ventral arm	73+
Mouth to tip of left ventral arm	117
Length of umbrella between dorsal arms	37
Length of umbrella between ventral arms	27

Type.—Cat. No. C. 40888 of the Australian Museum [S.S.B. 436].

Type Locality.—Station V., Lat. South 64° 34′, Long. East 127° 17′, off Wilkes' Land, 1,700 fathoms, bottom of thick ooze and rocks; bottom temp. −0·3° C.; one ♀ specimen.

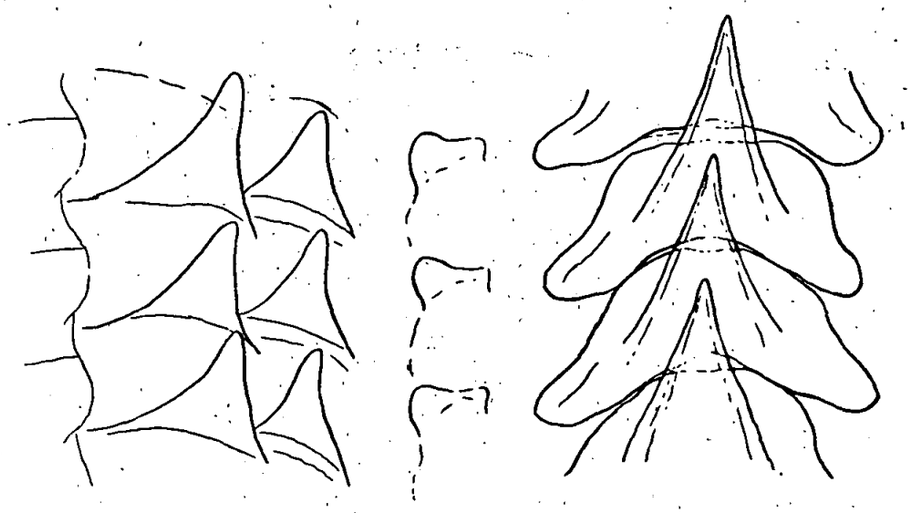

Fig. 9.—*M. albida.*

Radula.

Remarks.—The radula and funnel organ of this species are wholly unlike those of any other *Moschites* known to me. More superficially *M. albida* appears to show relationship to another smooth deep water species, the *M. rotunda* of Hoyle, but differs from the latter only in the relatively longer arms, but more strikingly in its pale coloration. *M. turqueti* Joubin seems to be a quite different form from shallow water, and if the original specimen was an adult is a much smaller species, well distinguished by its short umbrella and crowded suckers. I rather doubt if the affinity here will prove a particularly close one.

The beak of *M. albida*, as of the remaining species to be dealt with, diverges little from the regulation type, but is figured as an admittedly uncertain aid in the determination of the numerous remains collected from the stomachs of various vertebrates in the region. The radula, fortunately, affords us better characters for this purpose.

4.—Moschites adelieana *new species.*

(Pl. XI., fig. 5; Pl. XII., figs. 6, 7, 8.)

Description:

Body rounded, compressed, very short and broad, the width about equaling the length of the body and head together; a longitudinal depression in the median line below. Pallial opening very ample, reaching a point just above the base of the eyes and well behind the plane of the eye opening.

Head quite large in comparison with the body, its size due almost wholly to the immense, swollen eyes, which nearly meet in the median line above.

Funnel cylindrical, reaching a little less than two-thirds of the distance from its base to the umbrella margin. Funnel organ well developed, W-shaped (text fig. 10).

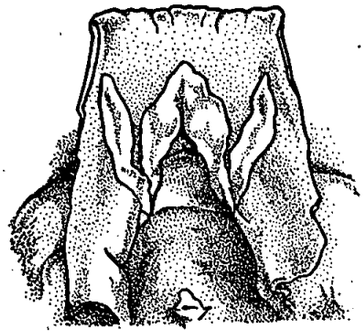

Fig. 10.—*Moschites adelieana.*

Funnel organ of type. × 3.

Arms short, scarcely twice as long as the head and body, or three times the length of the body alone; robust, their extremities little attenuate; not keeled or webbed; much compressed laterally so as to appear more or less rectangular in transection. Suckers (text fig. 11) rather large, particularly from about the 9th to the 15th from the

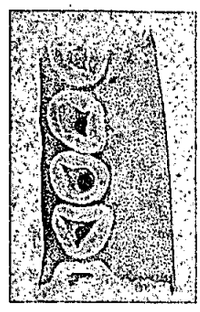

Fig. 11.—*M. adelieana.*

Suckers 7-10 of right dorsal arm. × 3.

base; arranged in a single series throughout, about 43 to be distinguished upon the left third arm. Umbrella very poorly developed, extending between the lateral arms, where its extent is a little the greatest, for scarcely a quarter of their length.

Hectocotylus unknown.

Surface everywhere smooth, permanent papillæ or tubercles of any description being indistinguishable.

Color in alcohol everywhere, excepting the cream-colored suckers, a dull clouded slaty grey, only slightly paler below, though quite pale under and around the funnel, and with a narrow line of paler tone traceable around the body just below the periphery in the position occupied in some species by an integumentary fold, no trace of such a fold being here evident.

Mandibles sharp, but rather thin and fragile; a good figure difficult to secure from the present material (text fig. 12).

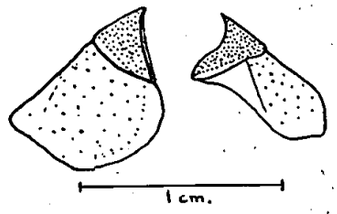

Fig. 12.—*M. adelieana.*

Mandibles.

Radula well developed. Rhachidian teeth with nearly rectangular bases and sharply tapering points, so far as I have been able to discover, without lateral cusps. First laterals small, teeth triangular. Second laterals well developed, teeth triangular, oblique. Third laterals largest, teeth long, curved, and scimitar shaped. (Text fig. 13.)

Measurements:	Type. mm.	Juv. mm.	Juv. mm.
Total length	110	18	16
Tip of body to dorsal base of umbrella	38	7	7
Length of body	25	5·5	5
Width of body	38	6	6
Width of neck	29	5	5
Width across eyes	33	6	6·5
Length of funnel	14	2	2
Mouth to tip of right dorsal arm	mutilated	7·5	9
Mouth to tip of left dorsal arm	69	10	8
Mouth to tip of right second arm	mutilated	10	9
Mouth to tip of left second arm	70	11	9
Mouth to tip of right third arm	mutilated	8	9
Mouth to tip of left third arm	74	8+	9
Mouth to tip of right ventral arm	71+	8	9
Mouth to tip of left ventral arm	76	8	9
Length of umbrella between dorsal arms	14	1	2
Length of umbrella between ventral arms	14	2	1·5

Type.—A female, Cat. No. C. 40889, of the Australian Museum [S.S.B. 438].

Type Locality.—Station II., Lat. South 66° 55′, Long. East 145° 21′, off the Mert Glacier Tongue, Adelie Land; 288-300 fathoms, ooze; bottom temp. −1·8° C.; December 28th, 1913; one adult ♀ specimen, two juvenals.

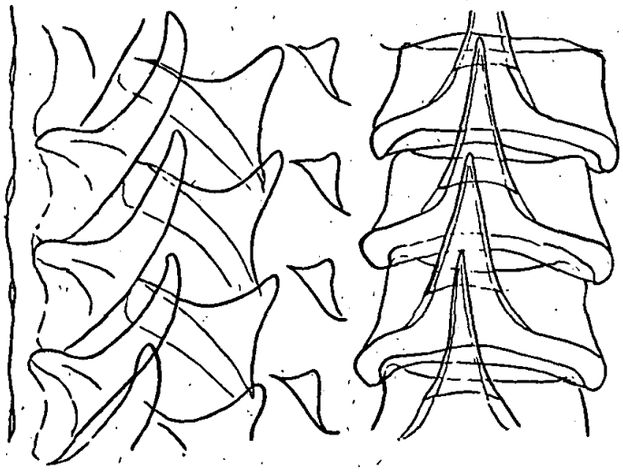

Fig. 13.—*M. adelieana.*

Radula.

Remarks.—The short wide body, enormous eyes, scanty umbrella, short robust arms, characteristic funnel organ, and distinct radula of this species are the features which more especially seem to forbid its union either with any of the previously described members of the genus or with any of the remaining forms captured by the Australasian Expedition. In many respects *M. adelieana* bears a certain resemblance to the *M. turqueti* of Joubin, but the description of the latter, though lacking in detail, fails in several points to tally with our specimens. Unfortunately Joubin does not describe the funnel organ or figure the radula of his type, else it might not be necessary to leave to the future the final disposition of these forms.

Two very small specimens of the same genus [S.S.B. 439] were taken with the type, and I have small doubt that they are conspecific with it. Though neither has a total length of as much as two centimeters, they agree in most of the essential particulars. The larger of the two is probably a male.

5.—Moschites auroræ *new species.*

(Pl. XII., fig. 9; Pl. XIII., figs. 10, 11, 12.)

Description:

Body firm, about as long as broad; rounded and swollen at the sides but flattened above, compressed dorso-ventrally, and with a conspicuous longitudinal groove below. Pallial opening broad, extending fully halfway around the neck and terminating just below the posterior angle of the eyelid.

Head large, fairly well delimited, notably narrower than the body. Eyes large, prominently swollen.

Funnel stout, reaching just past the base of the arms, or about halfway between its posterior margin and the umbrella margin. Funnel organ well developed, almost quadripartite, well separated in the median line, so that each of the two resulting divisions has an outline like a V, with broad but sharply pointed limbs (text fig. 14).

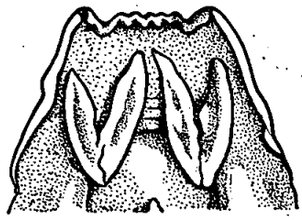

Fig. 14.—*Moschites aurorœ*.
Funnel organ of type. × 4.

Arms of nearly equal length, about twice as long as the body, the order quite regularly 4 = 3, 2, 1; extremities attenuate. Dorsal arms rounded; laterals with obsolete keels, except the third right arm in the male, which has a well developed seminal fold. Suckers (text figs. 15, 16) of moderate size and very closely placed (about 46 on the right second arm of the type); uniserial, but toward the base of the arms occasionally subject to lateral displacement so that they appear superficially biserial in this region on one arm (the right third) of the type, and almost triserial on another (the right ventral); cups deep. Third right arm hectocotylized. Umbrella well developed, of nearly equal extent all around, but best developed between the lateral arms and poorest between those of the ventral pair; extending along the arms for about a quarter to a third of their length.

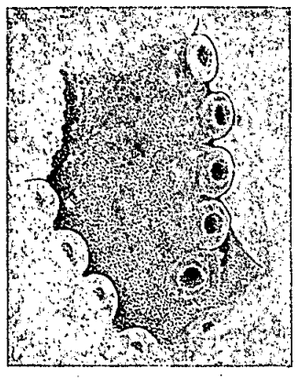

Fig. 15.—*M. aurorœ*.
Right dorsal arm suckers 6-11 of type. × 4.

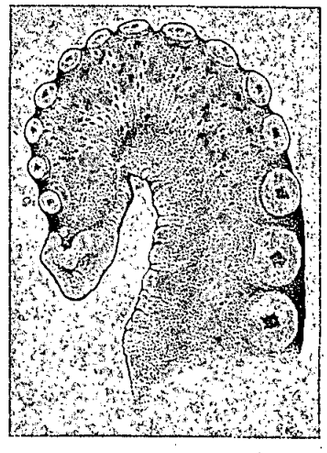

Fig. 16.—*M. aurorœ*.
Extremity of right third arm of type. × 8.

Hectocotylus very minute, both calamus and ligula bluntly conical, the latter with five or six fleshy but mostly rather obscure transverse grooves (text fig. 16).

Surface very closely and harshly papillose over the entire dorsal integument, the papillæ gradually diminishing in size and number laterally and absent from most of the ventral surface, though extending well down the umbrella and along the outer margins of the ventral arms. Individual papillæ small, mostly simple, bluntly conical in outline, and very distinct. There is a large, bluntly conical, papillose tubercle just above the posterior angle of the eyelid (text fig. 18), and a similar smaller one just above the anterior angle. A few scattered and very obscure tubercles larger than the ordinary papillæ occur elsewhere on the dorsum. A low, but very distinct subperipheral fold begins near the mantle margin and extends all around the body, forming a fairly accurate dividing line between the papillose and non-papillose areas.

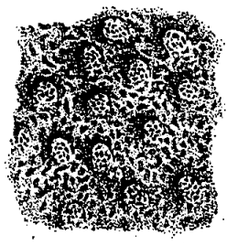

Fig. 17.—*M. auroræ.*

Region between eyes.

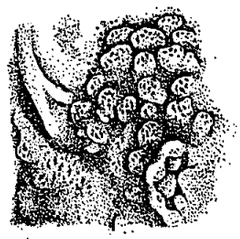

Fig. 18.—*M. auroræ.*

Region obliquely above left eye.

Color of body a dark slaty grey above, clouded with dim mottlings of a warmer tint, but becoming very pale ventrally and on the inner surfaces of the arms. Chromatophores exceedingly minute, very closely and evenly distributed above, but invisible over much of the light-colored areas.

Beak stout, mandibles black (text fig. 19).

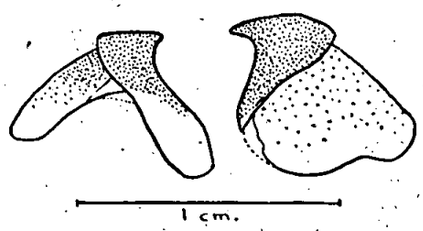

Fig. 19.—*M. auroræ.*

Mandibles.

Radula well developed, but transparent, and takes stain poorly (potassium bichromate). Rhachidian teeth helmet shaped, with acute points and distinct lateral cusps. First laterals weakly developed, very indistinct in outline. Second laterals with triangular teeth. Third laterals with long, curved, knife-shaped teeth. (Text fig. 20.)

Measurements :	Type. mm.	Juv. mm.
Total length	88	39
Tip of body to dorsal base of umbrella	36	15
Length of body	24	11
Width of body	25	13
Width of neck	19	10·5
Width across eyes	21	12
Length of funnel	13	5
Mouth to tip of right dorsal arm	50	29
Mouth to tip of left dorsal arm	49	23
Mouth to tip of right second arm	52	24
Mouth to tip of left second arm	51	22
Mouth to tip of right third arm	43	23
Mouth to tip of left third arm	54	22
Mouth to tip of right ventral arm	53	22
Mouth to tip of left ventral arm	55	21
Length of hectocotylus	2	—
Length of umbrella between dorsal arms	12	8
Length of umbrella between ventral arms	9	6

Type.—A male, Cat. No. C. 40891, of the Australian Museum [S.S.B. 437].

Type Locality.—Station VIII., Lat. South 66° 8′, Long. East 94° 17′ ; 120 fathoms, bottom of small granite rocks, January 27th, 1914 ; one ♂ specimen.

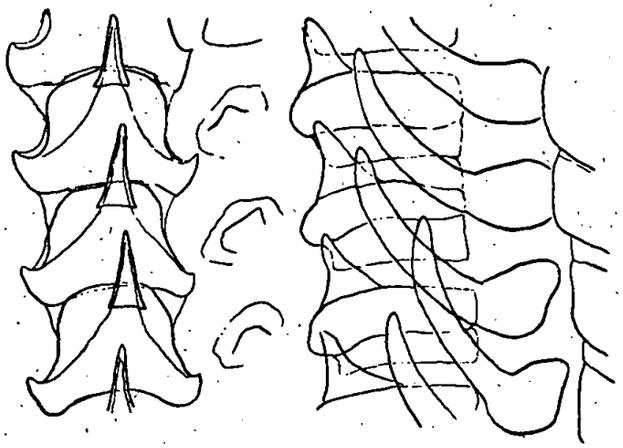

Fig. 20.—*M. aurorœ.*

Radula.

Remarks.—Though represented in the collection by only one mature specimen, this characteristic little species has no close resemblance to any of the other forms taken by the Expedition. In the heavy papillation of the body, as well as the characters of the hectocotylus, it appears to resemble most nearly the *M. charcoti* (Joubin) from

the opposite side of the continent. The finer papillæ, their farther extent ventrally, the distinct peripheral fold, more slender arms, and paired cirri above the eyes, would seem, however, quite ample to distinguish it.

A single young specimen [S.S.B. 444] obtained at Station X., in 325 fathoms, is apparently referable to the same species, as it shares in the distinct papillation, peripheral fold, and other characters, while its proportionate dimensions are as nearly similar as could probably be expected.

6.—Moschites harrissoni *new species.*

(Pl. XIII., fig. 13; Pl. XIV., figs. 14, 15, 16.)

Description :

Body firm, plump, broader than long; very rotund below, with a distinct longitudinal depression in the medio-ventral line. Pallial opening broad, terminating at a point below and a very little behind the posterior angle of the eye opening.

Head conspicuously narrower than the body, fairly well delimited by the slight nuchal constriction. Eyes large, prominent.

Funnel stout, conical, extending over half the distance from its posterior margin to the edge of the umbrella. Funnel organ conspicuous, comprising two broad-limbed U-shaped portions covering most of the inner wall (text fig. 21).

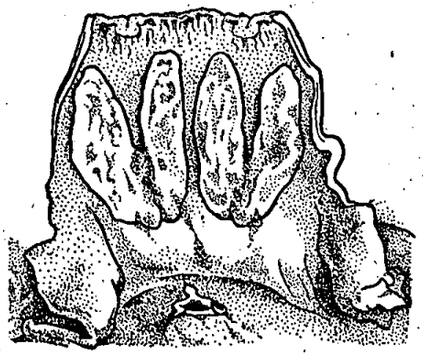

Fig. 21.—*Moschites harrissoni.*
Funnel organ of type. × 2.

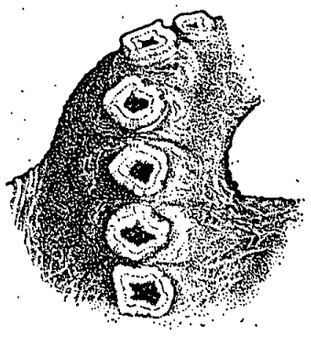

Fig. 22.—*Moschites harrissoni.*
Type. Suckers of right dorsal arm. × 2.

Arms stout, regularly tapering, and very short, scarcely twice as long as the head and body, or about two and a half times the length of the body alone; without notable keels or webs; dorsal arms shortest, the others very nearly of a length. Suckers (text fig. 22) quite large, deep cupped; uniserial throughout, but sometimes more or less displaced by contraction; about 44 on the right third arm. Umbrella short, nearly equal all around, but usually best developed at the sides, and a little longer between the ventral than the dorsal arms; attached to the arms for about a quarter of their length.

Hectocotylus unknown.

Surface smooth except for numerous soft wrinkles due to the action of the preserving fluid, and a number of low conical papillæ scattered irregularly over the dorsum and sides, around the eye openings, and on the base of the four dorsal arms. A distinct sub-peripheral fold of integument begins some distance below the termination of the pallial aperture and encircles the body.

Color everywhere a dull clouded slaty grey, a trifle paler on the venter and the inner surfaces of the arms.

Beak black, powerful (text fig. 23).

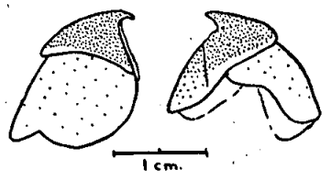

Fig. 23.—*Moschites harrissoni.*
Mandibles.

Radula well developed. Rhachidian teeth helmet shaped, with stout acute points, and bearing distinct lateral cusps at the base, intermediate cusps being present on certain teeth as well. First laterals small, obtusely pointed; second laterals with strong triangular teeth, springing from a rectangular base; third laterals with long, slightly curved, knife-like blades. (Text figs. 24, 25.)

	Type. #440	#441	#442	#443
Measurements:	mm.	mm.	mm.	mm.
Total length	190	208	140	26
Tip of body to dorsal base of umbrella	70	67	54	11
Length of body	51	50	39	8
Width of body	66	70	45	9
Width of neck	40	46	28	7
Width across eyes	45	48	39	8
Length of funnel	23	27	17	3
Mouth to tip of right dorsal arm	110	122	78	15
Mouth to tip of left dorsal arm	113	132	78	14·5
Mouth to tip of right second arm	128	133	83	15
Mouth to tip of left second arm	122	134	82	14
Mouth to tip of right third arm	121	126	87	14·5
Mouth to tip of left third arm	130	130	92	14·5
Mouth to tip of right ventral arm	130	137	89	15
Mouth to tip of left ventral arm	131	147	92	14·5
Length of umbrella between dorsal arms	21	33	21	3·5
Length of umbrella between ventral arms	27	35	21	3·5

Type.—A female, Cat. No. C. 40892, of the Australian Museum [S.S.B. 440].

Type Locality.—Station X., Lat. South 65° 6′, Long. East 96° 13′, off the Shackleton Ice-shelf, Queen Mary Land; 325 fathoms, ooze; bottom temp. −1·65 C.; January 29th, 1914; one ♀ specimen.

Material Examined:

No. Specimens.	Sex.	Depth.	Locality.	How Obtained.	Collector or Station.	Date.	Author's Register.	Remarks.
1	♀	Fms. 270	Off Shackleton Ice-shelf .	Trap	C. T. Harrisson ..	Jan., 1913...	[441]	—
1	♀	325	" " ..	Trawl	Station X.	Jan. 29, 1914	[440]	Type
1	♀	358	" " ..	"	Station XI.	Jan. 31, 1914	[442]	Paratype
1	—	358	" " ..	"	Station XI.	Jan. 31, 1914	[443]	—

Remarks.—This species is represented in the collection by more material than any of the others collected, a fortunate circumstance, since the specimens serve to verify many of the characters which have been held to be of taxonomic significance. Although the above description has been drawn practically in its entirety from the type, as the better preserved of the two largest specimens, both paratypes check up well with it, and on the whole give evidence of remarkably little variation.

Fig. 24.—*M. harrissoni.*
Radula.

Owing to its similar color and consistency, and the short umbrella, *M. harrissoni* at first sight reminds one very much of the *M. adelieana* already described, but the duplex funnel organ (probably derived, however, from an organ shaped much like that of *M. adelieana*), obscurely papillose surface, conspicuous subperipheral fold, and notable differences in the radula are amply sufficient to distinguish them. The taxonomic value of the peripheral fold has been called in question by several writers, but, so far as my experience goes, its presence or absence in well preserved material is a matter of great constancy, and this is true of even very young specimens.

The juvenal taken at Station XI. agrees with the larger specimens in its short arms, short umbrella, and wide body, as well as the peripheral fold. The small papillæ,

however, are lacking. The surface is smooth and the color paler, besides showing a characteristic finely punctate condition due to the smaller number and greater distinctness of the chromatophores.

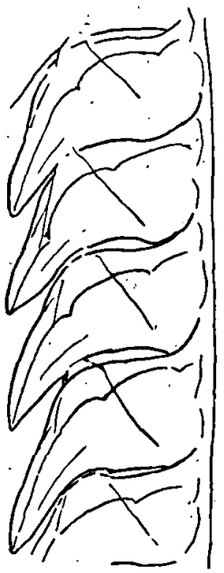

Fig. 25.—*Moschites harrissoni.*

Rhachidian teeth. × 55.

From the data given on three pencilled labels * accompanying the largest specimen I have no doubt that it is the one referred to in " The Home of the Blizzard " (Mawson :15, vol. 2, p. 127), the note being worthy of reproduction here—

> " Harrisson contrived a winch for sounding and fishing. Fourteen-gauge copper wire was wound on it and, through a crack in the sea-ice a quarter of a mile from the glacier, bottom was reached in 260 fathoms. As the water was too deep for dredging, Harrisson manufactured cage-traps and secured some fish, a squid, and other specimens."

This species appears to have been obtained only in the neighborhood of the Shackleton Ice-shelf, Queen Mary Land, though I cannot discover any good physiographical reason why it should not have turned up along with *M. albida* or *M. adelieana* farther to the eastward. Records to show the further distribution of all these forms will be awaited with interest.

The radula of *M. harrissoni* is much more like that of *M. aurorœ* than any of the other species; the similarity being so very strong as perhaps to indicate close relationship. The divided funnel organ offers evidence in the same direction.

* The three labels read as follows :—
No. 1.—" Mollusca—Cephalopoda—*Order* Octopoda—Depth 270 (?) Fathoms—Trapped at 2d Base."
No. 2.—" From Western Base—Shackleton Glacier—Queen Mary Land—Coll. by C. Harrisson."
No. 3.—" Mollusca—Cephalopoda—*Order* Octopoda—Depth 270 fathoms—Captured at Second Base—C. T. H."

Suborder DECAPODA.

Division ŒGOPSIDA.

Family Brachioteuthidæ.

7.—Brachioteuthis *sp., juv.* (?)

This [S.S.B. 446] and the following specimen were received from Mr. Charles Hedley, who found them among some other Expedition material bearing only the label "20 f., 21-1-14."* It is characterised by its short, flaring mantle (text fig. 26); very

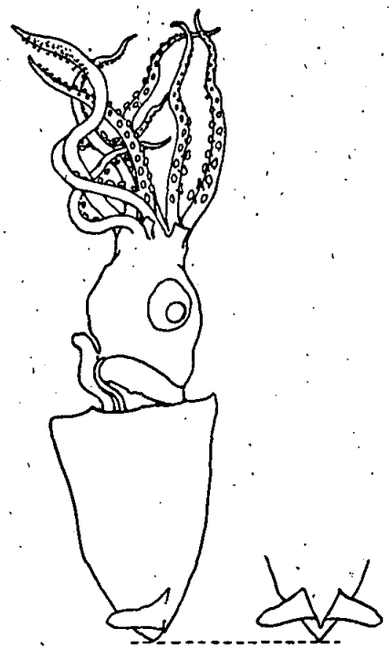

Fig. 26.—*Brachioteuthis.* (?)

× 6.

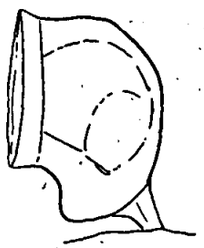

Fig. 27.

Sucker from left tentacle of 446.

minute, subterminal fins; double row of rather large urn-shaped suckers on the sessile arms; minute suckers (text fig. 27) on the tentacle club, scattered pairs of which continue down the stalk; conspicuous, but long and narrow locking cartilages without transverse grooves, on the base of the funnel, &c., &c. All the suckers are poised on rather long, slender pedicels. An umbrella is wanting. Maximum length, 13mm.; length of mantle alone, 5mm.

On the whole it seems probable that the specimen is referable to the genus *Brachioteuthis* (*Tracheloteuthis*), but, having no suitable material available for comparison, I feel no great certainty in the matter.

* At this date the "Aurora" was off Drygalski Island.—Ed.

INDETERMINABLE MATERIAL AND FRAGMENTS.

Larval Cephalopod.

A minute and much dilapidated cephalopod [S.S.B. 445] was obtained in 20 fathoms with the preceding specimen, January 21st, 1914. The specimen has a total length of only about 8mm., and is not in condition for description or determination.

[S.S.B. 449.]

Fragments of half-digested *Moschites* and four loose cephalopod mandibles were taken from the stomach of a Weddell seal shot at Adelie Land, Lat. South 67°, November 3rd, 1912. With our present scanty knowledge, any attempt at specific determination would be premature. The radula of the *Moschites* somewhat resembles that of *M. adelieana*, but does not coincide with the latter in all particulars.

[S.S.B. 450.]

This lot comprises about 90 loose mandibles, apparently belonging to several genera of cephalopods, taken from the stomach of a large sea elephant (*Macrorhinus leoninus*), at Macquarie Island (*vide* Mawson, :15, vol. 2, pp. 200, 220). Three of the mandibles are here figured (text figs. 28-30).

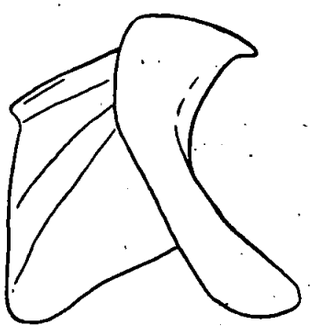

Fig. 28.—*Cephalopod.*
Mandible.

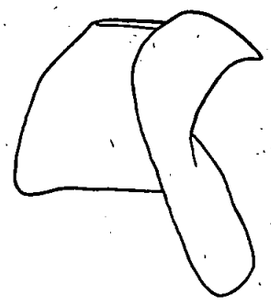

Fig. 29.—*Cephalopod.*
Mandible.

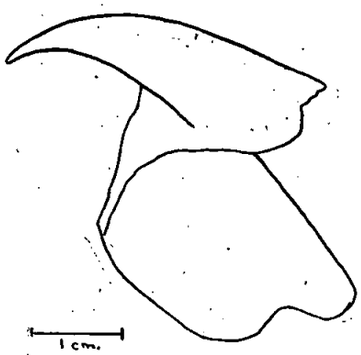

Fig. 30.—*Cephalopod.*
Mandible.

[S.S.B. 451.]

Remains of two medium sized cephalopoda, consisting in each instance of merely the arms and buccal portion, were taken from the ejecta of penguins at Macquarie Island. Although in wretched condition from the effects of the digestive fluids, enough is left to show that both specimens are the same species and represent some decapod, perhaps an Ommastrephid, with two rows of arm suckers.

LIST OF STATIONS AT WHICH CEPHALOPODS WERE TAKEN.

Off Maria Island, Tasmania; 65 fathoms; December 12th, 1912.

1 ♀ *Polypus duplex* (Hoyle) ?

From stomach of Weddell seal, Adelie Land, Lat. South 67°; November 3rd, 1912.

1 *Moschites* sp. (fragments).

4 mandibles.

From stomach of *Macrorhinus*, Macquarie Island.

90 mandibles.

From ejecta of penguins, Macquarie Island.

2 œgopsids (fragments).

Off Shackleton Ice-shelf, Queen Mary Land; 270 (?) fathoms; cage trap; C. T. Harrisson, January, 1913.

1 ♀ *Moschites harrissoni* n. sp.

STATION II.

Lat. South 66° 55′, Long. East 145° 21′, off the Mertz Glacier Tongue, Adelie Land; 288-300 fathoms, ooze; bottom temp. −1·8° C.; large trawl (Agassiz type); December 28th, 1913.

1 *Stauroteuthis mawsoni* n. sp.

1 ♀, 2 juv. *Moschites adelieana* n. sp.

STATION V.

Lat. South 64° 34′, Long. East 127° 17′; 1,700 fathoms, bottom of thick ooze and rocks; bottom temp. −0·3° C.; large trawl (Agassiz type); January 6th, 1914.

1 ♀ *Moschites albida* n. sp.

STATION VIII.

Lat. South 66° 8′, Long. East 94° 17′; 120 fathoms, bottom of few small granite rocks with abundant life; small dredge (Ball type); January 27th, 1914.

1 ♂ *Moschites auroræ* n. sp.

STATION X.

Lat. South 65° 6′, Long. East 96° 13′, off Shackleton Ice-shelf; 325 fathoms, ooze; bottom temp. −1·65° C.; large trawl (Agassiz type); January 29th, 1914.

1 juv. *Moschites auroræ* n. sp.

1 ♀ *Moschites harrissoni* n. sp.

Twenty fathoms; January 21st, 1914.

1 larval *Brachioteuthis* (?)

1 larval cephalopod.

STATION XI.

Lat. South 64° 44′, Long. East 97° 28′, off Shackleton Ice-shelf; 358 fathoms, ooze; large trawl (Agassiz type); January 31st, 1914.

1 ♂, 1 juv. *Moschites harrissoni* n. sp.

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EXPLANATION OF PLATES.

(AUTHOR'S NOTE.—*All of the plated figures are from photographs prepared by Mr. E. F. Everitt and Mr. E. Russell Lord-Wood.*)

PLATE X.

Fig. 1.—*Stauroteuthis mawsoni* n. sp., dorsal view of type specimen [S.S.B. 447], enlarged about one-third.

Fig. 2.—*Moschites albida* n. sp., dorsal view of type specimen [S.S.B. 436], natural size.

Fig. 3.—*Moschites albida* n. sp., ventral view of type specimen [S.S.B. 436] natural size.

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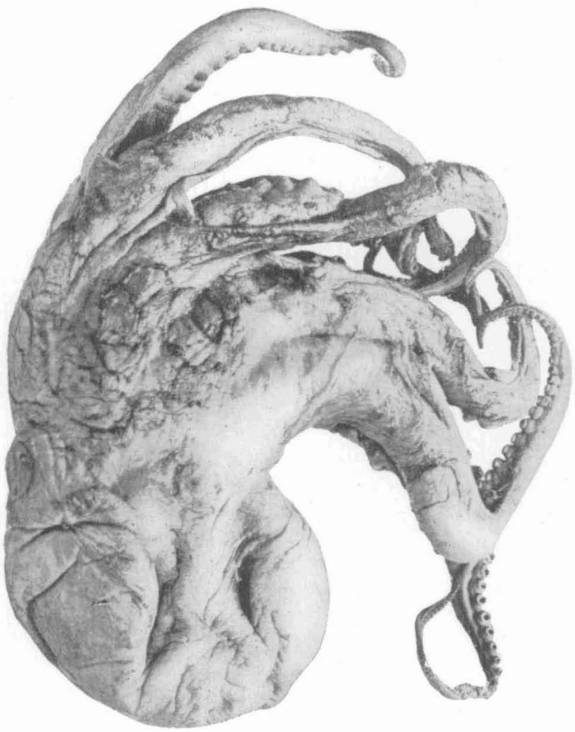

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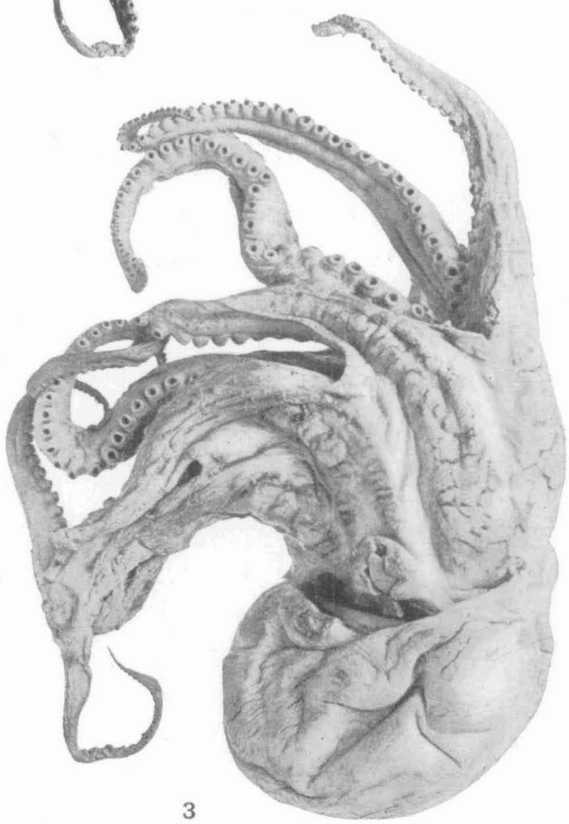

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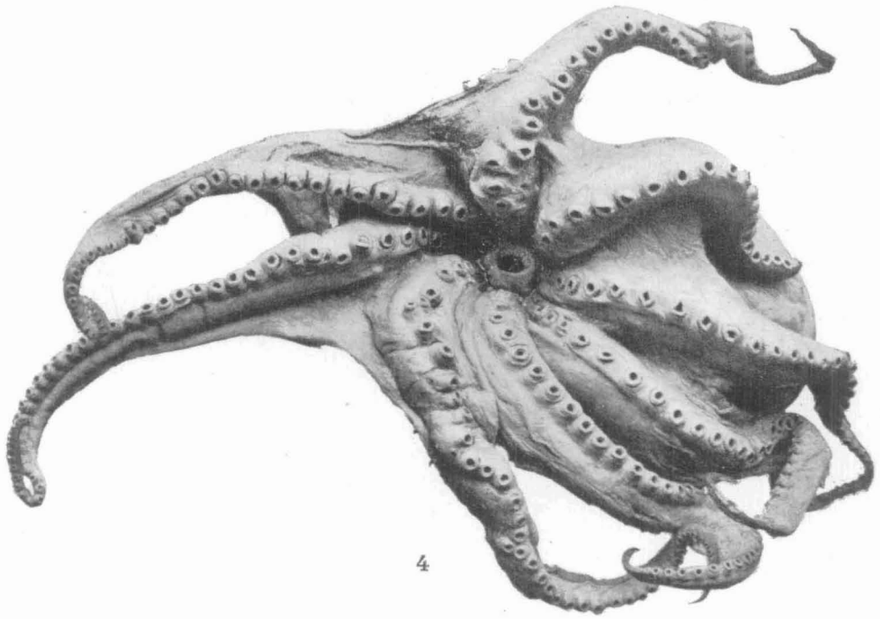

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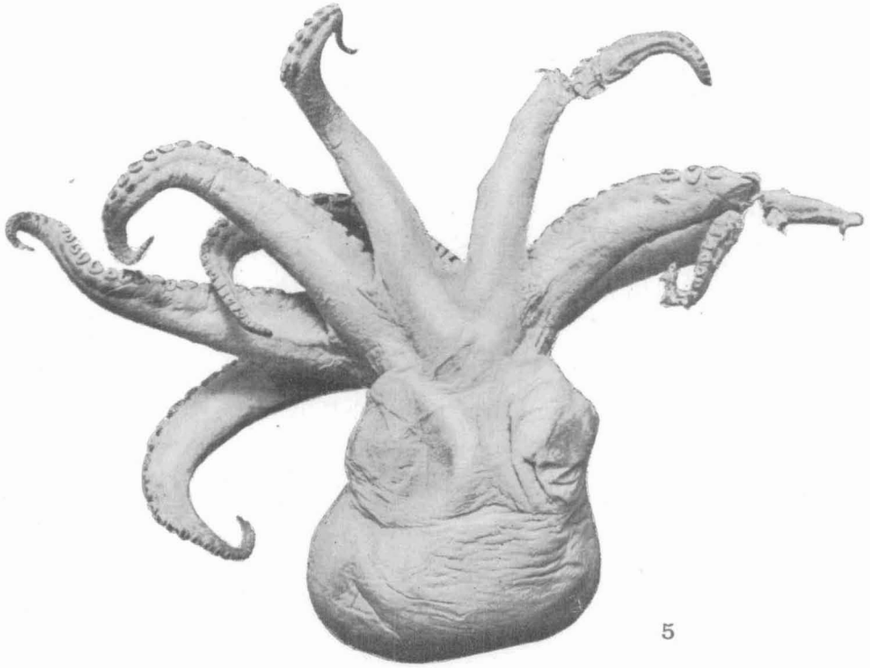

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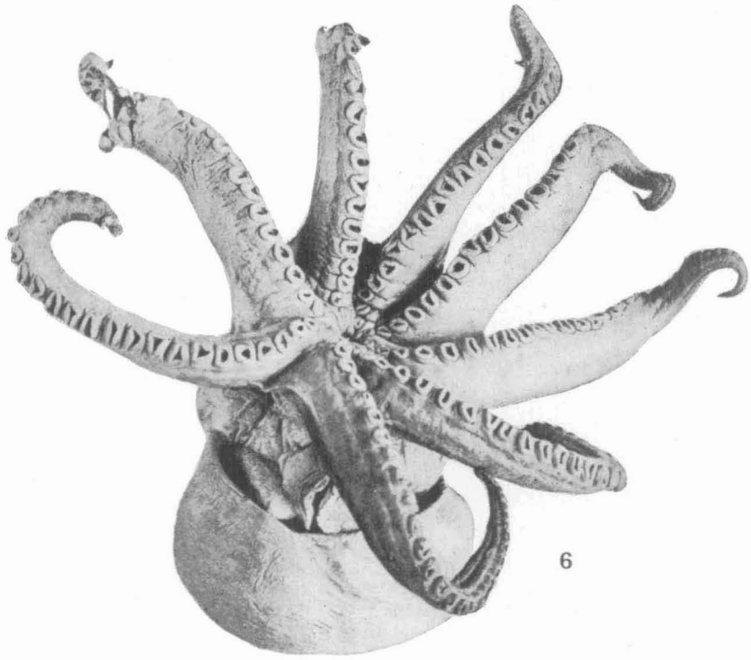

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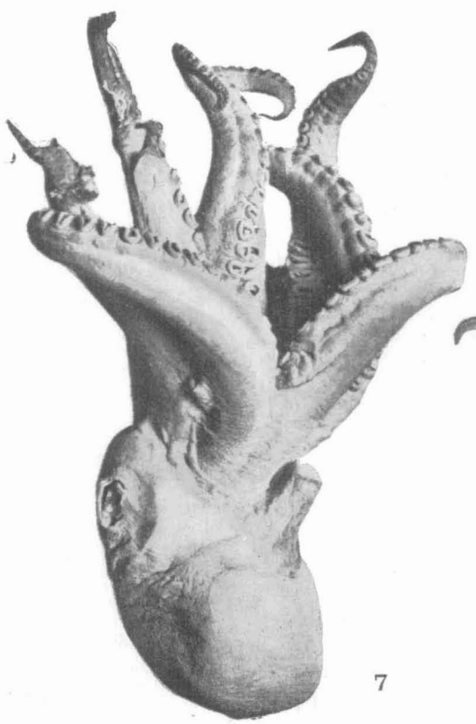

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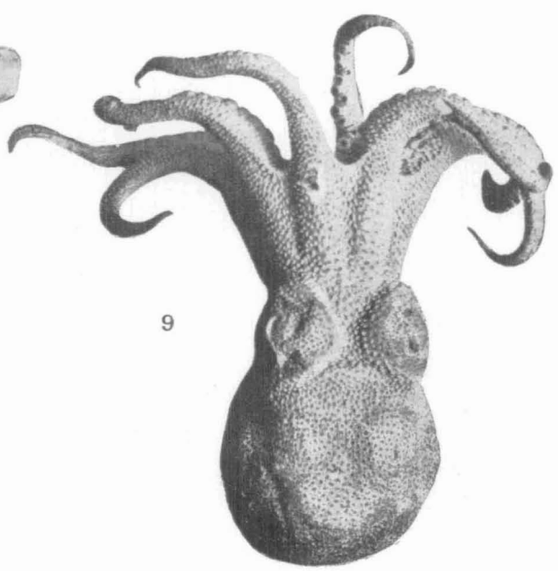

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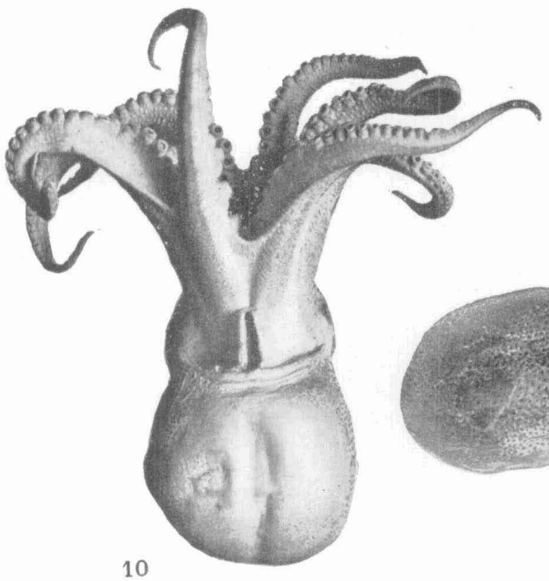

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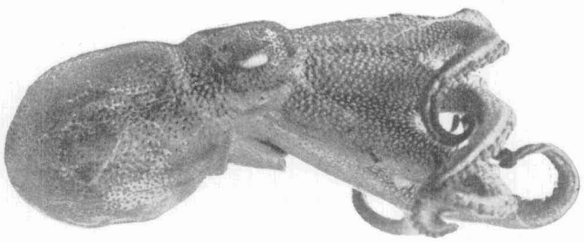

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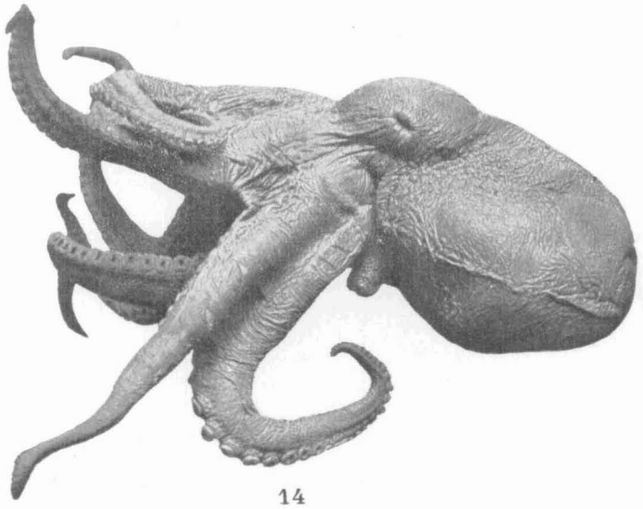

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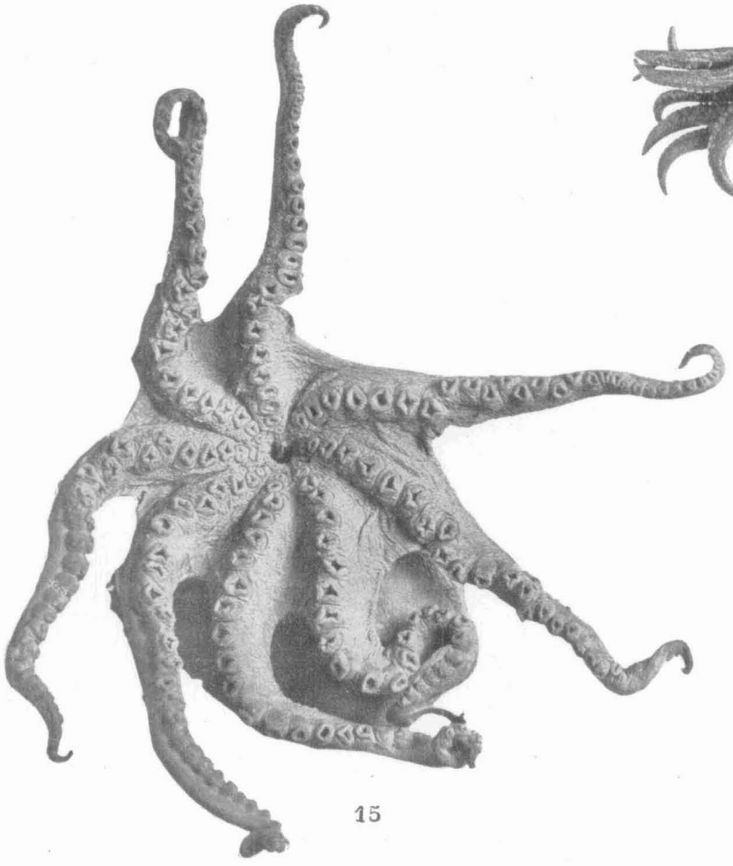

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