LAGENAE OF THE SOUTH-WEST PACIFIC OCEAN.

(SUPPLEMENTARY PAPER.)

By Henry Sidebottom.

(*Read June 24th*, 1913.)

Plates 15-18.

INTRODUCTION.

The Lagenae dealt with in this supplementary paper were arranged by the late Mr. Thornhill on nine slides, each of which is divided into one hundred squares. Nearly every square is occupied, with the exception of some on the last slide. The number of specimens exceeds twelve thousand. In the material for my first paper the number of specimens of Lagenae exceeded six thousand, thus making a grand total of over eighteen thousand. For reasons stated in my former Introduction, it has not always been possible to give the locality at which specimens were found.

The series dealt with now is on three sets of slides, Nos. **1–4** A being *Penguin* gatherings, Nos. **1–3** B *Penguin* and *Dart* gatherings combined and Nos. **1, 2** C those on which Mr. Thornhill had just begun to bring together specimens arranged according to a system he had hoped to carry out.

The specimens of Lagenae on the three sets of slides were not arranged in sequence with each other, so that the work has proved more laborious than that of my first report.

The division of the keel, which occurs in a good many tests and in more than one species, adds to the difficulty of identification, and it is easy to be misled by it. The same may be said of some of the markings on the faces of the test, which have hitherto been considered as specific characters.

Again I must acknowledge the kindness of Mr. Millett, whose advice I have always found most valuable and freely given. My thanks are due to Mr. Wright, of Belfast, to Prof. Hickson, of the University of Manchester, for kind assistance, and also to Mr. Earland for bringing these papers before the Quekett Microscopical Club and examining specimens for me in order to

find out the nature of certain markings. Lastly, as regards the text, I wish to acknowledge my indebtedness to my wife for her assistance in rendering my descriptions more concise.

H.M.S. "PENGUIN." S.W. PACIFIC. 1897.

No.	Station.	Lat. & Long.	Fms.	No.	Station.	Lat. & Long.	Fms.
1.	939.	18·29′ S., 178·38′ E.	1,122.	**12.**	959.	31·39′ S., 176·49′ E.	2,210.
2.	940.	18·57′ S., 179·04′ E.	1,092.	**13.**	961.	33·00′ S., 176·16′ E.	2,086.
3.	941.	18·43′ S., 178·51′ E.	1,360.	**14.**	964.	34·52′ S., 175·34′ E.	917.
4.	943.	19·21′ S., 179·30′ E.	1,420.	**15.**	974.	35·01′ S., 171·37′ E.	796.
5.	945.	21·47′ S., 179·25′ E.	2,043.	**16.**	975.	35·23′ S., 170·34′ E.	994.
6.	947.	22·49′ S., 179·20′ E.	1,948.	**17.**	976.	36·09′ S., 169·20′ E.	1,298.
7.	949.	23·44′ S., 179·09′ E.	1,903.	**18.**	986.	36·30′ S., 168·11′ E.	1,207.
8.	952.	25·52′ S., 178·47′ E.	2,183.	**19.**	987.	37·10′ S., 166·30′ E.	822.
9.	954.	26·57′ S., 178·35′ E.	2,318.	**20.**	996.	37·47′ S., 164·40′ E.	735.
10.	955.	27·46′ S., 178·29′ E.	1,803.	**21.**	998.	38·24′ S., 163·15′ E.	2,182.
11.	956.	29·17′ S., 177·17′ E.	2,050.	**22.**	1,003.	43·05′ S., 148·39′ E.	1,611.

H.M.S. "PENGUIN." S.W. PACIFIC. 1898.

No.	Station.	Lat. & Long.	Fms.	No.	Station.	Lat. & Long.	Fms.
23.	3.	33·53′ S., 157·29′ E.	2,578.	**25.**	35.	34·19′ S., 168·6′ E.	828.
	4.	33·50′ S., 158·47′ E.	2,338.		41.	34·20′ S., 168·28′ E.	1,191.
24.	5.	33·48′ S., 160·2′ E.	1,190.		44.	34·22′ S., 170·19′ E.	979.
	7.	33·56′ S., 161·13′ E.	988.	**26.**	75.	36·21′ S., 176·44′ E.	832.
	12.	33·56′ 7″ S., 162·33′ E.	498.		79.	36·3′ S., 178·55′ E.	1,389.
	18.	33 56′ 6″ S., 163 20′ E.	575.	**27.**	83.	34·33′ S., 178·15′ W.	4,278.
	21.	33·57′ S., 163·56′ E.	603.	**28.**	85.	32·56′ S., 176·49′ W.	3,360.
	24.	33·58′ S., 164·37′ E.	1,073.		86.	32·16′ S., 175·54′ W.	3,220.
	25.	33·58′ 5″ S., 164·55′ E.	1,653.		87.	31·28′ S., 171·5′ W.	3,100.
	27.	34·0′ 6″ S., 165·37′ E.	1,676.				

No.	Station.	Lat. & Long.	Fms.
29.	93.	26·38′ S. 174·17′ W.	2,420.
30.	90.	29·17′ S. 175·11′ W.	3,105.
	94.	25·53′ S. 174·6′ W.	2,775.
	95.	23·24′ S. 173·40′ W.	3,205.
	96.	22·14′ S. 173·29′ W.	3,420.
31.	98.	21·8′ S. 174·7′ W.	2,115.
32.	143.	23·15′ S. 175·32′ E.	2,351.

No.	Station.	Lat. & Long.	Fms.
33.	148.	26·1′ S. 172·56′ E.	2,428.
	149.	26·38′ S. 172·26′ E.	2,070.
	151.	27·55′ S. 171·22′ E.	1,632.
34.	156.	29·35′ S. 168·51′ E.	1,269.
	157.	29·42′ S. 168·51′ E.	1,446.
	167.	30·29′ S. 166·16′ E.	1,819.
35.	169.	30·57′ S. 160·52′ E.	1,557.
36.	172.	31·18′ S. 163·46′ E.	1,010.

H.M.S. "Penguin." S.W. Pacific.

No.	Station.	Lat. & Long.	Fms.
37.	140.	10·57′ S. 162·21′ E.	508.
38.	70.	23·17′ S. 154·33′ E.	470.
39.	181.	11·42′ S. 175·51′ W.	2,335.
	182.	11·09′ S. 175·36′ W.	1,992.
	188.	9·41′ S. 174·37′ W.	2,290.
	191.	8·57′ S. 174·03′ W.	2,606.
	192.	8·36′ S. 173·51′ W.	2,712.
40.	393.	3·51′ N. 164·13′ W.	2,330.
	429.	4·55′ N. 160·54′ W.	1,701.
	480.	5·10′ N. 160·15′ W.	2,033.

No.	Station.	Lat. & Long.	Fms.
40.	482.	6·15′ N. 160·36′ W.	1,861.
	487.	7·25′ N. 160·59′ W.	2,501.
	488.	7·47′ N. 160·45′ W.	2,573.
	498.	8·47′ N. 159·45′ W.	2,588.
41.	499.	9·04′ N. 159·32′ W.	2,579.
	502.	9·43′ N. 159·07′ W.	2,758.
	503.	10·04′ N. 158·53′ W.	2,800.
	505.	10·43′ N. 158·30′ W.	2,938.
	506.	11·01′ N. 158·21′ W.	2,863.

H.M.S. "Dart."

No.	Station.	Lat. & Long.	Fms.
42.	No date.	24·15′ S. 153·15′ E.	328.
		24·34′ S. 153·32′ E.	478.
		24·36′ S. 153·32′ E.	392.

No.	Station.	Lat. & Long.	Fms.
43.	19. (14.5.97.)	29·22′ S. 153·51′ E.	465.
44.	(16.1.97.)	28·14′ S. 149·54′ E.	481.

Family LAGENIDAE.

Sub-family **Lageninae.**

Lagena Walker and Boys.

Lagena globosa Montagu sp. (Pl. 15, figs. 1–3).

Serpula (*Lagena*) *laevis globosa* Walker and Boys, 1784, *Test. Min.*, p. 3, pl. 1, fig. 8.

Vermiculum globosum Montagu, 1803, *Test. Brit.*, p. 523.

Very numerous and of varying size and shape. The orifice and internal tube are subject to great variation.—*Locality:* Many stations.

Pl. 15, fig. 1. The orifice is small and somewhat hooded, and the test often inclined to be apiculate.—*Locality:* Many stations. Rare.

Pl. 15, fig. 2. An elongate variety.—*Locality:* Uncertain. Only one found.

Pl. 15, fig. 3. An interesting variation, the body of the test being partly clear and partly opaque. The curiously produced, flattened mouth, which appears to be divided or pinched in at the centre, points to its being allied to the one figured † Pl. 14, fig. 2.* The entosolenian tube is absent.—†*Locality:* Nos. **24–26, 34, 38, 42, 44.**

† Pl. 14, fig. 2.—*Locality:* Uncertain.

† Pl. 14, fig. 4. The slightly elongated form predominates.—*Locality:* Many stations, including Nos. **6, 8**; after No. **22** only at one or two stations.

† Pl. 14, fig. 5. This compressed variety of the above is found sparingly at a few stations, but tests that are much more compressed, and pointed towards the aperture, are frequent.

Lagena globosa Montagu sp. single and bilocular form.

Lagena globosa Montagu sp. single and bilocular form, Sidebottom, 1912, *Journ. Q. M. C.*, p. 380, pl. 14, figs. 7, 8, 9.

Locality: Many stations up to No. **19**, also at Nos. **33, 43, 44.**

* The "†" denotes that the reference is to "Lagenae of the South-West Pacific Ocean" (*Journal Quekett Microscopical Club*, 1912, ser. 2, vol. xi., pp. 375–434, pls. 14–21).

† The numbers throughout this paper refer to my charts on pp. 162, 163, where will be found the official numbers of the stations, with other particulars.

Lagena globosa Montagu sp. var. *maculata* Sidebottom.

Lagena globosa Montagu sp. var. *maculata*, Sidebottom, 1912, *Journ. Q. M. C.* p. 380, pl. 14, figs. 10, 11.

Locality : Nos. **5–9.**

Lagena globosa Montagu sp. var. *emaciata* Reuss.

Lagena emaciata Reuss, 1862 (1863), p. 319, pl. 1, fig. 9.
Lagena globosa Montagu sp. var. *emaciata* (Reuss) Sidebottom, 1912, *Journ. Q. M. C.* p. 381, pl. 14, figs. 13–15.

Locality : Present at numerous stations throughout the series.

Lagena apiculata Reuss sp. (Pl. 15, fig. 4).

Oolina apiculata Reuss, 1851, p. 22, pl. 1, fig. 1.
Lagena apiculata Reuss, 1862 (1863), p. 318, pl. 1, figs. 1, 4–8, 10, 11.

Pl. 15, fig. 4.—A large, solitary specimen.—*Locality :* No. **15.**

† Pl. 14, fig. 16. Always rare.—*Locality :* At Nos. **24, 43,** and a few other stations.

† Pl. 14, figs. 17, 18. Found at many stations.—*Locality :* Chiefly at Nos. **2, 24, 42, 44.**

† Pl. 14, figs. 19, 20. The tube in this variation is very delicate, and often lies broken inside the test.—*Locality :* Occurs at very many stations.

Lagena apiculata Reuss sp. var. *punctulata* Sidebottom.

Lagena apiculata Reuss sp. var. *punctulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 382, pl. 14, figs. 21–23.

Locality : Nos. **3, 5–11, 41, 43.**

Lagena longispina Brady (Pl. 15, figs. 5, 6).

Lagena longispina Brady, 1881, *Quart. Journ. Micro. Sci.*, vol. xxi., N.S., p. 61.
Lagena longispina Brady, 1884, p. 454, pl. 56, figs. 33, 36 ; pl. 59, figs. 13, 14.

As Brady states in the *Challenger* Report, this is simply a variety of *L. globosa*. It is not unusual for *L. globosa* to have the base of the test roughened or finely spinous. The larger of

the two specimens figured is so opaque that it is impossible to say whether the entosolenian tube is present.—*Locality:* Nos. **5, 7, 9, 39–41, 44.**

Lagena ovum Ehrenberg sp.

Miliola ovum Ehrenberg, 1843, p. 166;—1854, pl. 23, fig. 2; pl. 27, fig. 1; pl. 29, fig. 45.

Locality: This unsatisfactory form occurs at many stations, but is always rare. See remarks †p. 382.

Lagena botelliformis Brady (Pl. 15, figs. 7, 8).

Lagena botelliformis Brady, 1884, p. 454, pl. 56, fig. 6.

Pl. 15, fig. 7. Only two specimens found. The orifice is phialine, and there is a short internal tube.—*Locality:* No. **44.**

Pl. 15, fig. 8. This is a very fine example in the apiculate condition. See also †Pl. 14, fig. 24.—*Locality:* No. **12.**

†Pl. 14, figs. 24, 25.—*Locality:* Many stations.

†Pl. 14, figs. 26–28.—*Locality:* Stations uncertain.

Lagena laevis Montagu sp. (Pl. 15, figs. 9, 10).

Serpula (*Lagena*) *laevis ovalis* Walker and Boys, 1784, p. 3, pl. 1, fig. 9.

Lagena laevis (Walker and Jacob) Williamson, 1848, p. 12, pl. 1, figs. 1, 2.

L. laevis occurs frequently in these gatherings, and the form of the test, the decoration of the neck and the position of the internal tube varies. Some are apiculate. In a few instances there is an entosolenian tube situated at the base.—*Locality:* Many stations.

Pl. 15, fig. 9. The tests are semi-opaque, the short neck is decorated and the internal tube straight. In several instances fine spines project at the base.—*Locality:* Nos. **1, 2, 3,** and one or two others.

Pl. 15, fig. 10. This appears to be a smaller variety of the above. The tests are too opaque for me to make out whether the entosolenian tube is present. Some are apiculate and may be *L. laevis* var. *distoma* Silvestri.—*Locality:* At a good many stations throughout the series.

Lagena laevis Montagu sp. var. *distoma* Silvestri.

Lagena laevis (Montagu) Silvestri, 1900, p. 244, pl. 6, figs. 74, 75.

Examples are rare, but they occur at a fair number of stations. —*Locality :* Chiefly at Nos. **1, 6, 11, 15, 17, 22, 42–44.**

Lagena gracillima Seguenza sp.

Amphorina gracilis Costa, 1856, p. 121, p. 11, fig. 11.
Amphorina gracillima Seguenza, 1862, p. 51, pl. 1, fig. 37.

Eight specimens occur which are all curved.—*Locality :* No. **44.**

Besides these specimens, only two or three others were found.—*Locality :* Uncertain.

Lagena elongata Ehrenberg sp.

Miliola elongata Ehrenberg, 1854, pl. 25, 1A, fig. 1.

I do not think these can be separated from *L. gracillima* Seguenza sp., as they appear to pass insensibly from one form to the other. Seven specimens occur, also two or three doubtful examples.—*Locality :* Six at No. **43**, and one at No. **2.**

Lagena aspera Reuss (Pl. 15, figs. 11–13).

Lagena aspera Reuss, 1861, p. 305, pl. 1, fig. 5.

Pl. 15, fig. 11. This is in good condition, except that the neck is broken. The protuberances, which are arranged in lines, are, I think, tubular.—*Locality :* No. **17.**

On another square are two smaller specimens, with very small protuberances ; these also have the neck fractured. They appear to be a weak form of the above.—*Locality :* Uncertain.

Pl. 15, fig. 12. Two specimens only occur ; the one figured is in a very opaque condition, the other is clear but much smaller.—*Locality :* Nos. **1, 22.**

Pl. 15, fig. 13. Three specimens found, the neck being bent to one side in each case. It is not unlikely that future investigation will reveal a connection between these forms and *L. striatopunctata.* —Locality : No. **43.**

There are also two oval tests, which have the protuberances, and the lines in which they are arranged, farther apart. The protuberances are very minute.—*Locality :* No. **10.**

Lagena rudis Reuss (Pl. 15, fig. 14).

Lagena rudis Reuss, 1862 (1863), vol. 46, p. 336, pl. 6, fig. 82.

A single example. The test is opaque and of a faint silvery-yellow colour.—*Locality :* No. **24**.

Lagena ampulla-distoma Rymer Jones.

Lagena vulgaris var. *ampulla-distoma* Rymer Jones, 1872, p. 63, pl. 19, fig. 52. See also + p. 384.

Locality : Nos. **1, 2, 3, 8, 19, 22, 24, 42, 43**.

Mr. Millett, 1901, p. 6, mentions two other localities for this species, besides the Malay Archipelago; it may therefore be worth while to state that I have since recorded it from the coast of Delos and Palermo.

Lagena hispida Reuss (Pl. 15, fig. 15).

Sphaerulae hispidae Soldani, 1798, p. 53, pl. 17, v, x.
Lagena hispida Reuss, 1858, p. 434.
Lagena hispida Reuss, 1862 (1863), p. 335, pl. 6, figs. 77–79.

In one form or another this is found at nearly all the stations. There is great variation in size, and shape of the tests, and many of the small ones have a long entosolenian tube at the opposite end from the neck, so that it is difficult in some cases to say which is the right end up. If turned one way, they might be treated as apiculate forms.

Pl. 15, fig. 15. The orifice is circular and sunk in a depression. The oral end of the test is surrounded by a series of short spines. A solitary example. *Locality :* No. **24**.

+ Pl. 15, fig. 1. Ten specimens occur.—*Locality :* Nos. **5, 6, 8,** and a single example at either Nos. **41** or **42**.

Lagena hispida Reuss, compressed form.

+ Pl. 15, fig. 2.—*Locality :* Nos. **1–3, 5–7, 10, 24, 33, 34, 36, 38–40, 42**.

Lagena hispida Reuss var. *tubulata* Sidebottom (Pl. 15, fig. 16).

Lagena hispida Reuss var. *tubulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 385, pl. 15, figs. 3–5.

Pl. 15, fig. 16. Nearly all the smaller tests have their necks broken, and a few are very large, as can be judged from the

drawing. The largest specimens have the body much clogged by exogenous shell-growth, or débris, through which small spines often project.—*Locality :* Nos. **17, 19, 24, 25, 35, 36.** Always rare.

† Pl. 15, fig. 5. This variation, which is much more delicate in every way, is found at many stations.—*Locality :* Nos. **1–11, 24, 25, 33, 35, 36, 39.**

Lagena striata d'Orbigny sp. (Pl. 15, fig. 17).

Oolina striata d'Orbigny, 1839, p. 21, pl. 5, fig. 12.

Many examples at numerous stations. They vary remarkably both in size and decoration. Many are apiculate. † See remarks, p. 386.

Pl. 15, fig. 17. In this, the fine costae project at the base. The neck is bent to one side, the body of the test is also slightly curved. On a square by themselves are fifteen tests which have the contour of *L. clavata*, with the point at which the test begins to narrow towards the base sharply angular. Only two are marked on the chart. *Locality :* Nos. **1, 3–5, 7, 8, 12, 17, 21, 24, 34, 39, 40.**

Lagena (*Amphorina*) *Lyellii* Seguenza sp. is found frequently. This form may be treated either as *L. striata*, or *L. sulcata* in an apiculate condition.

† Pl. 15. fig. 6. Twenty-three specimens are on the slide.—*Locality :* Nos. **2, 3, 4.**

† Pl. 15, fig. 8. Fourteen fine examples occur, and a number of smaller ones. Taking the whole series into account they pass gradually into *L. Lyellii* Seguenza.—*Locality :* Nos. **2–12, 15, 17, 21, 24, 29, 31, 33, 34, 39, 40, 42, 43.**

† Pl. 15, fig. 9. Five typical tests are on the slide, but they are mixed with others that are not typical, and so the exact locality cannot be given with certainty. They were found, however, at one or two of the following stations.—*Locality :* Nos. **1, 5, 11, 13.**

On another slide two examples are placed.—*Locality :* Nos. **23, 24.**

Lagena striata d'Orbigny sp. var. *tortilis* Egger.

Lagena tortilis Egger, 1893, p. 329, pl. 10, figs. 61–63.

Two examples only.—*Locality :* Nos. **43, 44.**

Lagena striata d'Orbigny sp. var. *striatotubulata* Sidebottom.

Lagena striata d'Orbigny sp. var. *striatotubulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 387, pl. 15, figs. 11, 12.

This is well represented. A good many are more or less fractured, otherwise they are clean and fresh-looking.—*Locality :* Nos. **4–12, 23, 24, 29, 33, 34, 39, 40.**

Lagena distoma Parker and Jones.

Lagena laevis var. *striata* Parker and Jones, 1857, p. 278, pl. 11, fig. 24.

There is a single large specimen and it agrees with the *Challenger* figure, pl. 58, fig. 11.—*Locality :* No. **2.**

There are about twelve examples which have their sides slightly curved and parallel as in the type.—*Locality :* Uncertain.

Lagena lineata Williamson sp.

Entosolenia lineata Williamson, 1848, p. 18, pl. 2, fig. 18.

Many examples found.—*Locality :* Nos. **1, 2, 4, 5, 9, 10, 13–15, 17–20, 22, 24, 25, 36, 38, 42–44.**

† Pl. 15, fig. 15. The variety with the costae curved occurs at many stations.

Non-apiculate forms also are present.

Lagena variata Brady.

Lagena variata Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, N.S., p. 61.

Lagena variata Brady, 1884, p. 461, pl. 61, fig. 1.

Only two typical examples.—*Locality :* Uncertain.

† Pl. 15, fig. 13. The neck of the test is in many cases not so long as in the figure referred to.—*Locality :* Nos. **14, 15, 17, 19, 22, 24, 25, 44.**

Lagena costata Williamson sp. (Pl. 15, figs. 18, 19).

Entosolenia costata Williamson, 1858, p. 9, pl. 1, fig. 18.

Occurs frequently, typical and otherwise, sometimes apiculate. Pl. 15, fig. 18. This appears to be an elongate form with from

eight to ten costae. Entosolenian tube straight.—*Locality:* Uncertain; probably No. **22** and a few other stations.

Pl. 15, fig. 19. These appear to be the same, but they have only six costae, and occur more frequently.—Nos. **15, 17–20, 23, 24, 29, 33–36.**

+Pl. 15, fig. 16.—*Locality:* Many stations throughout the whole series.

+Pl. 15, fig. 19.—*Locality:* No. 43.

Lagena acuticosta Reuss (Pl. 15, fig. 20).

Lagena acuticosta Reuss, 1861, p. 305, pl. 1, fig. 4.

An unsatisfactory species, for it is linked closely with *L. costata* on the one hand, and *L. sulcata* on the other.—*Locality:* Many stations up to No. **22**; afterwards extremely rare.

Pl. 15, fig. 20. An odd specimen, probably a very weak form.—*Locality:* Uncertain.

+Pl. 15, fig. 22. Tests similar or nearly so occur, but they are not so large.—*Locality:* Nos. **2, 7,** and a few other stations.

Lagena melo d'Orbigny sp.

Oolina melo d'Orbigny, 1839, p. 20, pl. 5, fig. 9.

There are several fine typical examples and a few small ones on the slide, but as they are mixed with other varieties the locality cannot be determined.

The form with the cross-bars sunk, which is assigned by Reuss to *L. catenulata* Williamson, 1862 (1863), pl. 6, fig. 75, is also present.

Lagena hexagona Williamson sp. (Pl. 15, figs. 21–23).

Entosolenia squamosa var. *hexagona* Williamson, 1848, p. 20, pl. 2, fig. 23.

Very many beautiful specimens occur; some are globular, others pyriform, with and without necks. The depth and size of the mesh vary greatly.

A few, which I take to be *L. geometrica* Reuss, 1862 (1863), pl. 5, fig. 74, are exquisite, although the arrangement of their cells is not always parallel. The cells are deep, and their sides exceedingly delicate. Several have short necks. I have not attempted to draw them, as I could not have produced the

desired effect.—*Locality:* Again the mixing of the varieties prevents me from giving any definite information.

There are a few which appear to be the same as the one figured by Brady in the *Challenger* Report, pl. 58, fig. 33, of which the angles of the cells tend to become spinous, especially at the base of the test. This peculiarity seems to be feebly indicated in Brady's figure.

Pl. 15, fig. 21. Several of this elegant form occur.—*Locality:* Uncertain.

Pl. 15, fig. 22. A globular variety.

Pl. 15, fig. 23. A compressed variation of the above, but of smaller size. These two forms are placed together on the slide. —*Locality:* Taking the two forms together they are marked Nos. **2–5, 13, 17–20, 44.**

Lagena squamosa Montagu sp.

Vermiculum squamosum Montagu, 1803, *Test. Brit.* p. 526, pl. 14, fig. 2.

A few only are present.—*Locality:* Uncertain.

Lagena exsculpta Brady.

Lagenulina sulcata Terquem, 1876, *Anim. sur la Plage de Dunkerque*, fasc. 2, p. 68, pl. 7, fig. 9.
Lagena exsculpta Brady, *Quart. Journ. Micr. Sci.*, vol. xxi., N.S., p. 61.
Lagena exsculpta Brady, 1884, p. 467, pl. 58, fig. 1; pl. 61, fig. 5.

Five examples found, and they are compressed. Three of them are in poor condition. These latter are not quite typical, as the sculpture becomes irregular at the base.—*Locality:* Nos. **37, 39.**

Lagena sulcata Walker and Jacob sp. (Pl. 15, figs. 24, 25).

Serpula (*Lagena*) *striata sulcata rotunda* Walker and Boys, 1784, p. 2, pl. 1, fig. 6.
Serpula (*Lagena*) *sulcata* Walker and Jacob, 1798, p. 634, pl. 14, fig. 5.

This common foraminifer is well represented. In some the body of the test is globular, and in others cylindrical. Apicu-

late forms also occur.—*Locality :* Nos. **4, 14, 15, 20, 24, 26, 38, 42-44**, and a few others.

Pl. 15, fig. 24. This is closely allied to *L. alifera* Reuss, 1870, p. 467.—Von Schlicht, 1870, pl. 3, figs. 15, 16, 21, 22.—*Locality :* Nos. **3, 10**, and two or three others.

Pl. 15, fig. 25. This form, known as *L. sulcata* var. *interrupta* Williamson, is hardly worthy of a varietal name, as it is not at all uncommon for some of the costae or striae, both in *L. sulcata* and *L. striata*, to be shorter than the others.

Lagena plumigera Brady (Pl. 15, fig. 26).

Lagena plumigera Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, N.S., p. 62.
Lagena plumigera Brady, 1884, p. 465, pl. 58, figs. 25, 27.

Two of the tests are similar to the one figured ; several others are smaller and much damaged.—*Locality :* Nos. **1, 2, 43**.

Lagena semilineata Wright (Pl. 15, fig. 27).

Lagena semilineata Wright, 1884–5, App. 9, 1886, p. 320, pl. 26, fig. 7.

Evidently a bold form of *L. semilineata*.—*Locality :* Three examples at Station No. **2**.

Lagena gracilis Williamson.

Lagena gracilis Williamson, 1848, p. 13, pl. 1, fig. 5.

This protean species is found at many stations throughout the whole series. All the forms represented in the *Challenger* Report, 1884, appear to be present. No line of demarcation can be drawn between this species and apiculate forms of *L. sulcata* and *L. striata* ; they are also linked with *L. distoma* Parker and Jones.

Lagena quinquelatera Brady.

Lagena quinquelatera Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, N.S., p. 60.
Lagena quinquelatera Brady, 1884, p. 484, pl. 61, figs. 15, 16.

I take this to be a variety of *L. gracilis*.
Two specimens only.—*Locality :* No. 2.

Lagena semistriata Williamson.

Lagena striata var. *β semistriata* Williamson, 1848, p. 14, pl. 1, figs. 9, 10.

The great majority are small. Some have the neck bent to one side and the body slightly curved. A few are cylindrical and others have the contour of *L. clavata* d'Orbigny.—*Locality :* Nos. **1, 20–22, 29, 42–44.**

Lagena crenata Parker and Jones var. (Pl. 15, fig. 28).

Lagena crenata Parker and Jones, 1865, p. 420, pl. 18, fig. 4.

They are not typical, but I think they are best placed under the above heading. The projecting parts at the base run partly towards its centre as blades. The neck is not decorated. A few of the examples are not so slim as the one figured, and have their sides slightly convex. Thirteen specimens occur. I cannot give all the stations at which they are found, but the following may be indicated. *Locality :* **22, 43.**

Lagena Thornhilli Sidebottom (Pl. 15, fig. 29).

Lagena Thornhilli Sidebottom, 1912, *Journ. Q. M. C.*, p. 390, pl. 15, fig. 26.

They differ slightly from the one figured at the above reference, for the upper parts of the wings are joined together so as to form a hood, as shown in the figure. In one of the examples the three cavities formed by the hood are blocked with exogenous shell-growth.

Four examples occur.—*Locality :* **6, 8, 29.**

Lagena stelligera Brady.

Lagena stelligera Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, N.S., p. 60.

Lagena stelligera Brady, 1884, p. 466, pl. 57, figs. 35, 36.

A good many agree with Brady's *Challenger* figure, pl. 57, fig. 35, but some are more slender, and several are very minute.

See remarks, † pp. 391, 392.—*Locality :* Nos. **5, 14, 17–19, 21,**

22, also Nos. **23**, **24**, **29**, **32**, **33**, **35**, **37**, **39–41**. From these latter stations a few of the "nude" form were obtained.

† Pl. 16, fig. 1. In most of the specimens, some of the costae are more prominent than the others, but none of them are "interrupted," as in the figure referred to.—*Locality:* **10**, **22–24**, **36**, **39**.

† Pl. 16, fig. 2. Numerous examples of this "nude" variety are on the slides, some having very long, delicate necks. The apiculate portion varies both in width and length. Two very large tests were found, and except for the absence of the costae they agree well with the *Challenger* figure, pl. 57, fig. 36.—*Locality:* Nos. **2**, **3**, **5**, **12**, **19**, **23**, **24**, **29**, **32**, **33**, **35**, **36**, **38–40**.

† Pl. 16, fig. 3.—*Locality:* Nos. **3–7**, **9**, **10**, **13**, **17**, **23**, **24**, **26**, **29**, **33–35**, **39**, **40**.

† Pl. 16, fig. 4. Compressed. Nine examples found.—*Locality*: Nos. **2**, **24**. Other stations uncertain.

Lagena stelligera Brady var. *eccentrica* Sidebottom (Pl. 15, fig. 30).

Lagena stelligera Brady var. *eccentrica* Sidebottom 1912, *Journ. Q. M. C.*, p. 392, pl. 16, figs. 5, 6.

Pl. 15, fig. 30. On this specimen the ridge at the base is scarcely perceptible. Two or three only found.—*Locality:* Uncertain.

† Pl. 16, fig. 5. Not typically represented in these gatherings.

† Pl. 16, fig. 6. The examples generally have the ridge at the base carried farther up the side of the test.—*Locality:* Nos. **11**, **14**, **37**.

Lagena stelligera Brady var. *eccentrica* Sidebottom, compressed form (Pl. 15, fig. 31).

This is the compressed form, and some of the specimens from No. **43** are in fine condition.—*Locality:* Nos. **10**, **13**, **14**, **19**, **20–43**. Very rare, except at No. **43**.

Lagena striatopunctata Parker and Jones.

Lagena sulcata var. *striatopunctata* Parker and Jones, 1865, p. 350, pl. 13, figs. 25–27.

Various forms are present. Some have the neck bent to one side, others have only a very short neck. The body of the test

also varies greatly, being occasionally almost globular.—*Locality :* Nos. **1–3, 22, 24-26, 33, 34, 38, 42, 43.**

Lagena striatopunctata Parker and Jones (?) var. *complexa* Sidebottom.

Lagena striatopunctata Parker and Jones (?) var. *complexa* Sidebottom, 1912, *Journ. Q. M. C.*, p. 393, pl. 16, fig. 11.

† Pl. 16, fig. 11. None of the tests are in perfect condition, all showing signs of the disintegration mentioned at the above reference.—*Locality :* Nos. **7, 9, 24.**

Lagena striatopunctata Parker and Jones var. *inaequalis* Sidebottom.

Lagena striatopunctata Parker and Jones var. *inaequalis* Sidebottom, 1912, *Journ. Q. M. C.*, p. 393, pl. 16, fig. 12.

Three tests are on the slide, but only two belong to this variety. —*Locality :* Two of the following, Nos. **4, 10, 11.**

Lagena striatopunctata Parker and Jones var. *spiralis* Brady.

Lagena spiralis Brady, 1884, p. 468, pl. 114, fig. 9.

Locality : Nos. **1–4, 22, 37, 38, 43, 44.** Very rare except at No. **1.**

Lagena Fieldeniana Brady.

Lagena Fieldeniana Brady, 1878, *Ann. Mag. Nat. Hist.* (5) vol. 1, p. 434, pl. 20, fig. 4.
Lagena Fieldeniana Brady, 1884, p. 469, pl. 58, figs. 38, 39.

A solitary, rather rotund example, of which the neck is broken off short.—*Locality :* Uncertain.

Lagena desmophora Rymer Jones.

Lagena vulgaris var. *desmophora* Rymer Jones, 1872, p. 54, pl. 19, figs. 23, 24.

The specimens are typical and in good condition. All are, or have been, apiculate. The number of spines at the base varies from one to four.—*Locality :* Nos. **2, 5, 7–11, 13, 33, 40.**

Lagena foveolata Reuss.

Lagena foveolata Reuss, 1862 (1863), p. 332, pl. 5, fig. 65.
Lagena No. 25, von Schlicht, 1870, p. 10, pl. 3, fig. 25.

Three or four only occur. The sculpture of the test is exceedingly fine.—*Locality :* No. **43**, and one or two other stations which are uncertain.

Lagena foveolata Reuss var.

Lagena foveolata Reuss var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 395, pl. 16, figs. 16, 17.

It is possible that further investigation may reveal this to be an apiculate form of one of the variations of *L. melo* d'Orbigny sp.—*Locality :* Nos. **1, 2, 4, 6, 8, 10, 12, 14, 15, 17, 19, 21, 22, 24, 33, 36, 38, 40, 42–44.**

Lagena foveolata Reuss var. *spinipes* Sidebottom.

Lagena foveolata Reuss var. *spinipes* Sidebottom, 1912, *Journ. Q. M. C.*, p. 396, pl. 16, figs. 18–20.

The tests are not in the best condition, and in some instances the spines appear to be absent, or scarcely perceptible. The rotund form does not occur.—*Locality :* Fifteen specimens at at No. **2**, three at No. **3**, four at No. **4**.

Lagena foveolata Reuss (?) var *paradoxa* Sidebottom (Pl. 15, fig. 32).

Lagena foveolata Reuss (?) var. *paradoxa* Sidebottom, 1912, *Journ. Q. M. C.*, p. 395, pl. 16, figs. 22, 23.

This is one of the commonest foraminifera in these gatherings. The tests vary greatly in size and shape.—*Locality :* Nos. **1–22**, (except No. **17**), **23–26, 29, 31, 33, 34–36, 39–41, 44.**

Lagena lamellata Sidebottom.

Lagena lamellata Sidebottom, 1912, *Journ. Q. M. C.*, p. 396, pl. 16, figs. 24, 25.

I can only identify four tests.—*Locality :* Two occur at No. **43** ; the other station or stations are uncertain.

Lagena Hertwigiana Brady (Pl. 15, fig. 33).

Lagena Hertwigiana Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, N.S., p. 62.
Lagena Hertwigiana Brady, 1884, p. 470, pl. 58, fig. 36.

The figure in my copy of the *Challenger* Report, pl. 58, fig. 36, does not show the reticulation referred to in the description of the species in the text, p. 470. In the three or four specimens found in these soundings, the surface is roughened and the perforations show very plainly.—*Locality :* Uncertain, with the exception of No. **43**.

Lagena Hertwigiana Brady var. *undulata* Sidebottom.

Lagena Hertwigiana Brady var. *undulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 397, pl. 16, figs. 26–28.

Many examples occur.—*Locality :* Nearly all the stations, but chiefly Nos. **2, 7, 10, 17, 24, 34, 43**.

Lagena pacifica Sidebottom.

Lagena pacifica Sidebottom, 1912, *Journ. Q. M. C.*, p. 398, pl. 16, fig. 29.

Only two or three specimens found.—*Locality :* Uncertain.

Lagena splendida sp. nov. (Pl. 16, figs. 1–3).

I am quite at a loss how to describe this exquisite Lagena adequately, and I am unable to draw it owing to the complexity of its decoration, which is exceedingly minute. The test glistens and most probably it has been apiculate. The neck is fractured. There is a second specimen which I think is the same, but there is a slight difference in its appearance which I am unable to explain. It is apiculate.—*Locality :* Uncertain.

Note.—Not being able to get a satisfactory definition with my microscope, I submitted the test to Mr. Earland for examination, who had better means of lighting up the test than I had. His observations were made with the assistance of a Zeiss vertical illuminator and daylight instead of artificial light. He writes as follows :

"The markings appear to be knife-edged costae, from one side of which triangular processes project at intervals. The apex of the process barely touches the inner side of the adjoining costa. . . . The triangular processes are flush with the costae at their base, but apparently sink away towards the apex, which is probably but little raised above the wall of the test. The sunken parts between the processes have a matt surface, whereas the processes and costae are quite translucent."

I may say that my own examination of the test agrees to a great extent with the above, but I think the edges of the costae are waved (see Pl. 16, fig. 3).

In a second communication Mr. Earland writes: "I succeeded in getting a stereoscopic view of the shell under a $\frac{1}{4}$ in. yesterday, and it gave rather a fresh view of its structure. It seemed to be covered with lines of pyramidal points in broken lines. Each pyramid is a blunt spine."

I have not succeeded, however, in seeing these characters of the test.

The figure (Pl. 16, fig. 2) gives the effect of what I think I see under the microscope, and it coincides to a great extent with Mr. Earland's first description, though the details given in his second communication do not appear to me to be necessarily contradictory. I wish to acknowledge my sense of the trouble Mr. Earland has taken in the matter.

Lagena spumosa Millett (Pl. 16, fig. 4).

Lagena spumosa Millett, 1901, p. 9, pl. 1, fig. 9.

Most of the tests are slightly curved at the oral end, but the "bird's-clawlike" process is more slender than is indicated in Mr. Millett's illustration. Several are more elongate than the one figured.—*Locality:* Frequent at No. **22**; Nos. **24, 38, 40, 42, 43,** and a few other stations.

Lagena spumosa Millett, var.

Lagena spumosa Millett var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 398, pl. 16, fig. 30.

It is curious that the aboral end of the test appears to have been slightly abraded, I think in all cases.—*Locality:* Nos. **4, 6, 7, 10, 11, 13, 24, 25, 33, 35, 39, 40, 42, 43.**

Lagena Chasteri Millett.

Lagena Chasteri Millett, 1901, p. 11, pl. 1, fig. 11.

See my remarks on the type-form † p. 398.

Lagena Chasteri Millett (var. ?).

Lagena Chasteri Millett (var. ?) Sidebottom, 1912, *Journ. Q. M. C.*, p. 398, pl. 16, figs. 32–34.

Many occur, but I am quite unable to separate this variation from the type, for the curious little "stopper" at the orifice is never so pronounced as in Mr. Millett's figure, and is often apparently absent. Taking the type-form and the variation together, for they are mixed on the slides, they occur as follows:—*Locality:* Nos. **1–4, 22, 34, 38,** and frequently at Nos. **42–44.**

Lagena pannosa Millett var.

Lagena pannosa Millett var. 1901, p. 11, pl. 1, fig. 14.

It is probable that two or three examples of this variation are present.—*Locality:* Uncertain.

Lagena intermedia Sidebottom.

Lagena intermedia Sidebottom, 1912, *Journ. Q. M. C.*, p. 399, pl. 17, figs. 1–3.

Locality: Nos. **3, 11, 12, 23, 24, 29, 32, 39–41.**

Lagena quadralata Brady.

Lagena quadralata Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. xxi. (N.S.), p. 62.
Lagena quadralata Brady, 1884, p. 464, pl. 61, fig. 3.

In the *Challenger* Report Brady states that this Lagena is allied to the *Lagena alifera* of Reuss. I should prefer to consider it as a variety of *L. lagenoides* Williamson var. *tenuistriata* Brady, for we know that this latter occurs in the trifacial condition (see † Pl. 19, fig. 5), and therefore it is not surprising to find it with four equidistant keels; also I have a good example of *L. lagenoides* with five equidistant keels. The specimen found is very small and not in the best condition. I think the wings are tubular, but cannot be certain. On the same slide there

are two examples with three keels, and two with five keels.—*Locality :* One specimen at No. **1.** Other stations uncertain.

NOTE.—One or two examples occur with four keels which are not tubulated. These I should place as a variety of *L. striata.*

Lagena sp. incert.

Lagena sp. incert. Sidebottom, 1912, *Journ. Q. M. C.*, p. 399, pl. 17, figs. 4, 5.

Locality : Three examples at No. **2,** two at No. **24.**

Lagena laevigata Reuss, sp. (Pl. 16, fig. 5).

Fissurina laevigata Reuss, 1850, p. 366, pl. 46, fig. 1.

Large and small examples of the type-form occur, but they are not numerous. It is impossible to separate *L. laevigata* from *L. acuta*, as the one passes insensibly into the other. Many other examples are present in which the orifice is not central. Forms ranging round *Fissurina oblonga* Reuss, 1862 (1863), pl. 7, fig. 89, are frequent, and are found at many stations. A few specimens occur that are circular in outline.

Pl. 16, fig. 5. There are two sets of these and they vary a little. Some have the appearance of being subcarinate, but this seems to be caused by the test being clearer at its edge than at any other part. Only two or three examples have the spines at the orifice well developed, and most have a small wing at either side of the neck. There is no internal tube.—*Locality :* Nos. **42–44.**

NOTE.—These are not far removed from *L. falcata* Chaster, 1892, p. 6, pl. 1, fig. 7. On another square (locality uncertain) there is one typical form, and there are also one or two others that are carinate at the base, which seem to be intermediate between *L. falcata* and Mr. Millett's figure of *L. marginata* var. Millett, 1901, p. 497, pl. 8, fig. 21.

Lagena laevigata Reuss sp. var. *virgulata* Sidebottom (Pl. 16, fig. 6).

Lagena laevigata Reuss sp. var. *virgulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 400, pl. 17, fig. 8.

Pl. 16, fig. 6. A few fine examples placed amongst others which are too opaque for me to be certain whether they belong to this variation.—*Locality :* Uncertain.

Lagena laevigata Reuss sp. var.

Lagena laevigata Reuss sp. var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 400, pl. 17, fig. 7.

† Pl. 17, fig. 7. Very rare.—*Locality :* Nos. **15, 34.**

Lagena acuta Reuss sp. (Pl. 16, fig. 7).

Fissurina acuta Reuss, 1862, p. 340, pl. 7, fig. 90, and *F. apiculata*, p. 339, pl. 6, fig. 85.

Lagena acuta (including such as have only the slightest indication of the apiculate process) is found at almost all the localities. The size and inflation of the tests, as well as their outlines, vary greatly.—Two at No. **14**.

Lagena acuta Reuss sp. var. (Pl. 16, fig. 8).

The chief feature of this variety is the curious oval marking at the base, on both sides of the test. It is very rarely so clearly shown as in the drawing. The tests are opaque or nearly so, and when the shell-substance becomes very dense the markings disappear, but if damped some trace of them can be detected.—*Locality :* Nos. **3–7, 9–11, 13–15, 29, 33, 34, 39, 40, 42, 44.**

† Pl. 17, fig. 9. The mixing of this form with that of fig. 10 prevents me from giving the exact localities, but it is evidently rather rare. They correspond with the *Fissurina apiculata* Reuss, 1862, p. 339, pl. 6, fig. 85.

Lagena acuta Reuss sp. var. *virgulata* Sidebottom.

Lagena acuta Reuss sp. var. *virgulata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 401, pl. 17, fig. 10.

† Pl. 17, fig. 10. This appears to occur at nearly all the stations up to No. **22**, after which it is extremely rare.

Lagena acuta Reuss sp. var.

Lagena acuta Reuss sp. var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 401, pl. 17, fig. 11.—

Locality : Nos. **3, 4, 6, 10, 11, 14, 24, 25, 34, 39.**

Lagena lucida Williamson sp. (Pl. 16, fig. 9).

Entosolenia marginata var. *lucida* Williamson, 1848, p. 17, pl. 2, fig. 17.

There are nine examples which are nearly circular in outline, and subcarinate.—*Locality :* No. **44**.

Pl. 16, fig. 9. I believe this to be an elongate form of *L. lucida*, in which the characteristic markings are only feebly represented. The shell is very little compressed. Two or three specimens only oocur.—*Locality :* Uncertain.

One or two tests are present which are intermediate between the type and the elongate form referred to above. Several are apiculate.—*Locality :* Nos. **1, 6, 14, 21, 22, 24, 38, 42, 43.**

Lagena multicosta Karrer sp.

Fissurina multicosta Karrer, 1877, p. 379, pl. 16 *b*, fig. 20.
Fissurina bouei Karrer, p. 378, pl. 16 *b*, fig. 19.

The examples are small, and some are without the irregularity of the costae characteristic of the type.—*Locality :* Nos. **24, 29, 34, 35, 39, 42–44,** and one or two of the earlier stations.

Lagena fasciata Egger sp. (Pl. 16, figs. 10–13).

Oolina fasciata Egger, 1857, p. 270, pl. 5, figs. 12–15.

Pl. 16, fig. 10. Beautiful specimens occur which have the mouth protruding, and the orifice composed of a line of pores. The bands are flush or nearly so. Large and small tests are on the slide.—*Locality :* Nos. **1, 3–5, 7, 10, 22, 44,** and several other stations which are uncertain.

Pl. 16, fig. 11. An apiculate form which is extremely rare. The edge of the test is flattened, and has a very fine groove running down its centre. The orifice appears to be composed of a line of pores.—*Locality :* Uncertain.

Pl. 16, fig. 12. Slightly apiculate, the orifice large, and the entosolenian tube divided at the end. The edges of the bands, which are not interrupted at the base, appear to be somewhat raised. When the test is opaque it is difficult to make out the bands.—*Locality :* Nos. **24, 34, 36, 43, 44**; frequent at No. **44.**

Pl. 16, fig. 13. The test is apiculate and the opaque bands which appear to be flush with the surface are continuous—that is,

not interrupted at the base as is usual in the type-form. About thirty specimens on the slide.—*Locality :* Nos. **42–44.**

Lagena fasciata Egger sp. var. *spinosa* Sidebottom.

Lagena fasciata Egger sp. var. *spinosa* Sidebottom, 1912, *Journ. Q. M. C.*, p. 402, pl. 17, figs. 16, 17.

† Pl. 17, fig. 16. One or two small specimens.—*Locality :* Uncertain.

† Pl. 17, fig 17. A fair number are present, but they are mixed with *L. staphyllearia*, so I cannot give the localities. See remarks † p. 402.

Lagena fasciata Egger sp. var. *carinata* Sidebottom (Pl. 16, figs. 14–16).

Lagena fasciata Egger sp. var. *carinata* Sidebottom, 1906, *Mem. Pro. Lit. Phil. Soc.*, Manchester, No. 5, p. 7, pl. 1, fig. 17.

Lagena fasciata Egger sp. var. *carinata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 403, pl. 17, fig. 18.

Pl. 16, fig. 14. The test is compressed, and the keel becomes more pronounced as it approaches the base of the shell. The internal tube is attached to the back of the test. A few of the examples are very fine, like the one chosen for illustration. The curved bands seem to be nothing more than an innumerable number of pores showing distinctly. In some of the smaller examples these bands can hardly be distinguished. It is open to question if these forms and the following (Pl. 16, fig. 15) would not be better placed under *L. marginata*.—*Locality :* Nos. **1–3, 5–7, 10, 11, 13–22.**

Pl. 16, fig. 15. Test compressed, carinate. The entosolenian tube is long and curled at its end. The bands are faintly marked as in the preceding form.—*Locality :* Nos. **2–5** ; common at No. **2.**

Pl. 16, fig. 16. A solitary example. The edges of the curved bands are very slightly raised, and the shell becomes more compressed as the orifice is approached. The keel is represented by a fine ridge only. The specimen is not in a very good condition, opaque patches interfering with the defirition of the bands, especially at their bases.—*Locality :* No. **42.**

† Pl. 17, fig. 18. Two or three examples found. The carina is not pointed at the base as in the figure referred to.—*Locality :* Uncertain.

Lagena staphyllearia Schwager sp.

Fissurina staphyllearia Schwager, 1866, p. 209, pl. 5, fig. 24.

The non-carinate form is rare. The number of spines varies. The tube is attached to one side, thus causing the orifice to be eccentric. In a few instances of the carinate variety, where only two spines are present, it is impossible to separate them from the *Fissurina bicaudata* Seguenza, which is generally placed with *L. marginata*.—*Locality :* Nos. **1–7, 9–12, 15–25, 29, 33, 34, 36, 37, 39–43**.

The variety with either the keel or the lower part of the test serrated or partially fimbriated is not so frequent, but occurs at many localities. The orifice is central and the sides of the test are only slightly carinate.—*Locality :* Nos. **5–8, 10, 11, 14, 15, 18, 19, 21, 22, 24, 33, 34, 40, 43**.

† Pl. 17, fig. 19. Very rare.—*Locality :* Nos. **2, 3, 15, 22**.

† Pl. 17, fig. 21. This peculiar variety is rather rare. The tests are semi-opaque. There is a short entosolenian tube.—*Locality :* Nos. **5–11, 13, 21, 23, 25, 36, 39, 40**.

† Pl. 17, figs. 22, 23. See remarks † p. 403.—*Locality :* Nos. **4–6, 8, 10, 22, 23, 33, 39**.

Lagena staphyllearia Schwager sp. var. *quadricarinata* Sidebottom.

Lagena staphyllearia Schwager sp. var. *quadricarinata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 404, pl. 21, fig. 16.

Locality : Nos. **2, 5–7, 9, 10, 12, 13, 21, 38, 41**.

Lagena unguiculata Brady.

Lagena unguiculata Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21, (N.S.), p. 61.

Lagena unguiculata Brady, 1884, p. 474, pl. 59, fig. 12.

See remarks † p. 404.—*Locality :* Nos. **5–10**.

Lagena quadrata Williamson sp.

Entosolenia marginata var. *quadrata* Williamson, 1858, p. 11, pl. 1, fig. 27.

Both the carinate and non-carinate form are present.—*Locality :* Nos. **15, 22, 24, 25, 34, 37, 40, 42–44**.

There are several examples which have a short neck and the orifice carrying a short spine at either side. Three or four specimens are similar to the one figured by Mr. Millett in his Malay Report, 1901, p. 496, pl. 8, fig. 18.

Lagena marginata Walker and Boys sp. (Pl. 16, figs. 17–20, fig. 18, trifacial form).

"*Serpula* (*Lagena*) *marginata*" Walker and Boys, 1784, p. 2, pl. 1, fig. 7.

This species is exceedingly well represented in these gatherings, and in one form or another is found at nearly all the stations. The shape of the body of the test varies from flattened to globular, and in outline from circular to elongate-pyriform, the carination from a fine ridge to a very broad wing. The situation and form of the orifice are variable. Apiculate examples are present and some have the keel acuminate at the base.

Pl. 16, fig. 17. This agrees fairly well in outline with *Fissurina paradoxa* Seguenza, 1862, pl. 2, fig. 7. The *Fissurina bicaudata* Seguenza, 1862, pl. 2, fig. 16, is also represented, and it is difficult in some cases to separate this from *L. staphyllearia*.

Pl. 16, fig. 18. A trifacial form. If anything, the three faces of the body are somewhat concave; one would rather expect them to be convex, judging from trifacial examples that occur in other species. The specimens vary very little.—*Locality*: Nos. **2–4, 8–10, 14, 15, 22, 29, 34, 36, 39, 40.**

Pl. 16, fig. 19. The edge of the test is flattened, the orifice fissurine. In some positions it has the appearance of being slightly bicarinate, but I do not think it is so.—*Locality*: Nos. **42, 43.**

Pl. 16, fig. 20. This minute variety has a comparatively large orifice, which is much compressed and opens out on one side of the median line; the tube is attached to the back of the test, which is very slightly carinate. The test is moderately compressed and curiously tucked in at its base. The specimens are mixed with others very similar to them, but which have the orifice central and the tube short and straight. There are other forms on the same square, so I cannot give the exact localities. The two forms mentioned are rare. Both were found at a station later in the series than No. **22**.

Lagena compresso-marginata Fornasini (Pl. 16, fig. 21).

Lagena compresso-marginata Fornasini, 1889, *Minute Forme di Riz. Retic. nella Marna Plioc. del Ponticello di Savena*, Bologna, fig. 16.

Pl. 16, fig. 21. This is rather a stoutly-built form. The aperture is fissurine and the test apiculate.—*Locality :* Nos. **22, 24.** Rather rare.

There are a few very small examples that appear to be almost identical with Fornasini's figure.—*Locality :* Uncertain.

† Pl. 17, fig. 30. Only two or three found.—*Locality :* Nos. **42, 44,** and two or three examples at one or two other stations.

† Pl. 17, fig. 31. Very rare.—*Locality :* Nos. **2, 4.**

† Pl. 18, fig. 1. Very rare. See remarks † p. 406.—*Locality :* Nos. **2, 5, 7, 19, 24.**

Lagena marginata Walker and Boys var.

Lagena marginata Walker and Boys var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 407, pl. 18, figs. 4, 5.

Locality : Nos. **4–6, 10–13, 16, 17, 19–23, 25, 36, 40.**

Lagena marginata Walker and Boys var. *catenulosa* Chapman (Pl. 16, fig. 22).

Lagena marginata var. *catenulosa* Chapman, 1895, p. 28, pl. 1, fig. 5.
Lagena marginata Walker and Boys var. *catenulosa* (Chapman) Sidebottom, 1912, *Journ. Q. M. C.*, p. 407, pl. 18, fig. 6.

Pl. 16, fig. 22. Four examples occur. The one chosen for illustration hardly shows a trace of the chain-pattern, and the test is free from exogenous shell-growth. The others show the chain-pattern. One of the specimens has the body of the test covered with exogenous beads. The few tubuli shown in the drawing are caused, I believe, by the borings of some animal.—*Locality :* Nos. **1, 5, 10.**

Lagena marginata Walker and Boys var. *raricostata* Sidebottom.

Lagena marginata Walker and Boys var. *raricostata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 408, pl. 18, figs. 8, 9.

† Pl. 18, fig. 8. Over twenty specimens are on the slide.—*Locality :* Nos. **1–3.**

Lagena marginata Walker and Boys var. *striolata* Sidebottom.

Lagena marginata Walker and Boys var. *striolata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 408, pl. 18, figs. 10, 11.

† Pl. 18, fig. 10.—*Locality :* Nos. **1, 3, 4, 15, 18–20, 22–25, 34, 35, 38, 42–44** ; frequent at Nos. **42, 43**.

† Pl. 18, fig. 11.—*Locality :* Nos. **23, 24, 42**.

Lagena marginata Walker and Boys var. *elegans* Sidebottom.

Lagena marginata Walker and Boys var. *elegans* Sidebottom, 1912, *Journ. Q. M. C.*, p. 409, pl. 18, fig. 12.

Locality : Nos. **14, 19, 20** ; frequent at No. **14**.

Lagena marginata Walker and Boys var. *retrocostata* Sidebottom.

Lagena marginata Walker and Boys var. *retrocostata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 409, pl. 18, fig. 13.

Locality : One specimen at No. **2**, and one other, station uncertain.

Lagena marginata Walker and Boys var. *semimarginata* Reuss.

Lagena No. 64, von. Schlicht, 1870, p. 11, pl. 4, figs. 4–6 ; and *No. 65*, p. 11, pl. 4, figs. 10–12.
Lagena marginata var. *semimarginata* Reuss, 1870, p. 468.

An altogether unsatisfactory variation. It occurs in several forms at a few stations ; that figured in the *Challenger* Report, pl. 59, fig. 19, occurs at No. **44**.

Lagena marginata Walker and Boys var. *seminiformis* Schwager.

Miliola stiligera Ehrenberg (?) 1854, pl. 31, fig. 6.
Lagena seminiformis Schwager, 1866, p. 208, pl. 5, fig. 21.

Four large examples occur, similar to those figured in the *Challenger* Report, pl. 59, figs. 28–30.—*Locality :* Nos. **5, 16, 17**.

† Pl. 18, fig. 16. Extremely rare, only one or two being found. —*Locality :* Uncertain.

† Pl. 18, fig. 17.—*Locality* : Nos. **1–3, 15**. Three examples at two or perhaps three of the four stations indicated ; also six at a few other uncertain localities.

† Pl. 18, fig. 18.—*Locality :* Nos. **1, 3, 13,** and several others. Very rare.

† Pl. 18, fig. 19. Several have the central spine at the base of the same length as the other two.—*Locality :* Nos. **2, 3, 6–8, 10, 11, 24, 34–36.**

Lagena marginato-perforata Seguenza (Pl. 16, figs. 23–25).

Lagena marginato-perforata Seguenza, 1880, p. 332, pl. 17, fig. 34.

Very numerous. The variety with no keel is rare. The shape of the test varies a good deal as regards compression and length. In a few cases, fine lines, running the length of the test, make their appearance. At the edge of the test, the markings are sometimes arranged in a line.—*Locality :* Nos. **1, 2, 4, 5, 7–15, 19, 20, 22–25, 29, 38–40, 42–44.**

Pl. 16, fig. 23. This is nearly circular in section near the base, and becomes compressed as the orifice is approached. Tube straight. Rare.—*Locality :* No. **14.**

Pl. 16, fig. 24. In this example fine pores are seen, but with few exceptions the centre of each face of the test is free from them. One specimen is in the trifacial condition.—*Locality :* Nos. **23–25, 29, 33, 36, 38, 39.**

Pl. 16, fig. 25. Test well compressed, subcarinate. Except for the two lines of pores that run round the test close to its edge, the faces are almost free from them. The shell is partially clouded. Fairly frequent.—*Locality :* Uncertain.

Lagena Wrightiana, Brady.

Lagena Wrightiana Brady, *Quart. Journ. Micr. Sci.*, vol. 21, 1881, p. 62.

Lagena Wrightiana Brady, 1884, p. 482, pl. 61, figs. 6, 7.

The central part of the faces of the test is not always smooth. Very rare.—*Locality :* Nos. **37, 42, 43.**

Lagena lagenoides Williamson sp. (Pl. 16, figs. 26–29, and pl. 17, fig. 1).

Entosolenia marginata Walker and Boys var. *lagenoides* Williamson, 1858, p. 11, pl. 1, figs. 25, 26.

This and its numerous variations are well represented. Pl. 16, figs. 26, 27. I was tempted to place these under *L. marginata*, but the appearance of the wing caused me to hesitate and to submit a specimen to Mr. Earland for examination. He reported that the wing was tubulated, being "infiltrated with amorphous carbonate of lime subsequent to the death of the animal." Mr. Millett considers that if tubuli are present "their affinity would be with *L. lagenoides* rather than with *L. marginata*." Besides the two forms figured, both large and small circular examples occur in the same condition, only with the tubuli showing more plainly.

Pl. 16, fig. 28 represents one of the small examples. There are also specimens which are apparently of exactly the same form, in which the tubuli, if present, must be extremely minute. It would appear therefore necessary to submit all such forms to critical examination.—*Locality:* Nos. **5–7, 11, 14, 15, 18–22**.

Pl. 16, fig. 29. In this instance the keel is twisted at the base. Four specimens found.—*Locality:* Uncertain, but after station No. **22**.

Pl. 17, fig. 1. The test is well compressed and the orifice also. Entosolenian tube short and curled.—*Locality:* Nos. **42–44**; frequent at Nos. **43, 44**.

†Pl. 18, fig. 22. The form occurring is very similar to the figure referred to. It is rather smaller and the keel is narrower and thicker; the neck and phialine orifice are the same.—*Locality:* Nos. **1–3, 42–44**.

Six large specimens similar to the *Challenger* Report figure, pl. 60, fig. 14, are also present. Very rare.—*Locality:* Nos. **2, 22, 24**.

Another set is similar to †pl. 19, fig. 4, but the tests are not striated. Frequent.—*Locality:* Nos. **2–8, 11**.

†Pl. 18, fig. 23. See remarks, †p. 412.—*Locality:* Nos. **2, 36, 38, 39**.

†Pl. 18, fig. 29. Typical examples are very rare and not so

large as the specimen referred to.—*Locality :* No. **3**, and either No. **35** or **39**.

Besides the above, there are a few specimens which are much smaller, especially in the width of the test.—*Locality :* Nos. **17, 19**, and one or two other stations.

Lagena lagenoides Williamson sp. var. nov. *duplicata* (Pl. 17, fig. 2).

The test is bicarinate ; aperture oval and the keels tubulated. Six specimens found.—*Locality :* Nos. **24, 37**.

Lagena lagenoides Williamson sp. var. *tenuistriata* Brady.

Lagena tubulifera var. *tenuistriata* Brady, 1881, *Quart. Journ. Micr. Sci.* vol. 21 (N.S.), p. 61.
Lagena lagenoides Williamson var. *tenuistrata* Brady, 1884, p. 479, pl. 60, figs. 11, 15, 16.

†Pl. 19, fig. 4. Very frequent. These correspond to the *Challenger* Report, pl. 60, fig. 11. The trifacial form also occurs. —*Locality :* Nos. **1–11, 13, 14, 17, 21–24, 29, 31, 33–35, 37, 39–41**.

There is another set of specimens which are not quite so large and have the costae on the body of the test, farther apart.—*Locality :* Nos. **14, 15, 17, 18**.

There are a few large specimens very similar to the *Challenger* Report, pl. 60, fig. 15. In the stouter examples the fine costae coalesce to such an extent that the surface has a pitted appearance.—*Locality :* Nos. **2, 8, 11**, and one or two other stations.

Lagena formosa Schwager (Pl. 17, figs. 3–7).

Lagena formosa (pars) Schwager, 1866, p. 206, pl. 4, fig. 19.
Lagena formosa (Schwager) Brady, 1884, p. 480, pl. 60, figs. 10, 18–20.

This is present in many forms ; some show the raised border punctate, others do not. See remarks † p. 414.

Pl. 17, fig. 3. In this, which is obviously of the same kind as fig. 18, pl. 60, in the *Challenger* Report, the raised border is absent. Others agree with this figure, also with the *Challenger* Report, fig. 20.

Several very fine specimens are intermediate between fig. 18 and *L. formosa* var. *favosa* Brady, on the same plate, fig. 21.

They are heavily punctate at the base of the neck, and costae just start to run down the keels. Many small examples occur, which come under this unsatisfactory species, but as they are mixed on the various squares I can only give the stations for the whole series.—*Locality :* Nos. **1–8, 10, 11, 13, 14, 17, 21, 23–25, 29, 37, 39–41, 43.**

Pl. 17, fig. 4. The keel splits near the top, and the space thus formed is filled with shell-growth. The specimens are not in a satisfactory condition for examination, so I cannot say if the tubuli in the keel occupy the whole of the space. The punctate border does not seem to be raised, and it shows clearer in substance than the rest of the test. I believe this is the same as *Challenger* Report, pl. 60, fig. 10.—*Locality :* No. **44.**

Pl. 17, fig. 5. I am inclined to believe that the keel has broken away in these specimens, of which there are seven. They are all in the same condition; the drawing shows how the keel has begun to split.—*Locality :* Nos. **43, 44.**

† Pl. 18, fig. 24. I am now inclined to believe that in this case also the keel has become fractured.

Pl. 17, fig. 6. This has a likeness to the preceding pl. 17, fig. 5. The keel, which commences at the neck, soon splits and joins the two borders; the space between them is filled with shell-growth. The test has a very compact look and the tubuli show clearly. Rare.—*Locality :* Nos. **42, 43.**

Pl. 17, fig. 7. A solitary specimen in good condition. The keel, commencing at the orifice, dies away about half-way down the test. A few well-marked pores are scattered on each face of the test. At the base are several short costae.—*Locality :* No. **37.**

† Pl. 19, fig. 9. See remarks, † p. 414. Frequent.—*Locality :* Nos. **1, 2, 10, 11, 14, 17–19, 22.** Over twenty examples occur after station No. **22,** but the exact stations are uncertain.

Lagena formosa Schwager, var. (Pl. 17, fig. 8).

The drawing of this variety must be taken more or less as diagrammatic. The test, which has three keels (the central one commencing at the aperture) is in an opaque condition. The spaces between the keels are filled with shell-growth. The tubuli hardly show, unless the shell be moistened. The body of the test has fine costae running lengthwise, and is finely pitted. There

are only two specimens and they are exactly alike.—*Locality :* No. **40**.

Lagena formosa Schwager var. *comata* Brady.

Lagena formosa var. *comata* Brady, 1884, p. 480, pl. 60, fig. 22.

A few large specimens occur very similar to the *Challenger* examples, pl. 60, fig. 22.—*Locality :* Nos. **5, 6, 33, 34**.

† Pl. 19, fig. 11. A single example.—*Locality :* Uncertain.

† Pl. 19, fig. 12. Very rare.—*Locality :* Nos. **6, 10, 22,** and one or two stations which are uncertain.

Lagena squamoso-alata Brady (Pl. 18, fig. 20).

Lagena squamoso-alata Brady, 1881, *Quart. Journ. Micr. Sci.* vol. 21 (N.S.), p. 61.

Lagena squamoso-alata Brady, 1884, p. 481, pl. 60, fig. 23.

A single example occurs, which is typical, except that the produced neck is absent, having most probably been broken off.—*Locality :* No. **23**.

Pl. 18, fig. 20. Besides the above typical specimen, there are twenty-two tests which are smaller and not so robust. They answer to Brady's description of the species. The pittings on the body of the test have a tendency at times to arrange themselves in lines. The raised border appears to be punctate. It is difficult to make out the markings on the wings, owing to débris, but they can be detected in some of the specimens. I believe the wings to be cellulated. Brady, in the *Challenger* Report, only mentions that they have radiate markings ; but on examining the edges of my typical specimen it is apparent that the wings are cellulated. I take this form to be simply a variety of *L. formosa.* One example is in the trifacial condition.—*Locality :* Nos. **24, 25, 34, 36.**

Lagena quadrangularis Brady.

Lagena quadrangularis Brady, 1884, p. 483, pl. 114, fig. 11.

Lagena quadrangularis (Brady) Millett, 1901, p. 625, pl. 14, fig. 17.

A single typical specimen, but the neck appears to be fractured. —*Locality :* Either No. **14** or No. **22**.

Lagena Orbignyana Seguenza sp. (Pl. 17, figs. 9–11).

Entosolenia marginata (pars) Williamson, 1858, p. 10, pl. 1, figs. 19, 20.
Fissurina Orbignyana Seguenza, 1862, p. 66, pl. 2, figs. 25, 26.

This occurs in many forms. Some of the specimens are similar to the *Challenger* Report, pl. 59, figs. 25, 26. Numerous small varieties also are present. In some the side keels are little more than slightly raised ridges.

Pl. 17, fig. 9. This is a very neat and compact variety.

The test is moderately compressed.—*Locality :* Nos. **42–44**; frequent at Nos. **42, 44.**

Pl. 17, fig. 10. I take this to be a variety of *L. Orbignyana*, in which the central keel has split soon after leaving the orifice. The body of the test is much compressed, and is roughened. The entosolenian tube is long and attached. The split keel is entirely blocked with débris, or shell-growth. Two examples found.—*Locality :* No. **38.**

Pl. 17, fig. 11. A neat form. The central keel is emarginate at the base, at the middle of which one or two small spines project. The two subsidiary keels are not generally continuous. There are over one hundred specimens.—*Locality :* Nos. **1, 2, 4–13, 21, 23, 26, 29, 33, 34, 38, 39.**

Lagena Orbignyana Seguenza sp. var. *lacunata* Burrows and Holland (Pl. 17, fig. 12).

Lagena lacunata (Burrows and Holland) Jones, 1895, p. 205, pl. 7, fig. 12.

One set agrees exactly with fig. 1, pl. 60 of the *Challenger* Report, which Messrs. Burrows and Holland point out in the above reference, is misnamed as *L. castrensis* Schwager.—*Locality :* Nos. **42–44**; frequent at No. **44.**

A few small examples are occasionally met with in which the pittings are numerous and minute, and the keels very feebly developed.—*Locality :* Uncertain.

Pl. 17, fig. 12. I am treating this as a form of *L. Orbignyana* var. *lacunata*, but it appears to have one of the characteristics of *L. annectens* (Burrows and Holland) Jones, 1895, for the band round the body of the test appears to be very slightly concave.

The edges of the band are just raised above the surface, and the space between is roughened. It will be noticed, by reference to the *Challenger* figure, pl. 60, fig. 1, that there is a ridge, or minor keel, between the side keel and the central one, and I take my specimens to be in the same condition, only the inner ridge is quite close to the central keel. The body of the test is finely pitted all over. The aperture is large, compressed and lipped. In two cases the keel is serrated all round, but it is doubtful if this is natural. The tube is attached. Frequent.—*Locality :* Nos. **42, 43.**

Lagena Orbignyana Seguenza sp. var. *Walleriana* Wright.

Lagena Orbignyana sp. var. *Walleriana* Wright, 1886, *Proc. R. Irish Acad.*, ser. 2, vol. iv., p. 611, and 1891, p. 481, p. 20, fig. 8.

In all the specimens the typical boss is replaced by a ring, which is very slightly raised.—*Locality :* Nos. **2, 22,** and one or more of the three stations, Nos. **42–44.**

Lagena Orbignyana Seguenza sp. var. *unicostata* Sidebottom.

Lagena Orbignyana Seguenza sp. var. *unicostata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 417, pl. 19, fig. 22.

The single costa in this case runs the whole length of the body of the test. Very rare.—*Locality :* Nos. **18, 22.**

Lagena Orbignyana Seguenza sp. var. *pulchella* Brady (Pl. 17, fig. 13).

Lagena pulchella Brady, 1866, *Rept. Brit. Assoc.* (Nottingham), p. 70.

Lagena pulchella Brady, *Annals and Mag. Nat. Hist.*, 1870, p. 294, pl. 12, fig. 1.

The largest specimens are very similar to *L. Orbignyana* var. *variabilis* Wright, 1891, pl. 20, fig. 9, but the costae are irregular and cover the whole of the body of the test; sometimes there is a fine ridge showing between the main keel and the side keels. Very rare.—*Locality :* Uncertain.

A smaller set is frequent, with few and irregular costae. The side keels amount to little more than slight ridges.—*Locality :* No. **44.**

A few very small examples are also present.

Pl. 17, fig. 13. This solitary example has the costae well raised, and as they are irregular I have placed it under the above heading. The side keels are only just apparent.—*Locality :* No. **44.**

† Pl. 19, fig. 24. Very rare. See remarks † p. 418.—*Locality :* Nos. **1, 38.**

Lagena Orbignyana Seguenza sp. var. *clathrata* Brady (Pl. 17, fig. 14).

Lagena clathrata Brady, 1884, p. 485, pl. 60, fig. 4.

The type-form occurs, but is always rare, except at No. **43,** where eleven were found.—*Locality :* Nos. **17, 18, 24, 29, 35, 37, 38, 43, 44.**

A few very small specimens are present, but they are not typical. Others are minute, with numerous fine costae either straight or curved, these latter resembling *L. variabilis*, as Mr. Millett remarks in his Malay Report, 1901, p. 628.

Pl. 17, fig. 14. I think this may be brought under the above heading. The test is compressed and has three keels; these stand out more than the three costae which run down each face of the test.—*Locality :* Nos. **8, 10–14;** frequent at No. **8.**

Lagena Orbignyana Seguenza sp. var. *variabilis* Wright.

Lagena Orbignyana sp. var. *variabilis* Wright, 1890, p. 482, pl. 20, fig. 9.

Except that the side keels are not so well developed, and the striae are very numerous, the specimens are fairly typical. In several instances the striae are inclined to cover the body of the test, and in others they are either absent or scarcely perceptible.—*Locality :* **2, 5–7, 10–14, 16–18, 24, 29, 34, 35.**

Lagena Orbignyana Seguenza sp. var. (Pl. 17, fig. 15).

The test is only slightly compressed; the main keel, which starts at the orifice, splits as it approaches the body of the test. Very fine bars cross the space thus formed. Between the cross-bars is a well-marked circular depression. Besides the side keels there are two semicircular costae, one of these on each face of the test. At the base is an irregular circular projection to which the keels are attached. The wall of this projection is thin.

Only two specimens were found, each of them badly fractured. Both have been utilised in preparing the illustration, which must be considered as a drawing of a restored specimen.—*Locality :* Uncertain.

Lagena bicarinata Terquem sp. (Pl. 17, figs. 16, 17).

Fissurina bicarinata Terquem, 1882, p. 31, pl. 1 (9), fig. 24.

The type-form does not appear to be present.

Pl. 17, fig. 16. The tests are in a very opaque condition.—*Locality :* Nos. **23, 24, 33, 34, 40**.

Pl. 17, fig. 17. There are two or more spines at the base. Eleven specimens are in good condition.—*Locality :* Nos. **2–3**.

† Pl. 19, fig. 27. See remarks † p. 419.—*Locality :* Nos. **2–4**.

A few also occur, very similar to these, except that the body of the test is more circular in outline.—*Locality :* Uncertain.

Lagena bicarinata Terquem sp. var. (Pl. 17, fig. 18).

Test bicarinate. The faces of the test are slightly convex, and the two keels slope towards their edges, the effect being that the test appears to have a boss on either face. Orifice much compressed and composed of a row of pores. A solitary specimen.—*Locality :* No. **37**.

Lagena bicarinata Terquem sp. var. (Pl. 17, fig. 19).

Test bicarinate and apiculate, with a row of very short tubular projections running round the edge of the test between the keels. The test becomes more compressed as the orifice is approached. Two examples only occur. The neck appears to be broken off in both cases.—*Locality :* No. **43**.

Lagena bicarinata Terquem sp. var. (Pl. 17, fig. 20).

Test bicarinate, the keels generally dying away as they approach the orifice, which is composed of a series of fine pores. I cannot say if the fine bands, which adorn each face of the test, are raised or not. Bands of different nature and length are found on other species besides *L. fasciata*, so I prefer to place this form under *L. bicarinata*, instead of treating it as *L. fasciata* in the bicarinate condition.—*Locality :* Nos. **1–10, 13, 15, 16**.

Lagena auriculata Brady (Pl. 17, figs. 21, 22, and pl. 18, fig. 1).

Lagena auriculata Brady, 1881, *Quart. Journ. Micr. Sci.*, vol. 21 (N.S.), p. 61.
Lagena auriculata Brady, 1884, p. 487, pl. 60, figs. 29, 31, 33.

This is largely represented, especially in its variations; intermediate forms occur which it would be interesting to figure.

Pl. 17, fig. 21. In this solitary specimen the wing has divided at a point a little above the body of the shell.—*Locality*: No. **29** or No. **39**.

Pl. 17, fig. 22. A neat form which appears to be strongly built. The shell is moderately compressed. The entosolenian tube, when present, is very short and straight. The orifice is crowned with a boss, and the loops at the base are feebly represented. Nine specimens occur.—*Locality*: Nos. **2, 10**.

Pl. 18, fig. 1. A stoutly-built form. The test is subcarinate, and the orifice situated in a depression. The two loops at the base are feebly developed. Very rare.—*Locality*: Uncertain, but after station No. **23**.

† Pl. 20, fig. 4. A few examples resemble this variation, the keel being continuous round the edge of the test.—*Locality*: Nos. **23, 24, 26, 36, 38, 40, 42, 43**.

† Pl. 20, fig. 5. There are twelve examples, closely resembling this figure, but having no small wings at the top of the test.—*Locality*: Nos. **24, 29, 34, 36, 39–41**.

† Pl. 20, figs. 7. 8. A large number are similar to these forms and to *Challenger* Report, pl. 60, fig. 29.—*Locality*: Nos. **2–4, 6–12, 17–24, 26–29, 33–35, 38–43**.

† Pl. 20, figs. 9, 10. Some forms present lie more or less between the two figures given at this reference.—*Locality*: Nos. **2–6, 6–11, 17, 18, 21, 22**.

† Pl. 20, figs. 11, 12. Only two or three specimens are near † fig. 11; all the rest, and there are over eighty, are like † fig. 12.—*Locality*: Nos. **1–11, 22, 23, 33, 34, 37, 39**. Most of them were found at Nos. **1–11**.

† Pl. 20, fig. 13. Nine examples occur, and one is in the trifacial condition.—*Locality*: Nos. **1, 38, 42–44**; the trifacial specimen at No. **43**.

† Pl. 20, fig. 14. Eight specimens found.—*Locality*: Nos. **1–4**.

Lagena auriculata Brady var. nov. *caudata* (Pl. 18, figs. 2, 3).

Test compressed, the lower part of the body faintly striated. A single long spine, probably always bent more or less to one side, projects at the base. Orifice situated at the end of a long neck. In fig. 2 the basal spine is partly broken off.

The faint striation seems to indicate an affinity with *L. auriculata* var. *costata* Brady, but in order to avoid giving subvarietal names, I have treated it as a variation of *L. auriculata*.—*Locality :* No. **2**.

Lagena auriculata Brady var. nov. *circumcincta* (Pl. 18, fig. 4).

Test compressed, subcarinate, except at the lower edge and base, where the keel is well developed. A few costae run across each face of the test. Orifice oval. Entosolenian tube long and curved. Four specimens occur. There are six tests on the square, but two do not belong to the same variety.—*Locality :* No. **43**, and one of the following stations: Nos. **38, 42, 44,** but which one is doubtful.

Lagena auriculata Brady var. nov. *clypeata* (Pl. 18, fig. 5).

Test compressed, carinate. Orifice oval. Two raised oval rings (sometimes slightly irregular) on each face of the shell. The loops at the base small. Entosolenian tube long and curved. It is easy to miss noticing the loops. The tests vary a little from one another in outline. The keel is not quite so wide as indicated in the drawing.

About twenty specimens are arranged on the same square as a number of *L. Orbignyana* sp. var. *Walleriana* Wright, for which they may have been temporarily mistaken.—*Locality :* The majority must have been found either at Nos. **42** or **43**, or both.

Lagena auriculata Brady var. Sidebottom (Pl. 18, fig. 6).

Lagena auriculata Brady var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 421, pl. 20, figs. 15–18.

Pl. 18, fig. 6 and † pl. 20, fig. 15. I have figured one of average size. There are often a few spines at the base.—*Locality :* Nos. **4, 23, 24, 38–44.**

A few elongate examples occur.—*Locality :* Nos. **2. 3**.

Several approach † pl. 20, fig. 18.—*Locality :* Uncertain.

† Pl. 20, fig. 17. A number are near this form, and mixed with them are several identical with Mr. Millett's Malay Report, pl. 14, fig. 15.—*Locality :* Nos. **1–4**.

A few elongate specimens occur, the body being striated, or wrinkled, as indicated in the figure.—*Locality :* Nos. **8, 9, 11**.

Lagena auriculata Brady var. *arcuata* Sidebottom.

Lagena auriculata Brady var. *arcuata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 421, pl. 20, figs. 19, 20.

† Pl. 20, fig. 19. The specimens differ from the figure, as the arches radiate from the base.—*Locality :* Nos. **4–7, 9, 10.**

Lagena auriculata Brady var. *costata* Brady.

Lagena auriculata Brady var. *costata* (Brady) Sidebottom, 1912, *Journ. Q. M. C.*, p. 422, pl. 20, figs. 21, 22.

† Pl. 20, fig. 22. See remarks, † p. 422.—*Locality :* Nos. **23, 24, 29, 33, 39, 42.**

Lagena auriculata Brady var. *duplicata* Sidebottom
(Pl. 18, figs. 7, 8).

Lagena auriculata Brady var. *duplicata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 422, pl. 20, fig. 23.

Pl. 18, fig. 7. The loops in this case extend from the base almost to the neck. At the first glance, I took the specimens to be *L. Orbignyana*, as in some of the specimens débris or shell-growth partially covered the loops, the inner sides of which are quite close to the keel ; a closer examination of other examples, which are free from débris, show the loops to be complete. The tests, of which there are ten, are large.—*Locality :* No. **42**.

Note.—The above might, with equal propriety, be treated as a carinate form of *L. alveolata* var. *separans* Sidebottom, 1912, † pl. 21, fig. 4.

Pl. 18, fig. 8. This differs from † Pl. 20, fig. 23, chiefly in the

absence of the carina. Very rare.—*Locality :* Nos. **29**, **34**, **39**. Two or three were found at other stations besides those indicated.

NOTE.—Several examples occur almost identical with the above ; the only difference being that the loops merge together as in *L. alveolata*, and so must be treated as such.

+ Pl. 20, fig. 23. One specimen. *Locality :* Uncertain.

Lagena fimbriata Brady (Pl. 18, fig. 9).

Lagena fimbriata Brady, *Quart. Journ. Micr. Sci.*, vol. 21 (N.S.), 1881, p. 61.
Lagena fimbriata Brady, 1884, p. 486, pl. 60, figs. 26–28.

Two specimens occur similar to the *Challenger* Report, pl. 60, fig. 28.—*Locality :* Uncertain.

Pl. 18, fig. 9. This is a neat, small, compactly built variety, and the fimbriated portion does not appear liable to get fractured. The tube is curled upon itself. The test is moderately compressed, and the opening at the base is very narrow. This variety must not be confused with pl. 20, fig. 28.—*Locality :* Nos. **31**, **43**, **44** ; frequent at No. **44**.

+ Pl. 20, fig. 24. Two examples only occur.—*Locality :* No. **31**.

+ Pl. 20, fig. 25. Eight specimens.—*Locality :* One or more of the following stations : Nos. **5**, **6**, **22**.

+ Pl. 20, fig. 26. Four very fine examples occur.—*Locality :* Nos. **4**, **6**, **8**, **10**.

Three specimens, with the base more pointed and the opening more contracted, are also on the slide.—*Locality :* Nos. **7**, **10**, **12**.

Lagena fimbriata Brady var. nov. *duplicata* (Pl. 18, fig. 10).

Test compressed, ovate. There are two narrow loops, side by side, across the width of the test at its base. Tube curled on itself. I think the walls of the loops are tubulated, but cannot be quite certain about it. A solitary specimen.—*Locality :* Uncertain.

There is another test which has the orifice wider, and the tube short and straight. The loops are in the same position, but so feebly represented that it is doubtful whether it belongs to the above variety.

Lagena fimbriata Brady var. *occlusa* Sidebottom.

Lagena fimbriata Brady var. *occlusa* Sidebottom, 1912, *Journ. Q. M. C.*, p. 423, Pl. 20, figs. 27, 28.

† Pl. 20, fig. 27. Common. Most of the specimens have the opening at the base more open than in the illustration. See remarks, † p. 423.—*Locality:* Nos. **1–4, 6–13, 15, 17, 19, 22, 24, 25, 29, 31, 33–35, 37–42.**

Lagena alveolata Brady (Pl. 18, figs. 11, 12).

Lagena alveolata Brady, 1884, p. 487, pl. 60, figs. 30, 32.

Pl. 18, fig. 11. The tests are large and strongly built. All are in the apiculate condition. The dotted line indicates the boundary of the chamber, thus showing the thickness of the wall. Orifice oval. Twelve examples occur.—*Locality:* Nos. **1, 5.**

Pl. 18, fig. 12. There are a large number present. The tests are fairly well compressed. The chief peculiarity is that, though the entosolenian tube is straight, the orifice opens out well below the median line. The part above the orifice is sharpened. The loops at the base are small, and their outer edges do not project nearly so far as does the central carina.—*Locality:* Nos. **1–15, 17–20.**

† Pl. 21, fig. 1. Unfortunately the specimens are mixed with another species, so that the stations at which they were found are uncertain. There are a fair number on the slide.

† Pl. 21, fig. 2. Good examples are present.—*Locality:* Nos. **1, 3–5, 7, 10, 16, 17.**

Lagena alveolata Brady var. *carinata* Sidebottom.

Lagena alveolata Brady var. *carinata* Sidebottom, 1912, *Journ. Q. M. C.*, p. 424, pl. 21, fig. 3.

This form is very rare in this collection.—*Locality:* Nos. **24, 39, 40.**

Lagena alveolata Brady var. *substriata* Brady.

Lagena alveolata var. *substriata* Brady, 1844, p. 488, pl. 6, fig. 34.

A single specimen. It is not quite typical, the neck of the test being more produced than in the *Challenger* figure.—*Locality:* No. **39.**

Lagena alveolata Brady var. *separans* Sidebottom.

Lagena alveolata Brady var. *separans* Sidebottom, 1912, *Journ. Q. M. C.*, p. 425, pl. 21, fig. 5.

Locality : Nos. **1–3, 5, 6, 17–20, 23–25, 34, 38.**

Lagena clypeato-marginata Rymer-Jones var.

Lagena clypeato-marginata Rymer-Jones var. Sidebottom, 1912, *Journ. Q. M. C.*, p. 425, pl. 21, fig. 6.

Several examples occur.—*Locality :* Uncertain.

Lagena magnifica Sidebottom.

Lagena magnifica Sidebottom, 1912, *Journ. Q. M. C.*, p. 425, pl. 21, fig. 8.

A few of the specimens are in the transparent condition.—*Locality :* Nos. **1–5, 7.**

Lagena Elcockiana Millett.

Lagena Elcockiana Millett, 1901, p. 621, pl. 14, figs. 5, 6.
Lagena Elcockiana (Millett) Sidebottom, 1912, *Journ. Q. M. C.*, p. 426, pl. 21, fig. 9.

A single specimen.—*Locality :* Uncertain.

Lagena galeaformis Sidebottom.

Lagena galeaformis Sidebottom, 1912, *Journ. Q. M. C.*, p. 426, pl. 21, figs. 11, 12.

† Pl. 21, fig. 12. Only the trifacial form appears to be represented in these gatherings.—*Locality :* Nos. **1–3.**

There are a few tests which may, or may not, be the bifacial form of this species. I have included them under † pl. 20, fig. 17, on page 421. They are not so stout as this figure represents, and the side keels are entire as far as the tubular process.

Lagena protea Chaster.

Lagena protea Chaster, 1892, p. 62, pl. 1, fig. 14.

See remarks, † p. 427.—*Locality :* Nos. **2, 10, 17, 19, 22, 23, 25, 38, 39, 43, 44.**

Lagena invaginata sp. nov. (Pl. 18, fig. 13).

Test slightly carinate; oral end protruding and arched; orifice a narrow slit, perhaps barred. The front highly convex; the back flat, with a large concave recess at the base. The entosolenian tube long and bent to one side. Twenty-one examples occur.—*Locality:* Nos. **38, 41, 42**; chiefly at No. **42**.

Lagena reniformis sp. nov. (Pl. 18, fig. 14).

The test reminds one of a kidney bean in shape; the orifice is situated on one side of the median line. The entosolenian tube is long and attached. A few of the specimens are not nearly so wide in relation to the height as the one figured.—*Locality:* About sixteen at No. 44. It occurs also at several other stations.

Lagena reniformis sp. nov. var. (Pl. 18, fig. 15).

I am treating this as a variation of the above. I believe the orifice is composed of a series of pores, at any rate it is exceedingly narrow. There are two other tests along with it, in which the width is about equal to the height, but I think they belong to the same variety.—*Locality:* Uncertain.

Lagena reniformis sp. nov. var. *spinigera* (Pl. 18, fig. 16).

The test is compressed, and the two spines, one on either side, project upwards. The orifice is slightly sunk, and the tube is long and attached, reaching almost round the shell. Two specimens only found.—*Locality:* Nos. **29, 44**.

Lagena sp. incert. (Pl. 18, fig. 17).

Probably this is only *L. marginata* in a contorted condition. The test is carinate, compressed and twisted. Two occur.—*Locality:* Both at No. **15**; or one at No. **1** and the other at No. **15**.

Lagena lagenoides Williamson sp. var. (Pl. 18, fig. 18).

The test is elongate, not much compressed, and bicarinate. Aperture fissurine. The keels, which only project slightly, are tubulated.

I take this to be an elongate variety of *L. lagenoides*, Williamson sp., pl. 17, fig. 1. Three occur.—*Locality:* No. **40**.

Lagena staphyllearia Schwager sp. var. (Pl. 18, fig. 19).

Test compressed (lower part angular in outline) with five very small protuberances arranged, as shown in the drawing, on the edge of the shell. The entosolenian tube starts straight and then bends towards the back of the test. Only four occur, and they vary a little in outline.—*Locality :* Nos. **3, 11.**

Lagena sp. incert. (Pl. 18, fig. 21).

I have only made an outline drawing of this form, because I am not sure what its natural condition may be. The test is compressed, and nearly all the examples are covered with shell-growth, which has a sugary appearance. The colour is a light cream. In those that are partially free from this incrustation, the test appears to be more or less in a hispid condition. The carina, starting at the orifice, often ends abruptly, as shown in the illustration, but sometimes it gradually diminishes until it is lost about half-way down the test. Two or more spines adorn the base. It may be a compressed form of *L. hispida.* —*Locality :* Nos. **23, 29, 39, 40, 41.**

Lagena sp. incert. (Pl. 18, fig. 22).

I am puzzled with this form, not knowing whether to treat it as *L. marginata* in which the keel has split, thus forming two long loops, one on either side of the test; or, as *L. auriculata* in which the loops extend almost to the neck. It will be noticed that the loops are quite separate at the base. Three occur. The specimens are mixed with those of another form.—*Locality :* One must have been found at No. **43** or No. **44.**

? **Lagena** sp. (Pl. 18, figs. 23, 24).

I believe this to be a foraminifer, but it is very doubtful if it be a Lagena. There was a small test, on the same square, which had every appearance of being the initial chamber of the same species. Unfortunately, in using a high-power lens for examination, I accidentally crushed the specimen; but I had previously made an outline drawing of it, see pl. 18, fig. 24.

The large test, pl. 18, fig. 23, is not compressed. The orifice is a rosette in form, and the upper part of the test is covered with a raised irregular mesh. Rows of tubular projections run at

intervals across the test. It being a solitary example I do not care to make a section of it, but probably it would reveal a series of chambers. As Mr. Thornhill has placed it among the Lagena, and it is such an interesting object, I cannot resist the opportunity of figuring it. It is opaque, but the single-chambered specimen was quite transparent.—*Locality :* No. **42.**

Lagena maculata sp. nov. (Pl. 18, fig. 25).

I was unable, for various reasons, to make out the nature of this interesting species, so submitted the test to Mr. Earland, and he has kindly sent me the following description of it :

"The shell appears to consist of two, probably three layers. An inner test which is covered with a raised hexagonal outline pattern, like network over a ball, and this in turn is covered with an extremely thin outer test. This latter may be merely chitinous or membranous; it is sufficiently thin to show diffraction spectra. Where this outer layer is stretched over the raised pattern it is depressed in a rounded fashion, as though it had been pressed down with the tip of the finger into the hexagonal cavity beneath."

A solitary example. It belongs to the *Waterwitch* set of Lagenae. Test not compressed.

Locality : No. **13.** Station 238, Lat. 12°44′ S., Long. 179°09′ W. (1,050 fms.).

Lagena marginata Walker and Boys var. *ventricosa* Silvestri.

Lagena ventricosa Silvestri, 1903–1904, *Accad. Reale delle Scienze di Torino*, p. 10, figs. 6 *a–e*.

This seems to me simply a stout form of *L. marginata*. There are eleven large specimens, but the carina is carried a little farther up the test. Three of the tests are nearly round in section. Examples moderately compressed, with orifice of the same character, I have placed with *L. marginata*.—*Locality :* Nos. **5, 15.**

[Mr. Henry Sidebottom has decided to make a type-slide of the species described in his two papers as an index to the collection of Lagenae. The collection will then be presented to the British Museum (Natural History), South Kensington, under the title, "The Thornhill Collection of Lagenae (South-West Pacific)."

DESCRIPTION OF PLATES.

Plate 15.

Plate 16.

Plate 17.

Plate 18.

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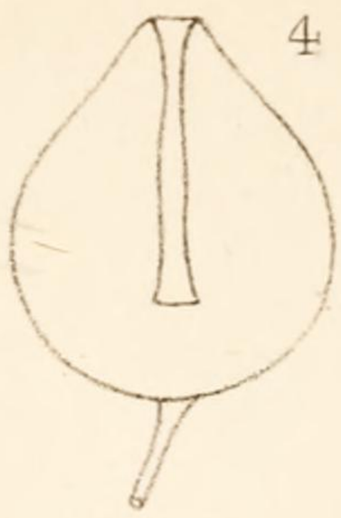
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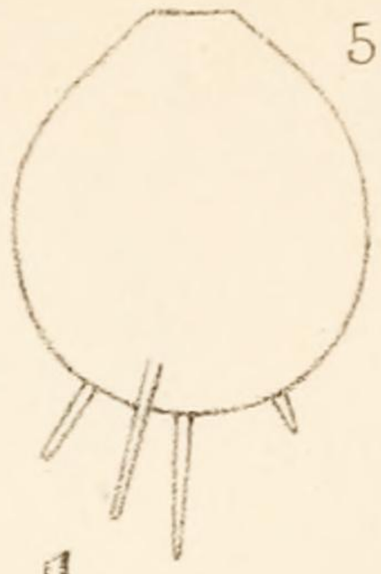
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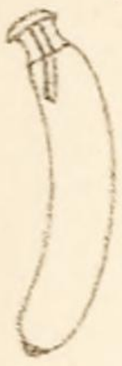
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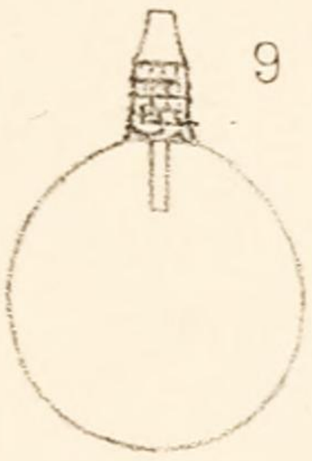
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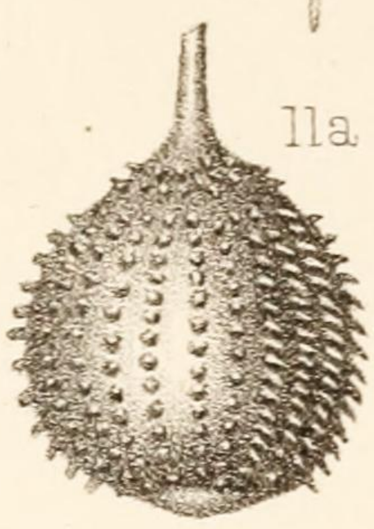
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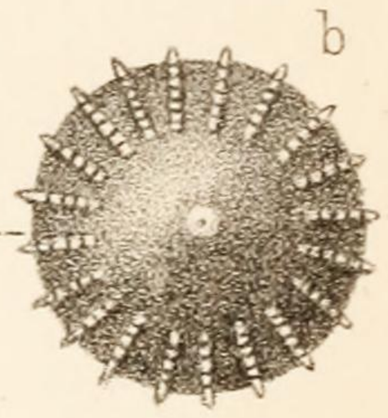
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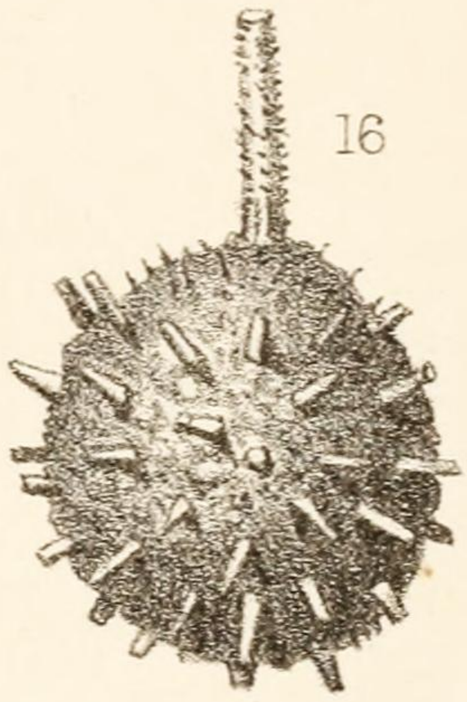
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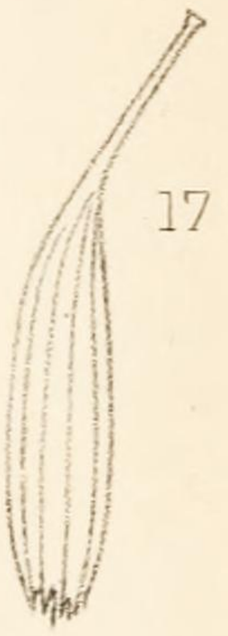
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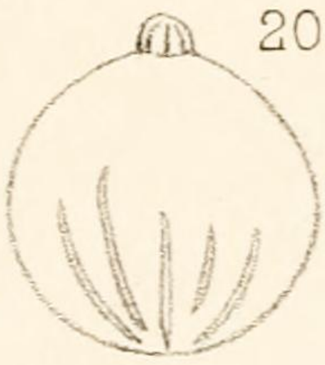
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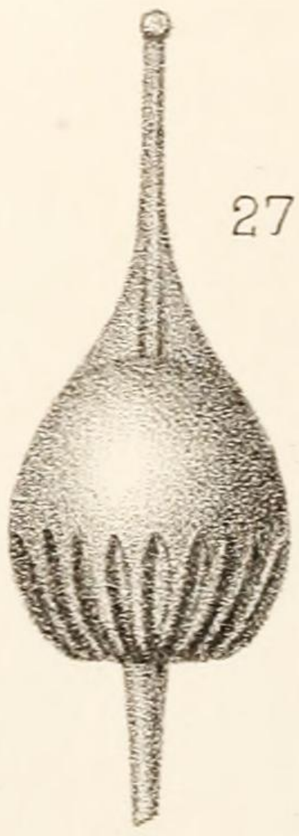
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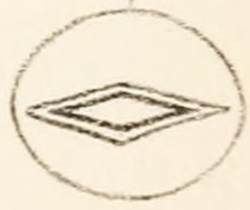
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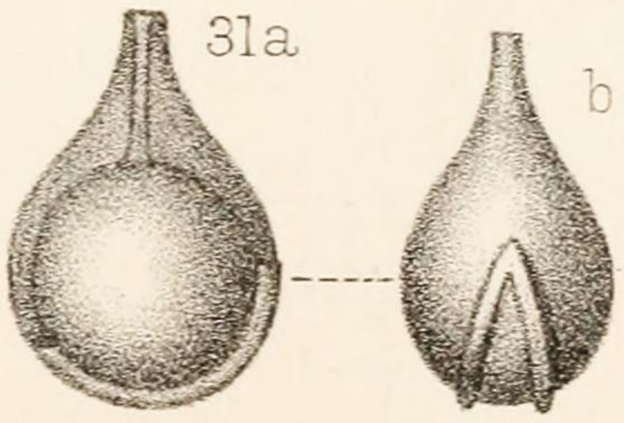
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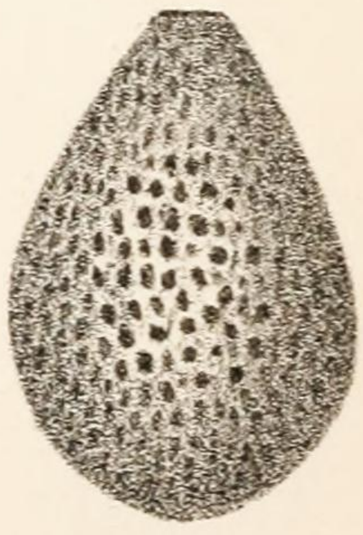
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H. Sidebottom del. ad nat.

West, Newman lith.

Lagenae of the South West Pacific Ocean.


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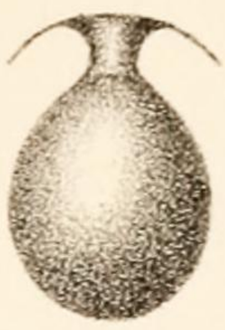
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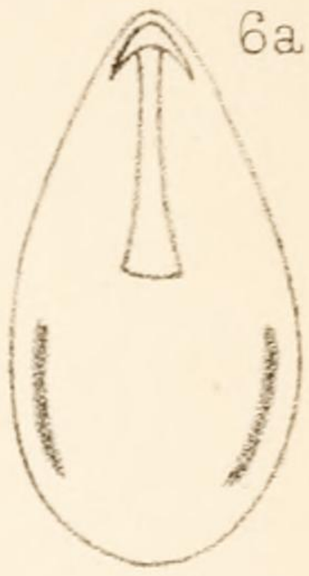
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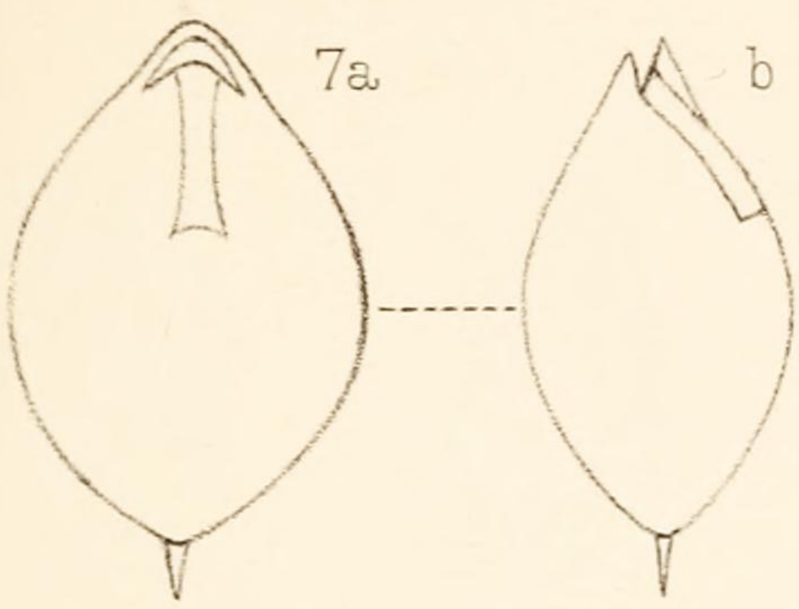
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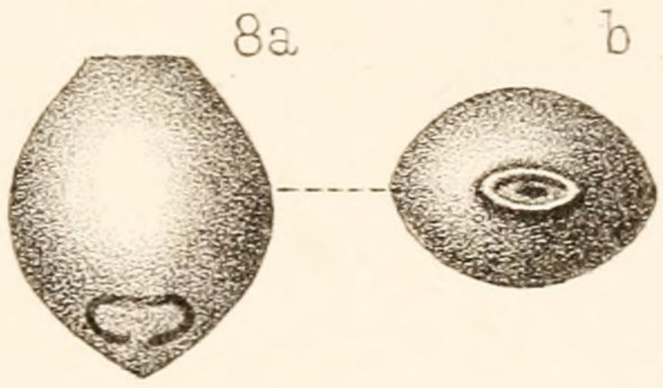
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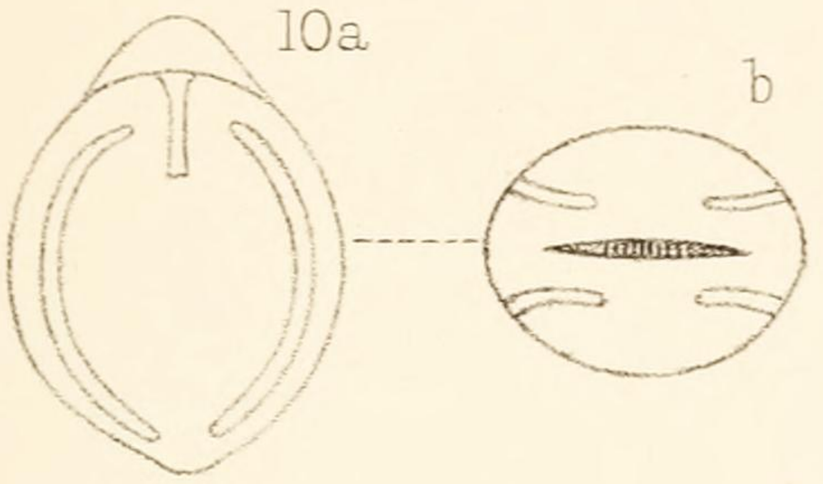
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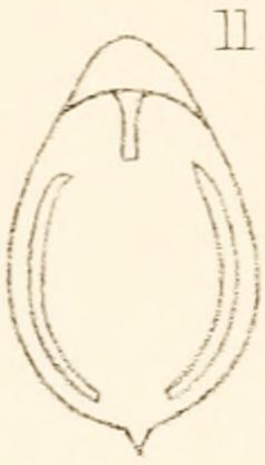
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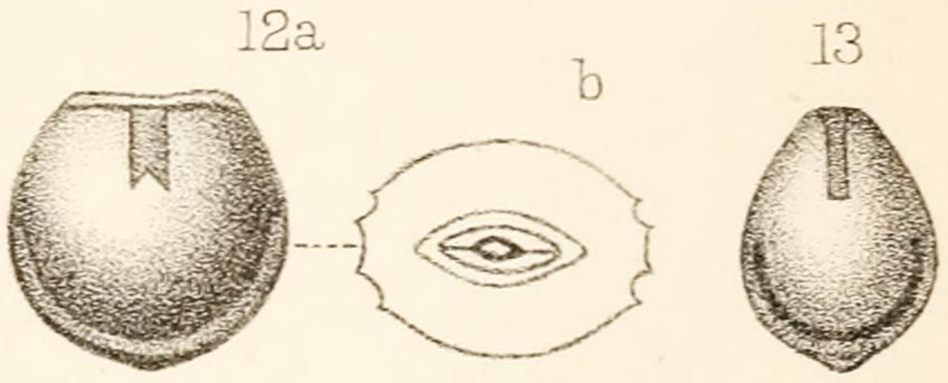
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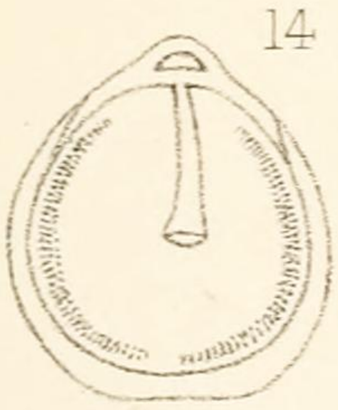
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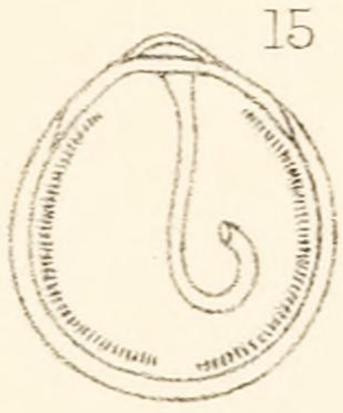
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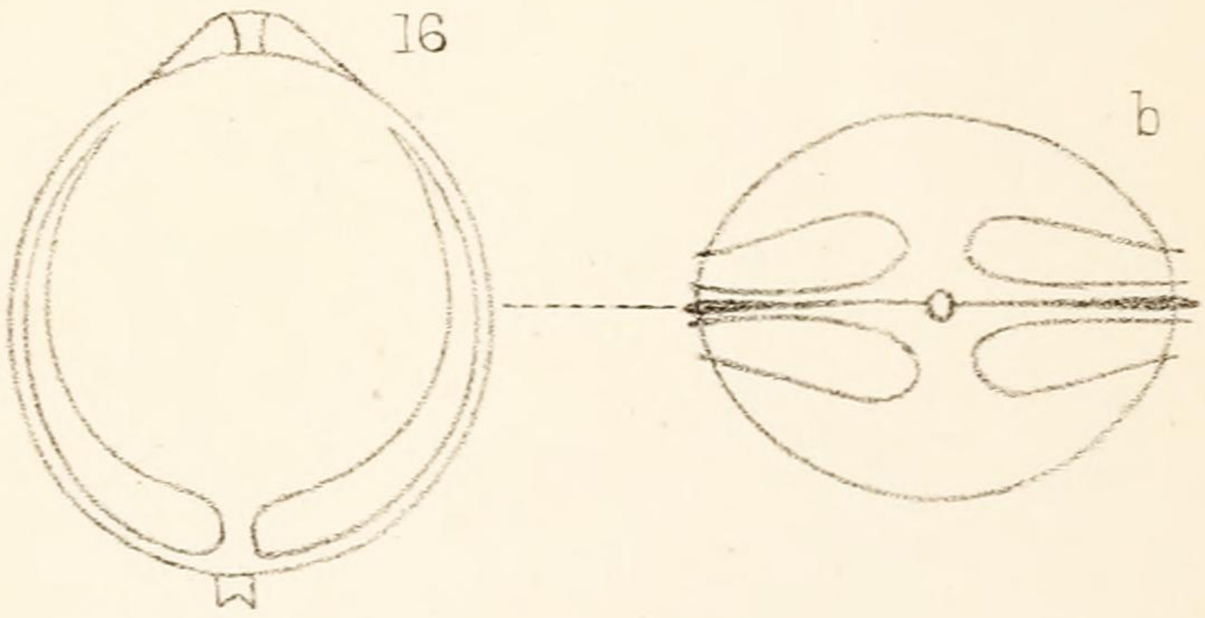
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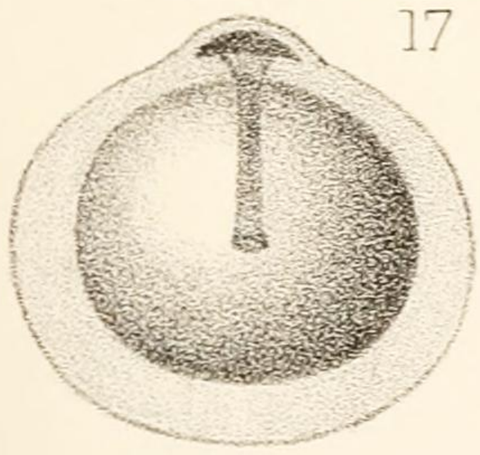
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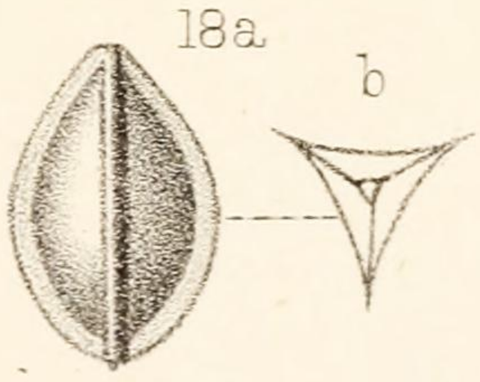
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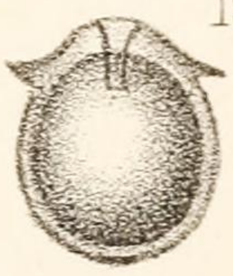
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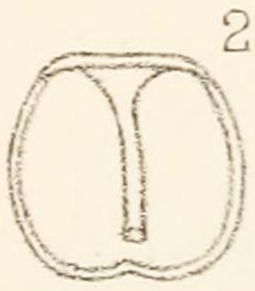
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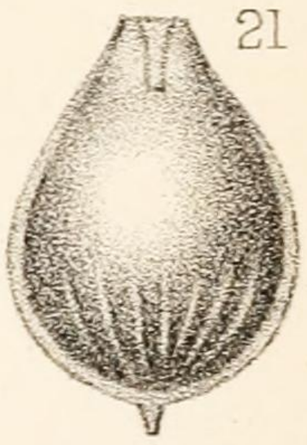
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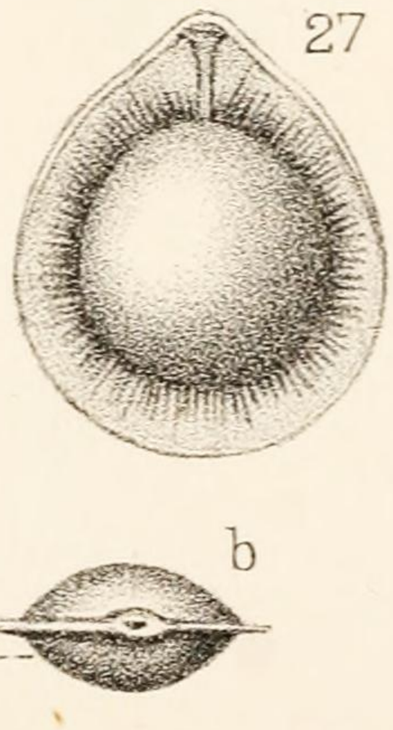
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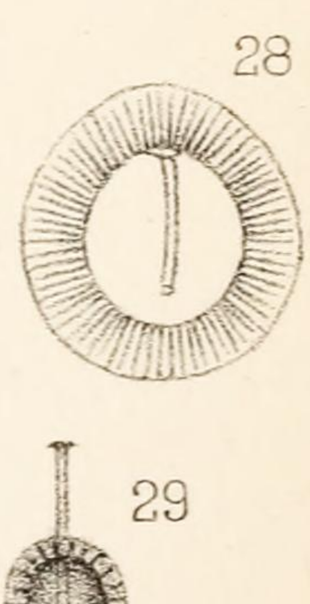
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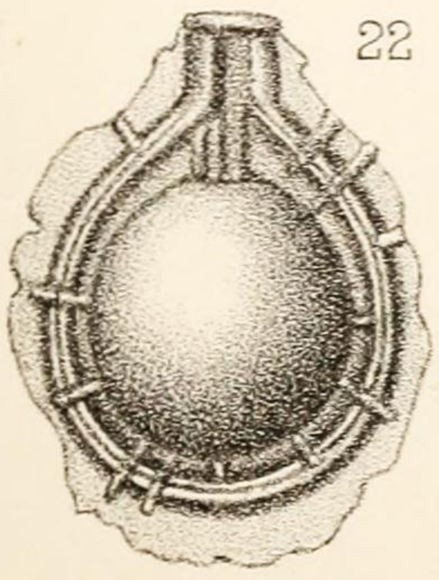
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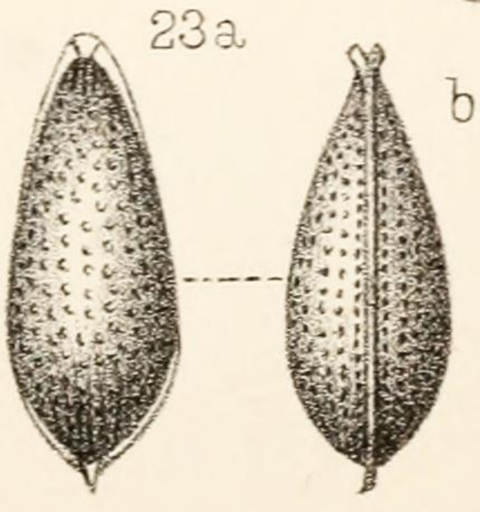
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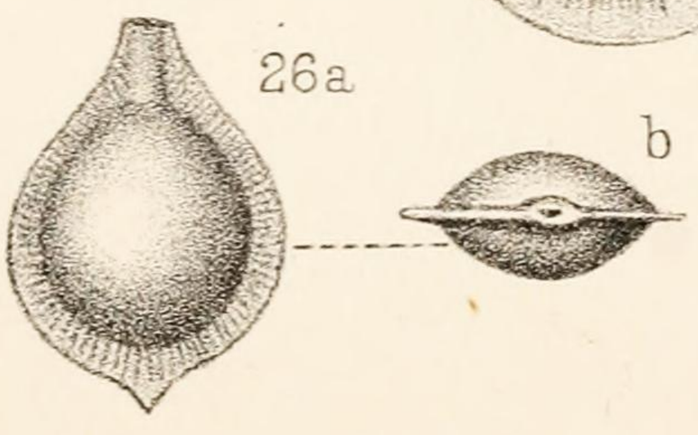
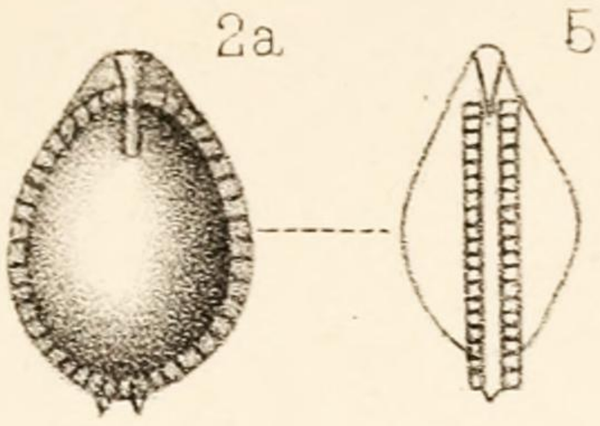

26a b

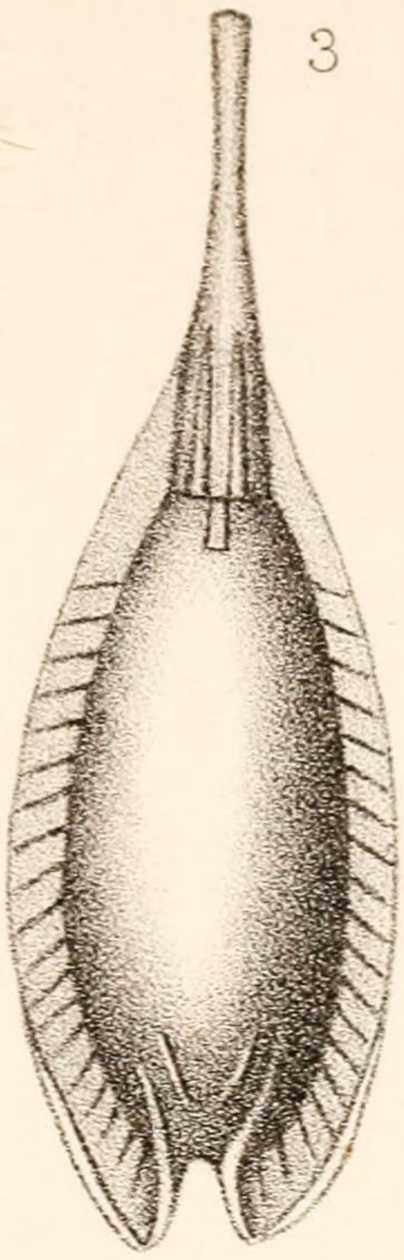

29

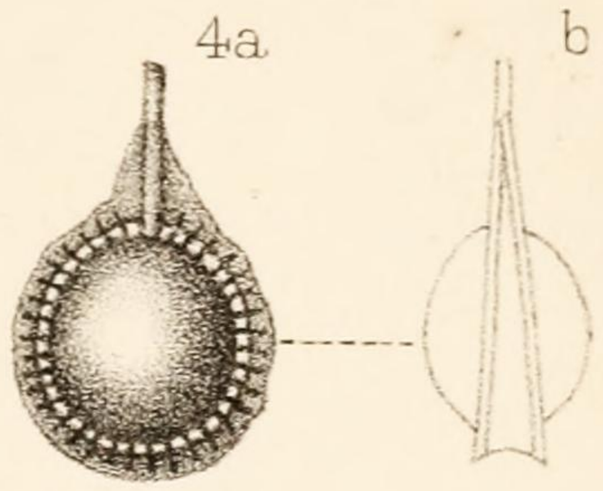
H. Sidebottom del. ad nat.

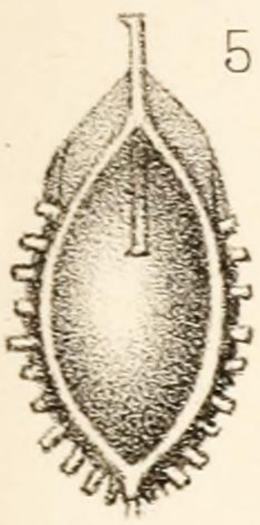
West, Newman lith.

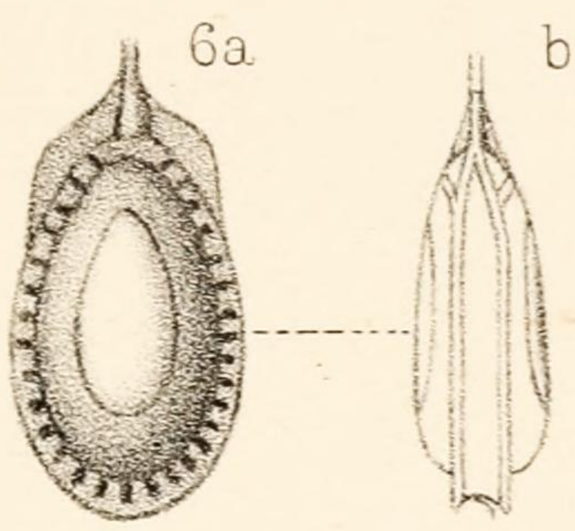
Lagenae of the South West Pacific Ocean.

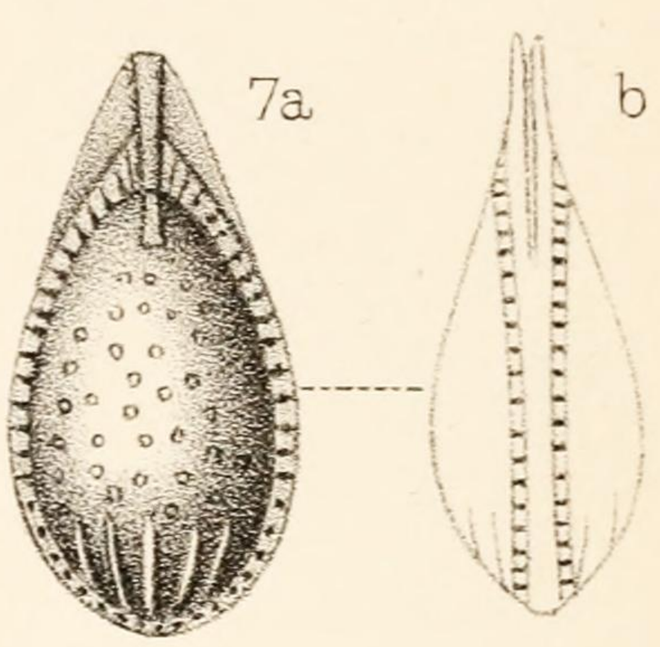


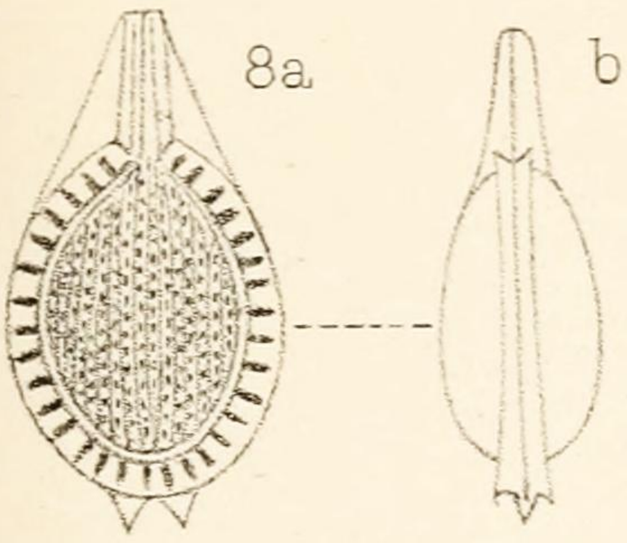


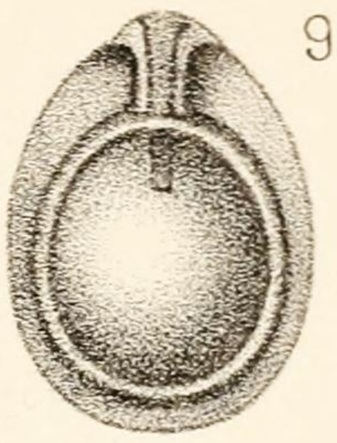


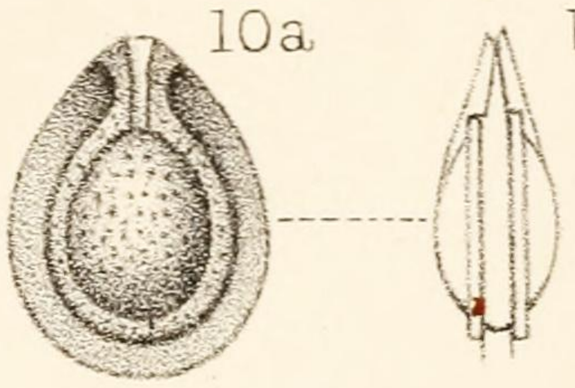


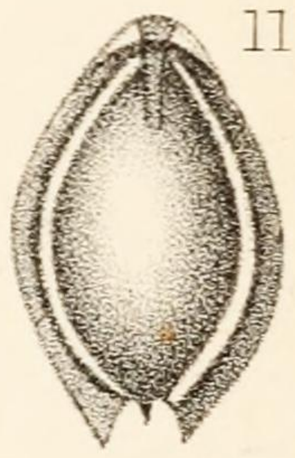


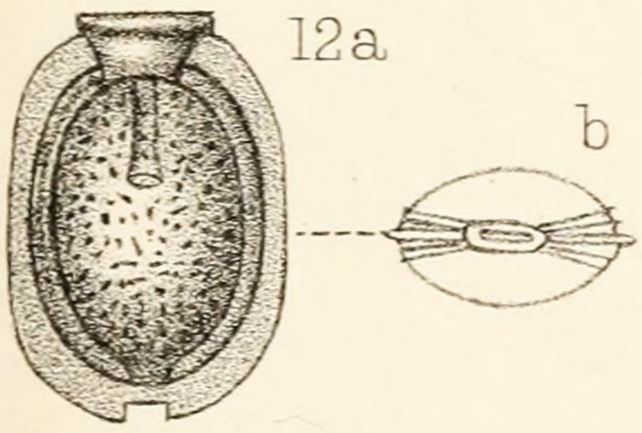


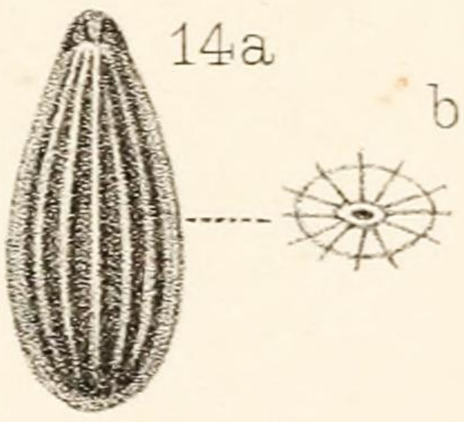


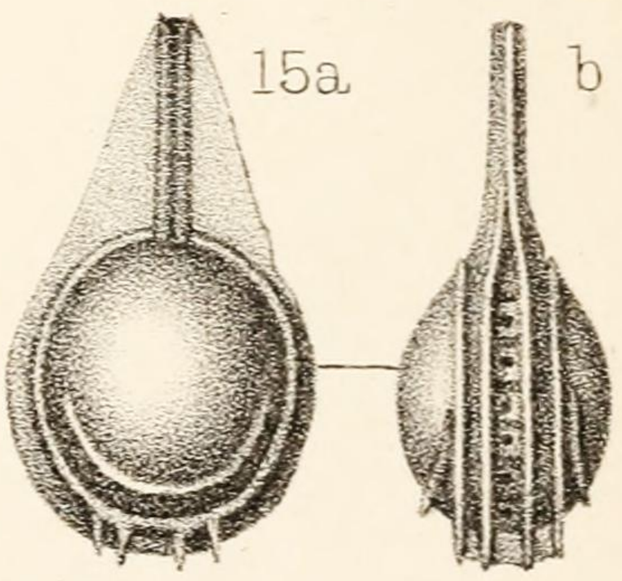


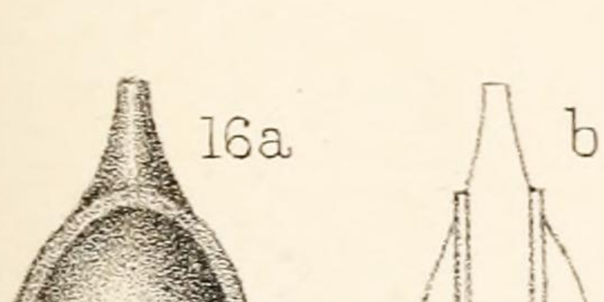


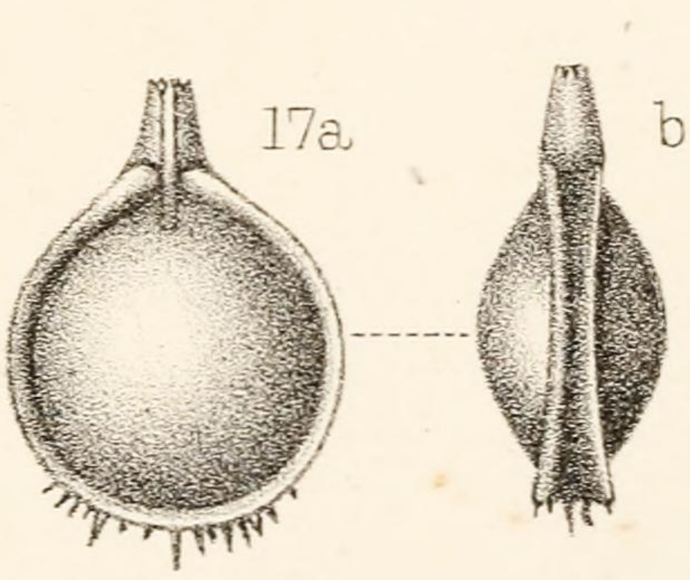


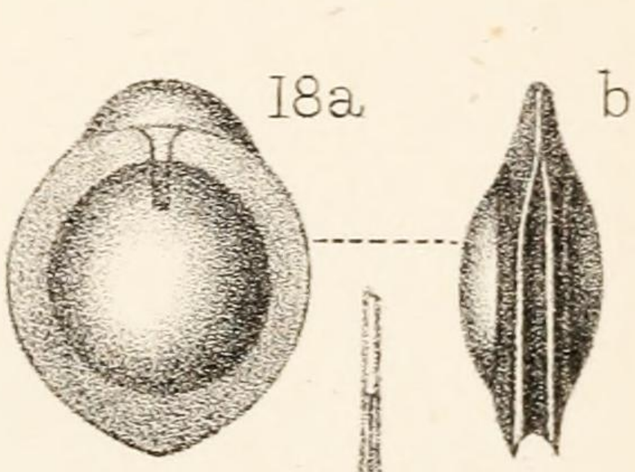


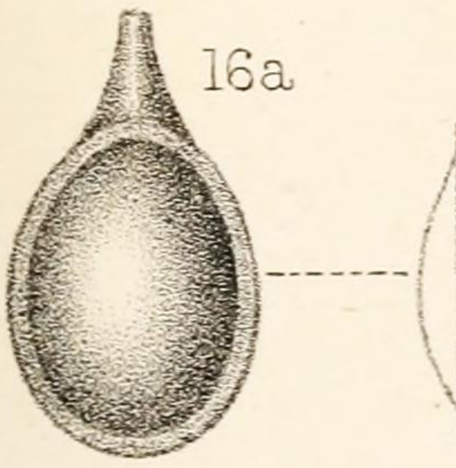








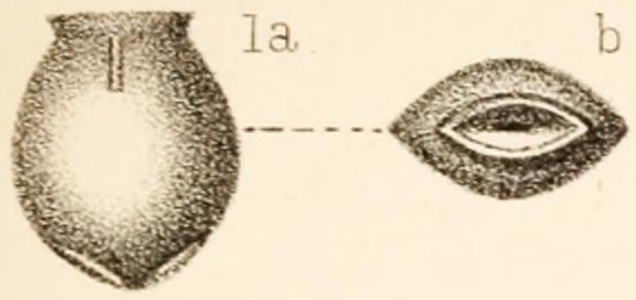


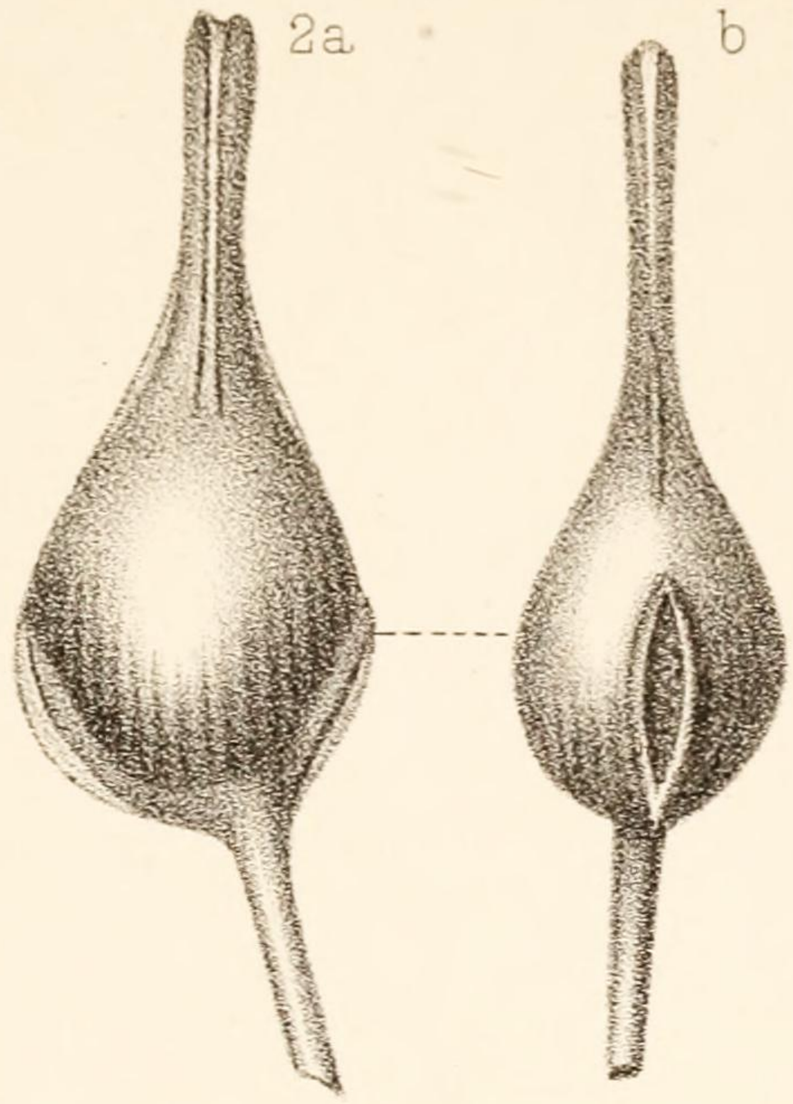


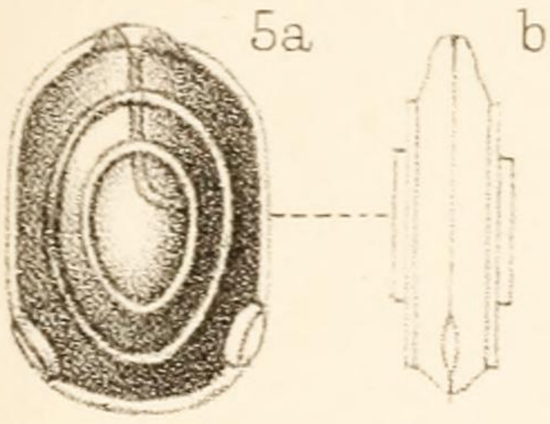
H. Sidebottom del. ad nat.

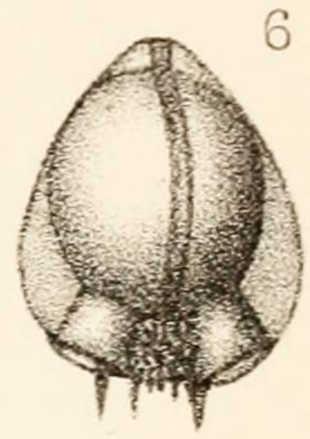
West, Newman lith.

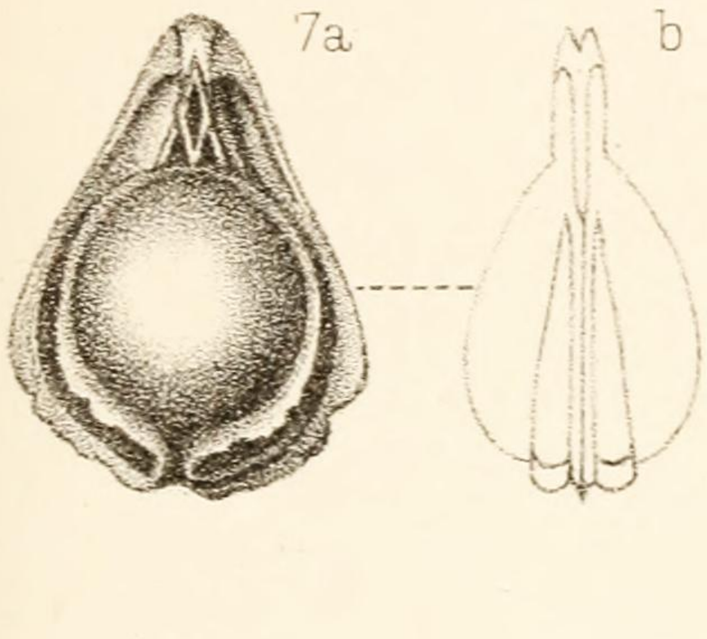
Lagenae of the South West Pacific Ocean.

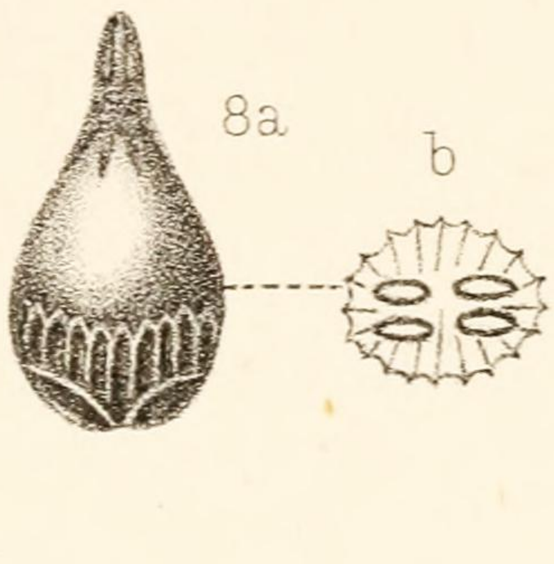


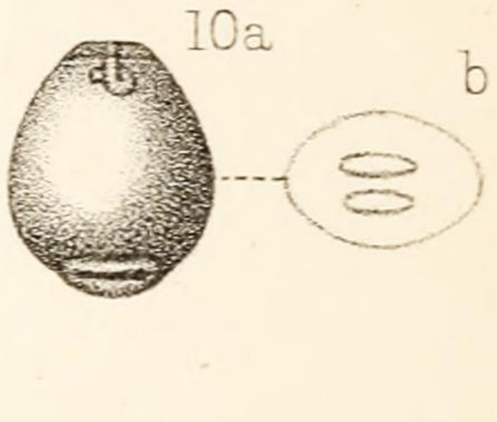


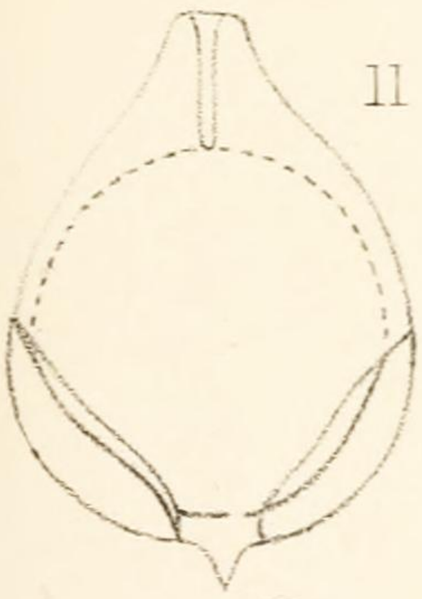


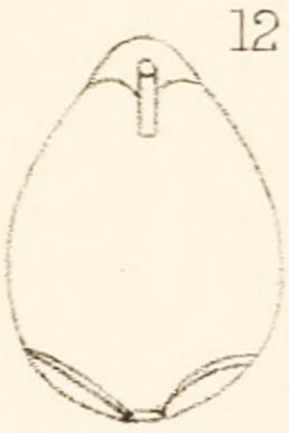


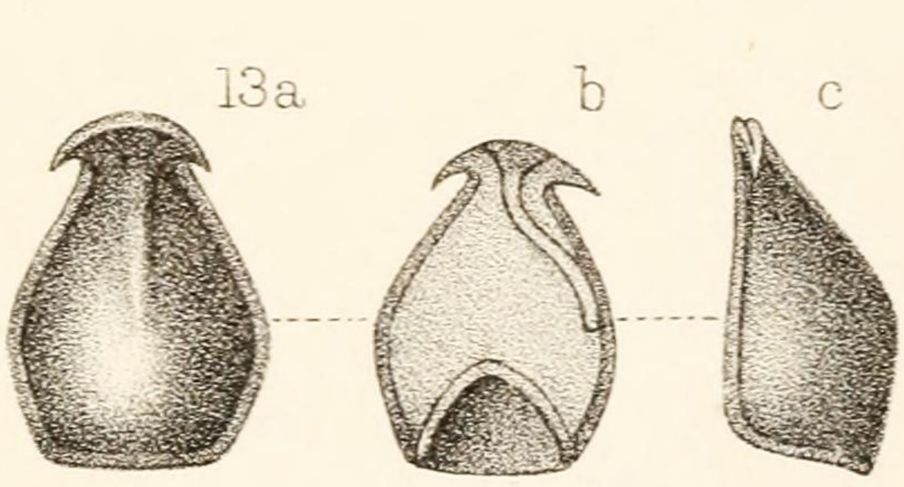


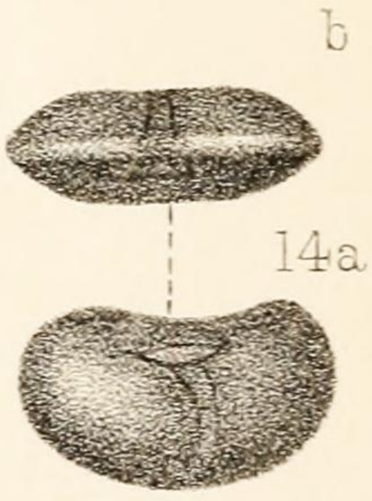


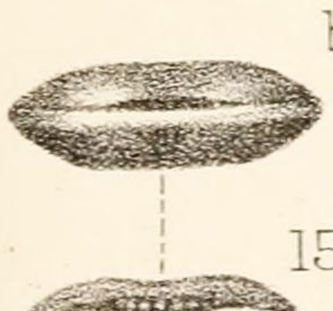


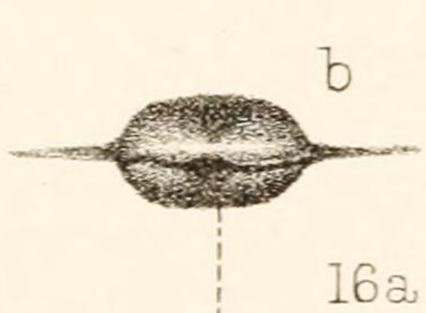


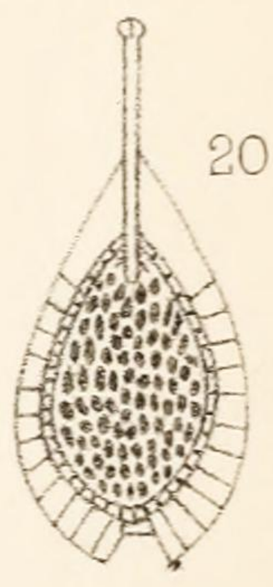


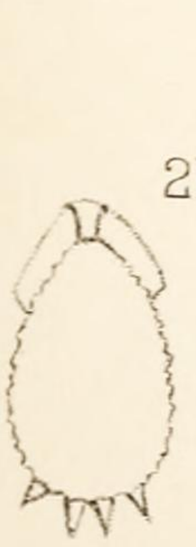


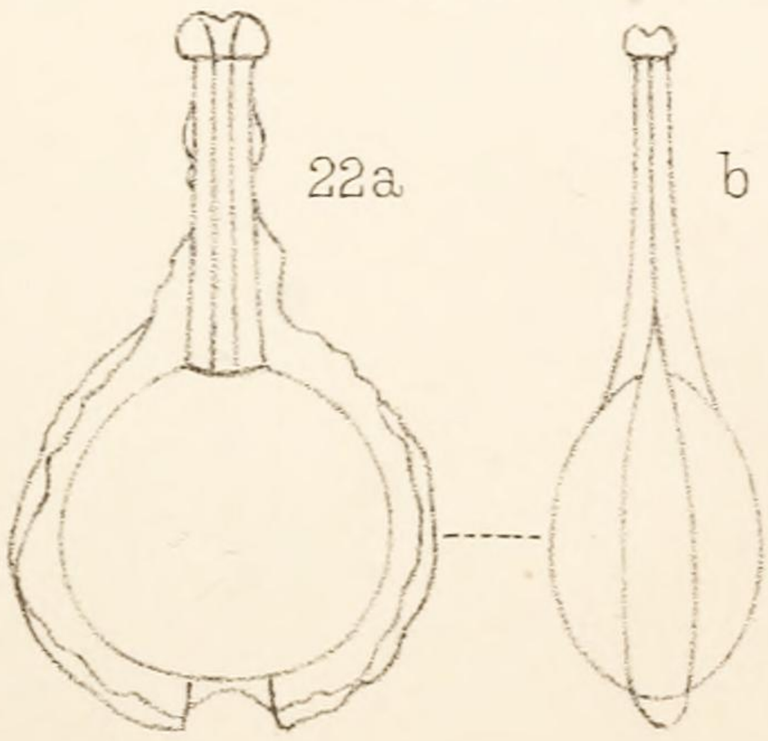


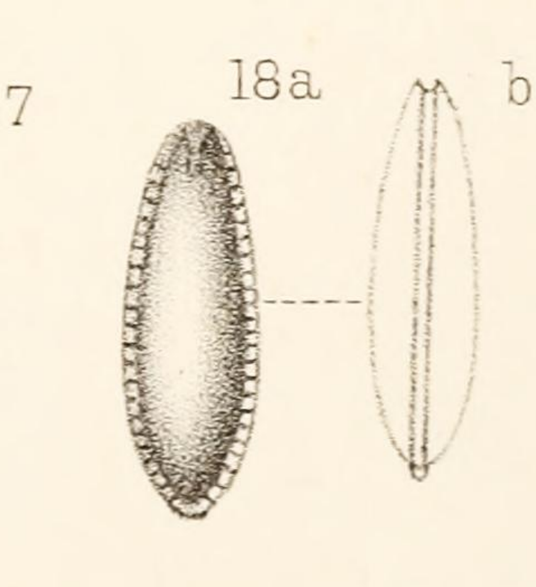












H. Sidebottom del. ad nat.

West, Newman lith.

Lagenae of the South West Pacific Ocean.

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