XVIII.—*Report on some recent Foraminifera found off the Coast of Dublin and in the Irish Sea.* By Frederick Pryor Balkwill, and Joseph Wright, F. G. S. (Plates XII., XIII., and XIV.)

[Read, 23rd June, 1884.]

When undertaking the present work it was our intention to have taken dredgings off the coasts of Dublin and Wicklow, an intention that was frustrated by unforeseen difficulties, which prevented our programme being carried out in its original shape. This Report, therefore, relates to Dublin, with the addition of some important gatherings taken in the Irish Sea, these being the limits to which it seemed desirable to confine our researches. Previous to the commencement of this undertaking, one of us had made a number of shore gatherings in the vicinity of Dublin, and a list of the Foraminifera then found was communicated to the Academy.* For the sake of completeness these species also appear in the present enumeration.

Having engaged a fishing smack of forty tons, and the weather being favourable, we put out on the 9th of May, 1881, for the purpose of commencing our dredgings off the Dublin coast. Three consecutive days were occupied in this manner, the only drawback being the lightness of the winds, which failed us at times. We were in consequence unable to reach a sufficient distance from land, and had to confine our operations to the shallow water, comparatively near the shore. We were fortunate to have for our skipper one whose practical knowledge of the ground, and skill in working the dredges, largely contributed to the number of gatherings we were able to secure, the dredges rarely coming up empty. Thirty gatherings were taken—three in Dublin Bay, the remaining twenty-seven off the coast extending from Ireland's Eye to Bray Head, and as far off land as the Kish and Bray Banks, the greatest depths dredged being off Bray Head, 27 fathoms.

* *Proceedings* R. I. Acad., vol. iii., 2nd Ser., Science, p. 545.

Two months later other dredgings were taken, in which we were joined by Prof. Haddon, who kindly placed a yacht at our disposal. The following day we were under a similar obligation to Thomas Arthur Bewley, Esq., for the use of a steam launch: on both these occasions the weather proved unfavourable, only six gatherings being secured, and these not far from land.

Early the following year (February, 1882,) we gave the Academy (*loc. cit.*) a short preliminary sketch of what we had accomplished, with a list of the Foraminifera found; it included also a report on certain material collected by Mr. Voysey in the Irish Sea, which he had submitted to us for examination. One hundred and thirty-nine species and varieties of Foraminifera were recorded in this communication, two being new to Britain, and two new to science. Considering the short space of time spent in examining this part of our coast, these results were most encouraging, and left little doubt but that a renewed search, especially in deeper water than we had hitherto explored, would still further increase the numbers, and lead to the discovery of other rare forms.

In August, 1882, we renewed the work of exploration, and engaged a fishing smack, much larger than the vessel previously used. We were again fortunate in engaging the services of an excellent skipper, Mr. Voysey, the gentleman who had on various occasions supplied us with material from the Irish Sea, and whose thorough knowledge of the nature of the sea-bottom in these parts now proved to be of the greatest service to us. The weather was, as on the previous occasion, exceptionally fine; but again we were greatly retarded from want of wind, and for the greater part of one day we were all but becalmed. The special object we had in view at this time was to secure gatherings from deep water, the parts near the coast having already been well examined. The whole of the first day and night was spent in going from Dublin to the part dredged by us, marked on the chart as "Lambay Deep," and situated about thirteen miles N. E. of the entrance to Dublin Bay. It was most desirable that this place should be visited, as here occurs the deepest water within many miles of Dublin, the sounding line showing at one place 73 fathoms. At daybreak on the morning of the second day (Tuesday, 8th,) we sounded in 45 fathoms, and soon afterwards

had the satisfaction of seeing two small dredges landed on the deck, filled with an oozy mud. The greater part of the day was spent dredging about this place. Towards evening, seven miles further east, we took two hauls in 50 fathoms, an oozy mud being again brought up, similar to what was collected in the morning. On the following morning (Wednesday, 9th,) about seven miles S. W. of last locality, in a dense fog, a haul was taken in 48 fathoms, the material being somewhat similar to that found on the previous day, but more sandy; and again, two miles to the S. W., another haul was taken in 40 fathoms, fine sand being brought up. By this time the wind had almost entirely died away; but the special object we had in view—to take dredgings in the deep water off Dublin—had been attained, so we now pressed on all canvas and hastened homewards, only taking two gatherings on the way back.

The dredgings taken at Lambay Deep in 45 fathoms, and those taken seven miles further east in 50 fathoms, require more than a passing comment. The material gathered in 45 fathoms yielded 118 species, whilst that in 50 fathoms only 108 species. The difference in these numbers may be easily accounted for by the much greater quantity of material obtained at the first mentioned place; but in every other respect they were similar, and may be regarded as one locality: no other spot off the British coast has yielded so large a number of species, or so many rare and interesting forms. *Lagena castrensis*, Schwager; *Rhabdogonium tricarinatum*, d'Orbigny; and *Pullenia quinqueloba*, Reuss, are only known as British species from this locality. Among the many other rare species found here, the following may be mentioned:—*Miliolina tenuis*, *Cornuspira foliacea*, *Psammosphæra fusca*, *Haplophragmium agglutinans*, *Ammodiscus charoides*, *Textularia globulosa*, *Bulimina subteres*, *Lagena curvilineata*, *Lingulina carinata*, *Nodosaria raphanus*, *N. radicula*, and *Marginulina glabra*, abundant; *Uvigerina pygmæa*, and *Gypsina lævis*. *Biloculinæ*, *Buliminæ*, and *Lagenæ*, were in great abundance; as also the following arenaceous forms, *Hyperammina elongata*, *Reophax scorpiurus*, and *Haplophragmium pseudospirale*. It was most instructive to observe how these arenaceous Foraminifera became gradually rarer, and eventually disappeared, as we changed from mud to sand in places not far

separated and differing only slightly in depth, as the following table will show:—

	Stations 34 and 35. Lambay Deep. 45 to 50 fathoms. Mud.	Station 36. Near Lambay Deep. 48 fathoms. Mud and Sand.	Station 37. Near Lambay Deep. 40 fathoms. Sand.
Hyperammina elongata, .	Very common.	Rare.	None.
Reophax scorpiurus, . .	Very common.	Rare.	None.
Haplophragmium pseudospirale,	Very common.	None.	None.

In addition to that collected by ourselves, we received from Mr. Voysey the material of a number of gatherings which had been obtained by him whilst trawling in the Irish Sea. The Foraminifera found by us in these gatherings are given in the distribution table columns as A to F. Two of these gatherings were of mud which had been taken from the mouths of fishes (*Lophius piscatorius*, Linn.); one was taken in deep water, off the Mourne Mountains, the other fourteen miles off Howth. Both were exceptionally rich in Foraminifera, the only good examples we have seen of *Bulimina aculeata* were got from this material.

Several of the names given in our preliminary Report, published two years ago, do not appear in the present Memoir. One or two of these were of somewhat doubtful forms, which it is thought better to omit. The others were Foraminifera, which we now consider should be merged into species already recorded; these we have noticed under their respective species. The Foraminifera in the list now appended, number one hundred and forty-seven species and varieties, ten of these being new to Britain and three new to Science.

Some years ago one of us examined the coast of Down and Antrim* for Foraminifera, the deepest parts dredged being in the vicinity of the Maiden Light Houses 60–70 fathoms. It may be of interest to compare the

* J. Wright, Rec. For. of Down and Antrim, *Proc. Belfast Nat. Field Club*, 1876–7.—App.

Foraminifera found in those dredgings, taken in the Northern Channel, with those found off Dublin and in the Irish Sea adjoining. As might have been expected, there was but little difference in the Rhizopodal fauna of these places. Certainly a much greater number of forms were obtained off Dublin, but many of these were very rare, frequently only one or two specimens being found. *Marginulina glabra*, found in several of the Dublin dredgings and common at Lambay Deep, 45–50 fathoms, did not occur in the Northern Channel. *Textularia agglutinans* (not typical), *Pulvinulina repanda*, and *Truncatulina refulgens* were common in deep water in the Northern Channel: the first mentioned came up very rarely off Dublin, and the others were entirely absent. Little value should be attached to *Reophax scorpiurus* and *Hyperammina elongata* occurring in such abundance at Lambay Deep, although the former is very rare, and the latter absent in the Northern Channel, as these two species were only found off Dublin where the bottom was muddy, and the dredgings in the Northern Channel yielded sand exclusively.

In conclusion, we have to thank those gentlemen who kindly gave us assistance in the preparation of this Paper. To H. B. Brady, F.R.S., we are deeply indebted for the kind and liberal help we have at all times received from him in the identification of critical species, and his advice and suggestions during the progress of the work have been of the utmost value. Mr. Brady has also placed us under further obligations by allowing us to consult the proof sheets of the scheme of classification in the Synopsis of Genera adopted in his Report on the Challenger Foraminifera, which he generously placed at our disposal to work from.*

We are much indebted to S. M. Malcomson, M.D., for the very accurate drawings which accompany this Report. Our thanks are also due in an especial manner to A. T. Hollick, Esq., for the care and skill bestowed in transferring them to stone. Mr. Hollick has, however, had the original specimens before him in all cases.

We have to thank Thomas Alcock, M.D., of Manchester, and Charles Elcock, Esq., of Belfast, for the loan of specimens of two rare Foraminifera which we have figured in the accompanying plates.

* Proof "Voyage H. M. S. Challenger."—*Zoology*, v. ix., *Report on Foraminifera*, pp. 60–76.

And lastly, we must not omit to mention our obligations to Stephen Voysey, Esq., who collected for us a number of gatherings in the Irish Sea, which have materially increased the value of this Paper.

The following is a detailed synopsis of the Foraminifera found :—

SUB-KINGDOM.—PROTOZOA.

CLASS.—RHIZOPODA.

ORDER.—Foraminifera—(Reticularia).

Family.—MILIOLIDÆ.

Sub-family.—MILIOLININÆ.

Biloculina, d'Orbigny.

Biloculina ringens, Lamarck, sp. (Pl. XII. figs. 6, 7).

Miliolites ringens, Lamarck, 1804, Ann. du Muséum, vol. v. p. 351, vol. ix., pl. 17, fig. 1; *Biloculina elongata*, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 298, No. 4.

Professor Williamson's figures (Rec. For. Gr. Br., pl. 6, figs. 169, 170, and pl. 7, fig. 171) give a very accurate representation of this species, as it is usually found around the British coast. *B. elongata*, d'Orbigny, we regard as an elongated form of this species, and we believe that the two pass into one another. Frequent.

A small thin-shelled sphærical variety, with a crescentic slit-aperture (Pl. XII. figs. 6, 7) was found in abundance at Lambay, depth 45–50 fathoms; it occurred sparingly at a few other stations in the Irish Sea.

Biloculina depressa, d'Orbigny.

Biloculina depressa, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 298, No. 1.

Found nearly everywhere, abundant in deep water.

Spiroloculina, d'Orbigny.

Spiroculina limbata, d'Orbigny.

Spiroloculina limbata, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 299, No. 12.

Rare, specimens small.

Spiroloculina planulata, Lamarck, sp.

Miliolites planulata, Lamarck, 1805, Ann. du Muséum, vol. v., p. 352, No. 4.

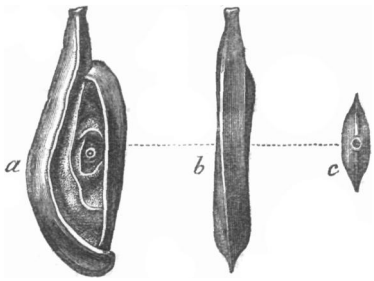
Rare, specimens small.

Spiroloculina acutimargo, Brady (woodcut).

Spiroloculina acutimargo, Brady, 1884, Rep. Voy. H.M.S. Challenger, vol. ix., p. 154, pl. 10, figs. 12–15.

Very rare. The trivial name accurately describes the sharp edge of this shell, which is well shown in the woodcut annexed. (Fig. 1.) The few specimens found off the Dublin coast were poor, and much smaller than those which occur in tropical seas.

FIG. 1.



Spiroloculina acutimargo. × 80.
a. lateral aspect. *b*. edge view. *c*. oral aspect.
Lambay, depth 45 fathoms.

Miliolina, Williamson.

Miliolina trigonula, Lamarck, sp.

Miliolites trigonula, Lamarck, 1804, Ann. du Muséum, vol. v., p. 351, No. 3.

Generally distributed, but rather rare at most localities.

Miliolina tricarinata, d'Orbigny, sp.

Triloculina tricarinata, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 299, No. 7; Modèles No. 94.

Rare.

Miliolina oblonga, Montagu, sp.

Vermiculum oblongum, Montagu, 1803, Test. Brit., p. 522, pl. 14, fig. 9.

Rather rare.

Miliolina seminulum, Linn., sp.

Serpula seminulum, Linn., 1767, Syst. Nat. 12th ed., p. 1264, No. 791.

Abundant everywhere.

Miliolina tenuis, Czjzek, sp. (Pl. XII. figs. 3–5).

Quinqueloculina tenuis, Czjzek, 1847, Haidinger's Naturwiss. Abhandl. vol. ii., p. 149, pl. 13, figs, 31–34.

This simple little shell is somewhat spiroloculine in aspect and twisted on itself. Only found in a few deep-water gatherings in the Irish Sea; at Lambay, depth 45–50 fathoms, it was rather plentiful, the specimens being fairly large and typical.

Miliolina subrotunda, Montagu, sp. (Pl. XII. figs. 8, 9).

Vermiculum subrotundum, Montagu, 1803, Test. Brit., part. 2, p. 521.

Most abundant everywhere.

Miliolina secans, d'Orbigny, sp.

Quinqueloculina secans, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 303, No. 43; Modèles No. 96.

Generally distributed, very fine, and abundant in some of the shore gatherings, but rare in deep water.

Miliolina bicornis, Walker and Jacob, sp.

Serpula bicornis, Walker and Jacob, 1798, (fide Kanmacher), Adams' Essays, 2nd ed. p. 633, pl. 14, fig. 2.

Frequent, nearly everywhere.

Miliolina ferussacii, d'Orbigny, sp.

Quinqueloculina ferussacii, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 303, No. 42.

Frequent, nearly everywhere.

Miliolina ferussacii, d'Orbigny, sp. *var.* (Pl. XII. figs. 10–12).

A coarse roughened variety of this species, at times somewhat sandy, approaching *M. sclerotica*, Karrer. The peripheral margin is flat and very broad at its base. Not unfrequent in shallow water and shore gatherings.

Miliolina pulchella, d'Orbigny, sp.

Quinqueloculina pulchella, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 303, No. 42.

Only a few poor specimens were found in the Dublin gatherings. The finest British examples we have seen of this very beautiful but rare species were got in dredgings taken in Marlpool, Strangford Lough, depth 20–25 fathoms,* where they occurred plentifully; they had strong, bold, longitudinal costæ, the surface being ornamented with longitudinal striæ. These specimens closely resemble that figured by Soldani. (*Testae*, vol. ii. p. 53, pl. 18, fig. *f*.)

Miliolina agglutinans, d'Orbigny, sp. (Pl. XIII. figs. 1–3).

Quinqueloculina agglutinans, d'Orbigny, 1839, Foram. Cuba, p. 168, pl. 12, figs 11–13.

A coarse-grained arenaceous Miliolina, in shape like a plum-stone, septal lines very indefinite. This shell has probably been often overlooked from its rude appearance and general resemblance to a pellet of hardened sand. Very rare, found at only one or two stations.

Miliolina fusca, Brady, sp.

Quinqueloculina fusca, Brady, 1870, Ann. and Mag. Nat. Hist., Ser. 4, vol. vii., p 47, pl. 11, fig. 2.

The occurrence of this arenaceous Miliolina may nearly always be looked on as indicative of brackish water. Very rare.

* J. Wright "Rec. For. Down and Antrim," *Proc. Belfast Nat. Field Club*, 1876–7.

Sub-family.—HAUERININÆ.

Ophthalmidium, Kübler.

Opthalmidium carinatum, nov. sp. (Pl. XII. figs. 13–16).

Shell much compressed, subdiscoidal, equilateral, showing all the convolutions; peripheral margin with a narrow keel, composed of a few convolutions slightly embracing; segments few, swollen at the base and getting narrower towards the superior end, each forming about two-thirds of a convolution; aperture simple, terminal.

We have placed this shell under Ophthalmidium, as being the genus to which it appears most nearly allied; it, however, differs from it somewhat in the convolutions being septate from their commencement, the forms hitherto recorded having their earlier convolutions non-septate. From Hauerina it differs in having an open aperture (not cribriform), and from Spiroloculina in the chambers forming two-thirds of a convolution, and not alternating at opposite extremities, as in that genus.

This interesting little rhizopod has probably hitherto been overlooked from its small size and general resemblance to Miliolina subrotunda, Mont., to which, however, it has no real relationship. We are indebted to Mr. Charles Elcock for first drawing our attention to this species, which is generally distributed around the Irish coast.

Sub-family.—PENEROPLIDINÆ.

Cornuspira, Schultze.

Cornuspira foliacea, Philippi, sp. (Pl. XII. figs. 1 *a*, 1 *b*).

Orbis foliaceus, Philippi, 1844, Enum, Moll. Sicil. vol. ii., p. 147, pl. 24, fig. 26.

A large and beautiful shell, very fragile, specimens nearly always in a more or less broken condition. A few perfect examples were dredged at Lambay, depth, 45–50 fathoms. Rare.

Cornuspira involvens, Reuss, sp. (Pl. XII. figs. 2 *a*, 2 *b*).

Operculina involvens, Reuss, 1849, Denkschr. Akad. Wien., vol. i., p. 370, pl. 45, fig. 20.

Found in nearly all the Dublin gatherings, but not frequent in any of them.

Family.—ASTRORHIZIDÆ.

Sub-family.—PILULININÆ.

Technitella, Norman.

Technitella legumen, Norman.

Technitella legumen, Norman, 1878, Ann. and Mag. Nat. Hist., ser. 5, vol. i., pl. 16, figs. 3, 4.

A very interesting form, having the test entirely built up of delicate sponge spicules, arranged longitudinally side by side with the most marvellous precision. Only a few specimens were found by us in the Irish Sea. Mr. Charles Elcock has since met with this species in considerable abundance in mud, dredged in the Irish Sea, midway between the Mourne Mountains and the Isle of Man, 70 fathoms.

Sub-family.—SACCAMMININÆ.

Psammosphæra, Schulze.

Psammosphæra fusca, Schulze.

Psammosphæra fusca, Schulze, 1874, II. Jahresbericht d. Comm. Untersuch. d. deutschen Meere in Kiel, p. 113, pl. 2, fig. 8, a-f.

Some small, neat, sphærical arenaceous forms of a grey colour were occasionally met with in the deep water gatherings. We regard these as weak specimens of *P. fusca*.

Sub-family.—RHABDAMMININÆ.

Hyperammina, Brady.

Hyperammina elongata, Brady (Pl. XIII. figs. 4 *a*, 4 *b*).

Hyperammina elongata, Brady, 1878, Ann. and Mag. Nat. Hist., ser. 5, vol. i., pl. 20, fig. 2.

Large and very abundant at Lambay, depth 45–50 fathoms, muddy bottom; it was also met with, but not so plentifully, at a few other places in the Irish Sea.

Family.—LITUOLIDÆ.

Sub-family.—LITUOLINÆ.

Reophax, Montfort.

Reophax fusiformis, Williamson, sp.

Proteonina fusiformis, Williamson, 1858, Rec. For. Gr. Br., p. 1, pl. 1, fig. 1.

Rather rare.

Reophax scorpiurus, Montfort (Pl. XIII. figs. 5 *a*, 5 *b*).

Reophax scorpiurus, Montfort, 1808, Conchyl. Syst. vol. i., p. 330, 83e genre.

Many of the specimens have the septal partitions rudimentary, showing a tendency to run into *R. fusiformis*, Will. Abundant at Lambay, depth 45–50 fathoms; also found at one or two other stations in the Irish Sea, but not so plentifully.

Reophax (?) sp. (Pl. XIII. figs. 9, 22–24).

Fragments of a straight, slender, arenaceous form, consisting of a number of segments of uniform thickness, have been found by us occurring at many places around the Irish coast. The test is composed of sand grains or of closely-fitting sponge spicules, arranged longitudinally, side by side, and cemented together by a hard, ferruginous material. The spicules

are never free, but are always imbedded in the test. When the shell is formed of sand grains it closely resembles the uniserial portion of *Bigenerina digitata*, d'Orbigny, and we think it not improbable that the specimens which were recorded by this name in Brady's Catalogue of Recent Foraminifera, Northumberland and Durham,* were similar to ours. Mr. Siddall, in the Foraminifera of the River Dee,† refers similar fragments to *Lituola findens*, Parker, but we cannot agree in this determination. We have not yet met with any perfect examples of this form, although we must have collected at least 200 specimens, and, consequently, are unable to say with any degree of certainty to what genus it should be referred. It is not, however, improbable but that these fragments may be portions of some parasitic rhizopod. Were such the case, it would account for the broken condition in which it has been hitherto found.

Haplophragmium, Reuss.

Haplophragmium glomeratum, Brady, sp.

Lituola glomerata, Brady, 1878, Ann. and Mag. Nat. Hist., ser. 5, vol. i., p. 433, pl. 20, fig. 1, a, b, c.

Rather rare, and the specimens small. This species has been found plentifully in Killybegs Harbour, depth 7–17 fathoms, muddy bottom; it has also been met with by Mr. Robertson in Portree Bay, Skye, depth 14–18 fathoms.

Haplophragmium globigeriniforme, Parker and Jones, sp.

Lituola globigeriniformis, Parker and Jones, 1865, Phil. Trans. vol. clv., p. 407, pl. 15, figs. 46, 47, and pl. 17, figs. 96–98.

Generally distributed, rare in shallow water and shore gatherings, frequent in deep water.

* Nat. Hist. Trans. Northumberland and Durham, vol. i., part 1, p. 102.

† Proc. Chester Soc. Nat. Sci., 1878, part 2, p. 47.

Haplophragmium pseudospirale, Williamson, sp. (Pl. XIII. figs. 6–8).

Proteonina pseudospiralis, Williamson, 1858, Rec. For. Gr. Br. p. 2, pl. 1, figs. 2, 3.

Very fine examples of this species were met with in profusion at Lambay, depth 45–50 fathoms; it was also common at two localities in the Irish Sea, but except at these places was rarely met with off the Dublin coast.

Haplophragmium agglutinans, d'Orbigny, sp. (Pl. XIII. figs. 18–20).

Spirolina agglutinans, d'Orbigny, 1846, For. Foss. Vien., p. 137, pl. 7, figs. 10–12.

Test crozier-shaped, coarsely arenaceous, linear portion very elongate cylindrical, septal lines obscure. Very rare, found only at two stations. This species has also been obtained by Mr. Millett off the Isle of Wight.

Haplophragmium canariense, d'Orbigny, sp.

Nonionina canariensis, d'Orbigny, 1839, Foram. Canaries, p. 128, pl. 2, figs, 33, 34.

Frequent everywhere.

Sub-family.—TROCHAMMININÆ.

Ammodiscus, Reuss.

Ammodiscus incerta, d'Orbigny, sp.

Operculina incerta, d'Orbigny, 1839, Foram. Cuba, p. 49, pl. 6, figs. 16, 17.

Very rare.

Ammodiscus gordialis, Jones and Parker, sp.

Trochammina gordialis, Jones and Parker, 1860, Quart. Jour. Geol. Soc., vol. xvi. p. 304, No. 88; Wright, 1877, Proc. Belfast Nat. Field Club, App. pl. 4, fig. 3.

Very rare.

Ammodiscus charoides, Jones and Parker, sp. (Pl. XIII. fig. 10).

Trochammina charoides, Jones and Parker, 1860, Quart. Jour. Geol. Soc., vol. xvi. p. 304.

Only three or four small poor examples were found.

Ammodiscus shoneana, Siddall, sp.

Trochammina shoneana, Siddall, 1878, Proc. Chester Soc. Nat. Sci. part 2, p. 46.

Only three examples were met with in the Dublin gatherings. Quite a number of specimens were found by Dr. Malcomson in shore gatherings at Rockport, Belfast Lough.

Trochammina, Jones and Parker.

Trochammina squamata, Jones and Parker.

Trochammina squamata, Jones and Parker, 1860, Quart. Jour. Geol. Soc. vol. xvi. p. 304, No. 88; 1864, Phil. Trans., vol. clv. p. 407, pl. 15, figs. 80, 81.

Frequent at most localities. A very beautiful variety with flush chambers (*R. ochracea*, Williamson, Recent Foraminifera, Gr. Br. pl. 4, fig 112, and pl. 5, fig. 113,) was found rather sparingly in some of the gatherings; it was much rarer than the typical form.

Trochammina inflata, Montagu, sp.

Nautilus inflatus, Montagu, 1808, Test. Brit. Suppl., p. 81, pl. 18, fig. 3.

Very rare, its occurrence is almost entirely restricted to brackish water.

Trochammina inflata, Montagu, sp. *var.* (Pl. XIII. figs. 11, 12).

A somewhat conical, many-chambered variety of this species was found in deep water off Dublin, and in the Irish Sea. Rare.

Trochammina macrescens, Brady.

Trochammina macrescens, Brady, 1870, Ann. and Mag. Nat. Hist., ser. 4, vol. vi. p. 290, pl. 11, fig. 5, a–c.

Very rare.

Family.—TEXTULARIDÆ.

Sub-family.—TEXTULARINÆ.

Textularia, Defrance.

Textularia sagittula, Defrance (Pl. XIII. figs. 15–17).

Textularia sagittula, Defrance, 1824, Dict. Sci. Nat., vol. xxxii. p. 177; vol. li p. 344; De Blainville, Malacologie, p. 370, pl. 5, fig. 5.

This species is closely allied to *T. gramen*, d'Orbigny, but differs from it in being more elongated, having the sides nearly parallel, and the peripheral margin more sharply angular. Rare.

Textularia gramen, d'Orbigny (Pl. XIII. figs. 13, 14).

Textularia gramen, d'Orbigny, 1846, For. Foss. Vien. p. 248, pl. 15, figs. 46.

Frequent at most places.

Textularia agglutinans, d'Orbigny.

Textularia agglutinans, d'Orbigny, 1840, Foram. Cuba, p. 136, pl. 1, figs. 17, 18, 32-34.

We obtained very few examples of this species, and the specimens found were small and obscure.

Textularia globulosa, Ehrenberg.

Textularia globulosa, Ehrenberg, 1839, Abhandl. Akad. Berlin, 1838, p. 135, No. 60, pl. 4, several figures.

This pretty little Textularia is very rare off Dublin. It occurs very abundant fossil in the chalk of the North of Ireland.

Verneuilina, d'Orbigny.

Verneuilina polystropha, Reuss.

Verneuilina polystropha, Reuss, 1846, Boëhm. Kreid., vol. ii. p. 109, pl. 24, fig. 53.

Frequent.

Verneuilina spinulosa, Reuss.

Verneuilina spinulosa, Reuss, 1849, Denkschr. Mathem. Natur. Cl. K. Akad. Wissench. Wien, vol. i., p. 374, pl. 47, fig. 12.

Only two poor examples were found.

Dimorphous (*Textularian*) *forms.*

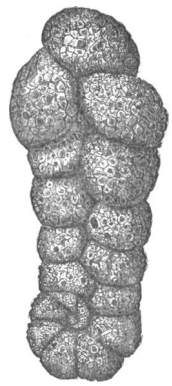
Spiroplecta, Ehrenberg.

Spiroplecta biformis, Parker and Jones (Pl. XIII. fig. 21).

Textularia agglutinans, var. *biformis*, Parker and Jones, 1864, Phil. Trans., vol. clv. p. 370, pl. 15, figs. 23, 24.

Only one or two examples were found. This form has hitherto been only known as British, from specimens found by Dr. Malcomson in shore gatherings at Rockport, Belfast Lough. A woodcut (Fig. 2) of one of these specimens is annexed, as they are much finer than those found off the Dublin coast.

FIG. 2.



Spiroplecta biformis × 80. Rockport, Belfast Lough.

Gaudryina, d'Orbigny.

Gaudryina filiformis, Berthelin.

Gaudryina filiformis, Berthelin, 1880, Mem. Soc. Geol. France, Ser. 3, vol. i. Mem. No. 5, p. 25, pl. 1, figs. a–d.

Rather rare.

Sub-family.—BULIMININÆ.

Bulimina, d'Orbigny.

Bulimina pupoides, d'Orbigny.

Bulimina pupoides, d'Orbigny, 1846, For. Foss. Vien. p. 185, pl. 11. figs. 11, 12.

Common everywhere.

Bulimina marginata, d'Orbigny.

Bulimina marginata, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii., p. 269, pl. 12, figs. 10–12.

Generally distributed, but rather rare at most places.

Bulimina aculeata, d'Orbigny.

Bulimina aculeata, d'Orbigny (after Soldani), 1826, Ann. Sci. Nat., vol. vii. p. 269, No. 7; *Bulimina pupoides*, var. *spinulosa*, Williamson, 1858, Rec. For. Gr. Br., p. 62, pl. 5, fig. 28.

This beautiful form was found abundant in mud, which was got in the mouths of two fishes (*Lophius piscatorius*, Linn.) taken in deep water off the Louth coast, the delicate spines which ornament the shell being in fine preservation. Only a few specimens were met with in the other gatherings.

Bulimina ovata, d'Orbigny.

Bulimina ovata, d'Orbigny, 1846, For. Foss. Vien. p. 185, pl. 11, figs 13, 14.

Frequent.

Bulimina elegantissima, d'Orbigny.

Bulimina elegantissima, d'Orbigny, 1839, Voyage l'Amér. Mérid. p. 51, pl. 12, figs. 13, 14.

Generally distributed, rather rare at most places.

Bulimina subteres, Brady.

Bulimina subteres, Brady, 1880, Quart. Jour. Micr. Sci., vol. xxi. New Series, p. 25; Wright, 1881, Proc. Belfast Nat. Field Club, App. pl. 8, fig. 2.

Only one or two specimens were found. A good many well-grown examples of this rare and elegant Bulimina were obtained in dredgings taken in Killybegs Harbour, depth 7–17 fathoms.

Virgulina, d'Orbigny.

Virgulina schreibersiana, Czjzek.

Virgulina schreibersiana, Czjzek, 1847, Haidinger's Naturwiss. Abhandl., vol. ii. p. 147, pl. 13, figs. 18–21.

Rare.

Bolivina, d'Orbigny.

Bolivina textilarioides, Reuss.

Bolivina textilarioides, Reuss, 1862, Sitzungsb, d. k. Ak. Wiss. Wien., vol. i. p. 38, pl. 48, fig. 15.

Rare.

Bolivina punctata, d'Orbigny.

Bolivina punctata, d'Orbigny, 1839, Voyage l'Amér. Mérid. p. 63, pl. 8, figs. 10–12.

This form has frequently delicate longitudinal striæ on the earlier chambers. Frequent.

Bolivina plicata, d'Orbigny.

Bolivina plicata, d'Orbigny, 1839, Voyage l'Amér. Mérid., p. 62, pl. 8, figs. 4–7.

Frequent.

Bolivina dilatata, Reuss.

Bolivina dilatata, Reuss, 1849, Denkschr. d. k. Ak. Wiss. Wien., vol. i. p. 381, pl. 48, fig 15.

Very rare.

Bolivina difformis, Williamson, sp.

Textularia difformis, Williamson, 1858, Rec. For. Gr. Br., p. 77, pl. 6, figs. 166, 167.

We have placed this species with the Bolivinæ, as it has the infolded notch-like aperture characteristic of the genus. Very rare.

Sub-family.—CASSIDULININÆ.

Cassidulina, d'Orbigny.

Cassidulina lævigata, d'Orbigny.

Cassidulina lævigata, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 271, No. 5, Modèles, No. 38.

Very rare.

Cassidulina crassa, d'Orbigny.

Cassidulina crassa, d'Orbigny, 1839, Voyage l'Amér. Mérid., vol. v. p. 56, pl. 7, figs. 18–20.

Rather rare off Dublin, specimens small and poor. This species has been obtained at many places around the Irish coast. *C. oblonga*, d'Orbigny, is an oblong form of this species; it was found in several of the Dublin gatherings.

Family.—LAGENIDÆ.

Sub-family.—LAGENINÆ.

Lagena, Walker and Boys.

Lagena globosa, Montagu, sp.

Vermiculum globosum, Montagu, 1803, Test. Brit., p. 524.

There are two distinct species of globular Lagenæ common off the Dublin coast, the apertures of which are respectively stellate and fissurine. It is the first of these, or that with the stellate aperture, which we have restricted to *L. globosa*, Mont. That with a fissurine aperture is a round form of *L. lævigata*, Reuss, which has lost its typical, depressed character, and forms a most instructive link between the round and the depressed Lagenæ. A few examples of the apiculate variety, *L. apiculata*, Reuss, Haidinger, Natwiss. Abhandl. vol. iv. pl. 1, fig. 1, were found at the entrance of Dublin harbour, 6 fathoms, and at station G.*

Lagena lineata, Williamson, sp. (Pl. XIV. figs. 13–16).

Entosolenia globosa, var. *lineata*, Williamson, 1858, Rec. For. Gr. Br., p. 9, pl. 1, fig. 17.

Shell ovate, broadest near the posterior end; surface ornamented with exceedingly delicate longitudinal lines; entosolenian, and frequently bearing an external tube, which is often bent and irregular in shape; it has also proceeding from the posterior extremity a tube, which is sometimes as long as the shell itself, but is usually broken off short. This species frequently occurs in abnormal forms. We have figured two such forms, in one of which there are no less than five separate chambers springing from a common centre.

Frequent everywhere.

* In our dredgings off the Irish coast, we have not found any examples of *L. globosa* with a simple, round aperture, as figured by Williamson and others. Such forms are, however, frequent in foreign gatherings.

Lagena lævis, Montagu, sp.

Vermiculum lævis, Montagu, 1803, Testacea Britannica, p. 524.

Frequent in nearly all the dredgings, as also the var. *clavata*, d'Orbigny, which was even more abundant than the type. *Lagena gracillima*, Seg., has been recorded in most of the Memoirs treating on British Foraminifera. We are, however, inclined to think that in many cases the specimens so called were *L. clavata*, d'Orbigny, with the neck broken off. In this imperfect condition they might be readily mistaken for *L. gracillima;* we have seen many such examples from the Dublin gatherings.

Lagena aspera, Reuss (Pl. XIV. figs. 10–12).

Lagena aspera, Reuss, 1861, Sitzungsb, d. k., Akad. Wiss. Wien., vol. xl. p. 305, pl. 1, fig. 5.

Several good typical specimens were found at Lambay, depth 45–50 fathoms. Very rare.

Some strange abnormal forms of this Lagena (Pl. XIV. figs. 11, 12) were met with off Dublin, being somewhat intermediate in character between this species and *L. sulcata*. Several examples were obtained of one of these forms (fig. 12). These specimens were made up of four or five of the Lagena in a cluster, attached at the sides, and the surface ornamented with coarse ribs; the ribs in parts being broken up into short bits, giving the shell a rudely tuberculated appearance.

Lagena hispida, Reuss.

Lagena hispida, Reuss, 1863, Sitzungsb, d. k. Akad. Wiss. Wien., vol. xlvi. p. 335, pl. 6, figs. 77–79.

Two forms of this species were met with off the Dublin coast, viz., one, typical, flask-shaped, the body ornamented with delicate hair-like spines; the other, distomous, the body roughened with short, blunt spines. Rather rare.

Lagena striata, d'Orbigny, sp.

Oolina striata, d'Orbigny, 1839, Voy. l'Amér. Mérid. p. 21, pl. 5, fig. 12.

There are two well-marked British forms of this very beautiful species, viz., an elongated form ornamented with very delicate longitudinal striæ,

which extend from one end of the shell to the other, being often more or less twisted as they pass up the neck: the other is much larger and more globular in shape, the striæ ending a short distance from the posterior extremity, where they form a ring of short, blunt spines; the neck of this variety is decussated with longitudinal and transverse striæ. This latter variety is abundant in deep water; the former is more frequent in shallow water near the coast. *L. lyellii*, Seg., we regard as a distomous variety of this species. It was found rather sparingly in several of the Dublin gatherings.

Lagena curvilineata, nov. sp. (Pl. XIV. figs. 21–24).

Flask-shaped, surface ornamented with fine curvilinear striæ. In typical examples the striæ commence from centres situated at opposite sides of the shell, round which they are twisted in the most beautifully regular manner. In some specimens the striæ cross, giving the shell a decussated appearance. This very elegant form is closely allied to *Lagena striata*. Very rare; the few examples found were nearly all from deep water in the Irish Sea.

Lagena gracilis, Williamson.

Lagena gracilis, Williamson, 1848, Ann. Nat. Hist., ser. 2, vol. i. p. 18, l. 1, figs. 3, 4.

Rare; found only at a few localities.

Lagena sulcata, Walker and Jacob (Pl. XIV. figs. 1, 2).

Lagena sulcata, Walker and Jacob, 1794 (fide Kanmacher), Adams' Essays on the Microscope, 2nd ed. p. 634, pl. 14, fig. 5.

Nearly all the Irish examples of this species which we have seen appear referable to *L. interrupta*, Will. Rec. For. Gr. Br. pl. 1, fig. 11. This form differs from the type in having the ribs of unequal length. We regard the difference as too trivial for even a varietal name. Frequent everywhere.

Lagena costata, Williamson, sp. (Pl. XIV. figs. 3–5).

Entosolenia costata, Williamson, 1858, Rec. For. Gr. Br. p. 9, pl. 1, fig. 18; Wright, 1877, Proc. Belfast, Nat. Field Club—App. pl. 4, figs. 11–14.

Generally distributed, abundant in deep water, rather rare in shallow water.

Lagena williamsoni, Alcock, sp. (Pl. XIV. figs. 6–8).

Entosolenia williamsoni, Alcock, 1864, Proc. Manchester Lit. and Phil. Soc., vol. iv No. 15; Wright, 1877, Proc. Belfast Nat. Field Club—App. pl. 4, fig. 14.

Common everywhere.

Lagena semistriata, Williamson.

Lagena semistriata, Williamson, 1848, Ann. and Mag. Nat. Hist. ser. 2, vol. i. p. 14, pl. 1, figs. 9, 10,

Frequent.

Lagena crenata, Parker and Jones (Pl. XIV. figs. 17, 18).

Lagena crenata, Parker and Jones, 1864, Phil. Trans., vol. clv. p. 420, pl. 18, fig. 4, a, b.

This is one of our rarest British Lagenæ. We only met with one specimen which was dredged in Dalkey Sound. It was not typical, the crenations being few and broad. We are indebted to Dr. Alcock, Manchester, for the very beautiful typical example which we have figured, Pl. XIV. fig. 18; it was found in a shore gathering from Dog's Bay, Connemara.

Lagena striato-punctata, Parker and Jones (Pl. XIV. fig. 20).

Lagena striato-punctata, Parker and Jones, 1867, Phil. Trans. vol. clv. p. 350, pl. 13, figs. 25–27.

This very rare Lagena was found at several localities, but we rarely got more than one or two specimens in any of the gatherings.

Lagena feildeniana, Brady (Pl. XIV. fig. 19).

Lagena feildeniana, Brady, 1878, Ann. and Mag. Nat. Hist. ser. 5, vol. i. pl. 20, fig. 4.

Only one or two specimens found; these were much more elongated in shape than the type specimen figured by Brady; they had also a basal neck and orifice somewhat similar to the basal neck and orifice in *L. lyellii*, Seg.

Lagena squamosa, Montagu, sp. (Pl. XIV. fig. 9).

Vermiculum squamosum, Montagu, 1803, Testacea Britannica, p. 526, pl. 14, fig. 2.

A very variable form, the areolæ differing greatly in shape, size and mode of arrangement. Common everywhere.

Lagena melo, d'Orbigny, sp.

Oolina melo, d'Orbigny, 1847, Voy. l'Amér. Mérid., vol. v. p. 20, pl. 5, fig. 9.

Very rare.

Lagena hexagona, Williamson, sp.

Entosolenia squamosa. var. *hexagona*, Williamson, 1858, Rec. For. Gr. Br., p. 13, pl. 1, fig. 32.

Frequent.

Lagena lævigata, Reuss, sp.

Fissurina lævigata, Reuss, 1849, Denkschr. d. k. Akad. Wiss. Wien, vol. i. p. 366, pl. 46, fig. 1 a, b.

Four well-marked forms of this species have been met with in the Dublin gatherings, viz. [1] *Lagena lævigata*, Reuss; typical, shell ovate, lanceolate, often with two mucroni at the base, common in dredgings 40–50 fathoms; trigonal examples rare. [2] Var. *lucida*, Will. Rec. For. Gr. Br., pl. 1. fig. 22. Shell compressed, pyriform, broad at the base, a bright lucid spot at either side; more depressed than the type and smaller in size; frequent in shallow water; trigonal examples rare. [3] Var. *quadrata*, Will. Rec. For. Gr. Br. pl. 1. fig. 27 (not fig. 28). Shell oblong with parallel sides, rare. [4] A fourth form was found in abundance at Lambay, depth 45–50 fathoms: shell round in cross section, and, but for its fissurine aperture, might be mistaken for *L. globosa*, Mont. It is also instructive to find occasional examples of this form with a triradiate aperture, showing the same tendency to a trigonal arrangement as the depressed forms. Common.

Lagena marginata, Walker and Jacob, sp.

Serpula (*Lagena*) *marginata*, 1874, Test. Min. p. 3, pl. 1. fig. 7; Wright, 1881, Proc. Belfast Nat. Field Club—App. pl. 8, fig. 4.

Shell depressed; periphery winged or carinate; rather rare. A few

specimens were found of a curiously modified form, one side being strongly convex, the other flat or concave; one or two trigonal examples were found with a single keel at the angles.

Trigonal examples of nearly all our British depressed Lagenæ have been found by us. We consider these as merely sports or slightly modified forms, to which no specific varietal or even subvarietal value should be attached. We have therefore excluded from the present Memoir the following hitherto recognised Lagenæ, viz.:—*L. trigono-marginata*, P. and J.; *L. trigono-oblonga* Seg.; and *L. trigono-ornata*, Brady; these we consider forms respectively of *L. orbignyana*, Seg.; *L. lævigata*, Reuss; and *L. lagenoides*, Will.

Lagena lagenoides, Williamson, sp. (Pl. XII. fig. 22).

Entosolenia marginata, var. *lagenoides*, Williamson, 1858, Rec. For. Gr. Br. p. 11, pl. 1. figs. 25, 26.

Rather rare. One or two beautiful trigonal specimens (*L. trigono-ornata*, Brady), were found in deep water gatherings.

Lagena orbignyana, Seguenza, sp.

Fissurina orbignyana, Seguenza, 1862, Foram. Monotal. Mess. p. 66, pl. 2, figs, 25, 26; Wright, 1881, Proc. Belfast Nat. Field Club—App. p. 181, pl. 8, fig. 5.

Shell depressed, tricarinate. Common everywhere. A neat, oblong variety, with parallel sides, is generally distributed around the Irish coast, but is not nearly so abundant as the typical form. Two different Lagenæ appear to be figured by Williamson under the name *L. quadrata;* (Rec. For. Gr. Br.) fig. 28 is the oblong variety just alluded to, while fig. 27 is an oblong variety of *L. lævigata*, Reuss, and is referred to in our remarks on that species. Trigonal forms (*L. trigono-marginata*, P. and J.) are rare.

Lagena castrensis, Schwager (Pl. XII. figs. 20, 21).

Lagena castrensis, Schwager, 1866, Novara Reise, Geol. Thiel, vol. ii. p. 208, pl. 5, fig. 22.

This form has hitherto been only known as a recent species from off the Australian coast, the finding of two well-marked characteristic speci-

mens in British water was therefore of great interest; the specimens were got in different dredgings, viz.: station 34, Lambay, depth 45 fathoms; and station 35, Lambay, depth 50 fathoms; and it may be of interest to state that they were found in dredged material that had been washed and floated by each of us separately.

Lagena pulchella, Brady (Pl. XII. fig. 19).

Lagena pulchella, Brady, 1866, Rep. Brit. Ass. (Trans. Sections) p. 70; 1870, Ann. and Mag. Nat. Hist. ser. 4, vol. vi. pl. 12, fig. 1.

Only three or four specimens were found; one was a trigonal form.

Lagena bicarinata, Terquem, sp. (Pl. XII. fig. 30).

Fissurina bicarinata, Terquem, 1882, Mém. Soc. Geol. France, ser. 3, vol. ii. Mém. 3, p. 31, pl. 1, fig. 24, a, b; Balkwill and Millett, 1884, Journ. Postal Micr. Soc., vol. iii. p. 14, pl. 2, fig. 4.

Shell depressed, bicarinate, with a median depression. Very rare.

Sub-family.—NODOSARINÆ.

Nodosaria, Lamarck.

Nodosaria raphanus, Linn. sp. (Pl. XII. fig. 26).

Nautilus raphanus, Linn., 1767, Syst. Nat., 12th ed. p. 1164, No. 283.

Only one specimen found.

Nodosaria obliqua, Linn. sp.

Nautilus obliquus, Linn., 1767, Syst. Nat., 12th ed., p. 1163, No. 281.

Very rare.

Nodosaria scalaris, Batsch, sp.

Nautilus (*Orthoceras*) *scalaris*, Batsch, 1791, Conchyl. Seesandes, pl. 2, fig. 4 *a*, *b*.

Frequent, generally distributed.

Nodosaria radicula, Linn. sp.

Nautilus radicula, Linn., 1767, Syst. Nat., 12th ed. p. 1164, No. 285.

Only one poor specimen found.

Nodosaria communis, d'Orbigny, sp.

Dentalina communis, d'Orbigny, 1826, Ann. Sci. Nat., vol. vii. p. 254, No. 35.

Generally distributed, but rather rare at most places.

Nodosaria consobrina, d'Orbigny, sp.

Dentalina consobrina, d'Orbigny, 1846, For. Foss. Vien., pl. 2, figs. 1–3.

Rather rare, found at a few stations in deep water.

Nodosaria pyrula, d'Orbigny (Pl. XII. fig. 23).

Nodosaria pyrula, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 253, No. 13; Soldani Testac., vol. ii. pl. 10, figs. b, c.

Generally distributed, but rare at most places. Large and beautiful specimens were found at Lambay, depth 45–50 fathoms.

Nodosaria hispida, d'Orbigny (Pl. XII. fig. 31).

Nodosaria hispida, d'Orbigny, 1846, For. Foss. Vien. p. 35, pl. 1, figs. 24, 25.

The only specimen found by us was unfortunately lost, it was from station C, off the Hen and Chickens, Isle of Man. Another example has since been found by Mr. Charles Elcock, in stuff dredged by Mr. Voysey, midway between the Isle of Man and the Mourne Mountains. We are indebted to Mr. Elcock for the privilege of figuring his specimen.

Lingulina, d'Orbigny.

Lingulina carinata, d'Orbigny.

Lingulina carinata, d'Orbigny, 1825, Ann. Sci. Nat. vol. vii. p. 257; 1839, Foram. des Canaries, p. 20, tab. 1, figs. 13, 14.

Only two specimens found.

Rhabdogonium, Reuss.

(?) *Rhabdogonium tricarinatum*, d'Orbigny, sp. (Pl. XII. figs. 17, 18).

Vaginulina tricarinata, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 258, No. 4, Modèles No. 4.

This is one of many rare things which have been met with at Lambay, depth 45–50 fathoms. It is interesting to note that the six or seven specimens found were restricted to two chambers, whilst well-grown examples of this species usually have six or seven chambers. We have therefore recorded this provisionally.

Marginulina, d'Orbigny.

Marginulina glabra, d'Orbigny (Pl. XII. figs. 24, 25).

Marginulina glabra, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 259, No. 6 Modèles No. 55.

Large, well-grown specimens of this species were found in abundance at Lambay, depth 45–50 fathoms. It was also found at a few other places; but not plentifully.

Marginulina costata, Batsch, sp.

Nautilus (*Orthoceras*) *costatus*, Batsch, 1791, Conchyl. des Seesandes, p. 2, pl. 1, figs. a–g.

Only one small specimen found.

Vaginulina, d'Orbigny.

Vaginulina legumen, Linn. sp.

Nautilus legumen, Linn., 1758, Syst. Nat. 12th ed. p. 1162.

Very rare.

Vaginulina linearis, Montagu, sp.

Nautilus linearis, Montagu, 1802, Test. Brit. Suppl. p. 82, tab. 19, fig. 6.

Very rare.

Cristellaria, Lamarck.

Cristellaria rotulata, Lamarck, sp.

Lenticulites rotulata, Lamarck, 1804, Annales du Muséum, vol. v. p. 188, No. 3.

Generally distributed, but rare everywhere.

Cristellaria cultrata, Montfort, sp.

Robulus cultratus, Montfort, 1808, Conchyl. Syst. vol. i. p. 215, gen. 54.

Very rare, specimens small and poor.

Cristellaria crepidula, Fichtel and Moll, sp.

Nautilus crepidula, Fichtel and Moll, 1803, Test. Micr. p. 107, pl. 19, figs. g–i.

Generally distributed, but rather rare at most places.

Sub-family.—POLYMORPHININÆ.

Polymorphina, d'Orbigny.

Polymorphina lactea, Walker and Jacob, sp.

Serpula lactea, Walker and Jacob 1798 (fide Kanmacher), Adams' Essays, 2nd ed. p. 634, pl. 24, fig. 4.

Frequent.

Polymorphina gibba, d'Orbigny, sp.

Globulina gibba, d'Orbigny, 1846, For. Foss. Vien. pl. 13, figs. 13, 14.

This species is so liable to variation that we hesitate to adopt the specific name, all the Dublin specimens being more or less compressed, showing a tendency to run into *æqualis*. Frequent at most localities.

Polymorphina fusiformis, Roemer.

Polymorphina (*Globulina*) *fusiformis*, Roemer, 1838, Neues Jahrb. für Min. Jahrg. 1838, p. 386, pl. 3, fig. 37.

Rare.

Polymorphina oblonga, Williamson.

Polymorphina oblonga, Williamson, 1858, Rec. For. Gr. Br., p. 71, pl. 6, figs. 149, 149a.

Frequent at many localities.

Polymorphina compressa, d'Orbigny.

Polymorphina compressa, d'Orbigny, 1846, For. Foss. Vien. p. 243, pl. 12, figs. 32–34.

Rare.

Polymorphina rotundata, Bornemann, sp.

Guttulina rotundata, Bornemann, 1855, Zeitschr. deutsch. Geol. Gesell. vol. vii. p. 346, pl. 18, fig. 3.

This form has been recently found by Mr. David Robertson, F. L. S., off the Scotch coast. It has also been found by one of us in considerable abundance in deep water off Belfast Lough. Rare in the Dublin gatherings.

Polymorphina concava, Williamson.

Polymorphina lactea, var. *concava*, Williamson, 1858, Rec. For. Gr. Br. p. 72, pl. 6, figs. 151, 152,

This interesting little parasitic form was found at a number of localities, but was usually very rare even where it occurred.

Polymorphina myristiformis, Williamson.

Polymorphina myristiformis, Williamson, 1858, Rec. For. Gr. Br. p. 73, pl. 6, figs. 156, 157.

Only a single specimen was found off the Dublin coast. It is frequent off the west coast of Ireland.

Polymorphina spinosa, d'Orbigny, sp. (Pl. XII. fig. 27).

Globulina spinosa, d'Orbigny, 1846, For. Foss. Vien. p. 203, pl. 13, figs. 23, 24.

A solitary example of this very rare species was found by Mrs. Shone in the estuary of the Dee.* It had been previously known only as a Miocene fossil. Two specimens were found in the Dublin gatherings.

Uvigerina, d'Orbigny.

Uvigerina pygmæa, d'Orbigny.

Uvigerina pygmæa, d'Orbigny, 1825, Ann. Sci. Nat. vol. vii. p. 269, pl. 12, figs. 8, 9; Modèles No. 67.

Only one or two specimens found.

Uvigerina angulosa, Williamson.

Uvigerina angulosa, Williamson, 1858, Rec. For. Gr. Br. p. 67, pl. 5, fig. 140.

Generally distributed, but rather rare at most places.

Family.—GLOBIGERINIDÆ.

Globigerina, d'Orbigny.

Globigerina bulloides, d'Orbigny.

Globigerina bulloides, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 277, No. 1; Modèles Nos. 17 and 76.

Generally distributed, but rather rare at most places.

Globigerina inflata, d'Orbigny.

Globigerina inflata, d'Orbigny, 1839, Foram. Canaries, p. 134, pl. 2, figs. 7-9.

Very rare.

* Siddall, Foraminifera of the River Dee, Proc. Chester Soc. Nat. Sci. N. S. vol. xix. p. 48.

Orbulina, d'Orbigny.

Orbulina universa, d'Orbigny.

Orbulina universa, d'Orbigny, 1839, Foram. Cuba, p. 85, pl. 1, fig. 1.

Very rare.

Pullenia, Parker and Jones.

Pullenia sphæroides, d'Orbigny, sp. (Pl. XII. figs. 28 *a*, 28 *b*).

Nonionina sphæroides, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 293, No. 1; Modèles No. 43.

Only two examples found.

Pullenia quinqueloba, Reuss, sp. (Pl. XII. figs. 29 *a*, 29 *b*).

Nonionina quinqueloba, Reuss, 1851, Zeitschr. deutsch. Geol. Gesell. vol. iii. pl. 5, fig. 31.

Only one example found. *P. sphæroides* and *P. quinqueloba* have been very rarely met with off the British coast. Both forms, however, are frequent in deep sea gatherings, and have a wide geographical distinction. They occur fossil in the chalk of the North of Ireland.

Family.—ROTALIDÆ.

Sub-family.—SPIRILLININÆ.

Spirillina, Ehrenberg.

Spirillina vivipara, Ehrenberg (Pl. XII. fig. 32).

Spirillina vivipara, Ehrenberg, 1841, Verbreitung, &c. p. 442, pl. 3, fig. 441.

Rare. A single specimen of a curiously ciliated form (Pl. XII. fig. 32), having delicate hair-like spines on the periphery, was found in Dalkey Sound, 5 fathoms.

Spirillina tuberculata, Brady.

Spirillina tuberculata, Brady, 1878, in Siddall's "Foraminifera of the Dee," Proc. Chester Soc. Nat. Sci., New Ser. vol. xix. p. 65, pl. 8, fig. 28.

We believe this to be the same shell as *S. margaritifera*, Will. Rec. For. Gr. Br. p. 93, pl. 7, fig. 204, but never having seen Professor Williamson's type specimen, we cannot speak with certainty on the subject. Very rare.

Sub-family.—ROTALINÆ.

Patellina, Williamson.

Patellina corrugata, Williamson.

Patellina corrugata, Williamson, 1858, Rec. For. Gr. Br. p. 47, pl. 3, figs. 86-88

Rare. A few specimens were found having an oval contour.

Discorbina, Parker and Jones.

Discorbina rosacea, d'Orbigny, sp.

Rotalia rosacea, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 273, No. 15; Modèles No. 38.

Frequent.

Discorbina globularis, d'Orbigny, sp.

Rosalina globularis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 271, No. 1, pl. 13, figs. 1–4.

Common.

Discorbina orbicularis, Terquem, sp. (Pl. XIII. figs. 31–33).

Rosalina orbicularis, Terquem, 1876, Anim. sue la Plage de Dunkerque, p. 75, pl. 9, fig. 4 a, b.

Rare; in dredgings near the coast, and in shore gatherings.

Discorbina bertheloti, d'Orbigny, sp.

Rosalina bertheloti, d'Orbigny, 1839, Foram. Canaries, p. 135, pl. 1, figs. 28–30.

Very rare.

Discorbina wrightii, Brady.

Discorbina wrightii, Brady, 1881, Ann. and Mag. Nat. Hist. Ser. 5, vol. viii. p. 413, pl. 21, fig. 6 a, b, c; *D. parisiensis*, Wright (in part), 1877, Proc. Belfast Nat. Field Club, 1876–7, App. p. 105, pl. 4, fig. 2 a, b, c.

Very rare off Dublin. This species has been obtained at many places around the Irish coast. It was found plentifully in shallow water off Grey Point, Belfast Lough, as also in material dredged off Kinsale by Messrs. Thomas Wright and John Harrison.

Discorbina parisiensis, d'Orbigny, sp.

Rosalina parisiensis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 271, No. 5; Modèles No. 38; Wright (in part), Proc. Belfast Nat. Field Club, 1876–7, App. p. 105, pl. 4, fig. 1 a, b, c, d.

Very rare.

Discorbina tuberculata, nov. sp. (Pl. XIII. figs. 28–30).

Test, trochoid, convex superiorly and inferiorly, with about two convolutions, which are visible on the superior side. The outermost convolution shows about six chamberlets. On the superior side these are separated by deeply constricted lines, and the surface of the chamberlets is roughened by a number of coarse tubercles which to a great extent obscure the septal lines. On the inferior side, the outermost convolution alone is visible. This side is usually smooth, but a few tubercles sometimes occur upon it. Aperture, a slit near the umbilicus, close to the inferior surface of the preceding convolution.

We have seen a number of examples of this small and somewhat obscure form. It may readily be distinguished from *D. globularis*, d'Orb., to which species it is most nearly allied, by its coarse tubercles, and its being very much smaller in size. Rare.

Planorbulina, d'Orbigny.

Planorbulina mediterranensis, d'Orbigny.

Planorbulina mediterranensis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 280, No. 2, pl. 14, figs. 4–6; Modèles No. 79.

Frequent.

Truncatulina, d'Orbigny.

Truncatulina lobatula, Walker and Jacob, sp.

Nautilus lobatulus, Walker and Jacob, 1798 (fide Kanmacher), Adams' Essays on the Microscope, 2nd ed. p. 642, pl. 14, fig. 36.

Very abundant everywhere.

Pulvinulina, Parker and Jones.

Pulvinulina auricula, Fichtel and Moll, sp.

Nautilus auricula, Fichtel and Moll, 1803, Test. Micr. p. 108, pl. 20, figs. a–f.

Rare in the Dublin gatherings. This species occurs plentifully and large, off the south and west coasts of Ireland.

Pulvinulina karsteni, Reuss, sp.

Rotalia karsteni, Reuss, 1855, Zeitschr. deutsch. Geol. Ges. vol. vii. p. 273, pl. 9, fig. 6.

Very rare, specimens small.

Pulvinulina menardii, d'Orbigny, sp.

Rotalia menardii, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 273, No. 26, Modèles No. 10.

Only one or two poor specimens found.

Rotalia, Lamarck.

Rotalia beccarii, Linn., sp.

Nautilus beccarii, Linn., 1767, Syst. Nat. 12th ed. p. 1162, No. 276.

Common everywhere. A neat, thin-shelled variety approaching

R. orbicularis, d'Orb., was frequent in some of the deep water gatherings in the Irish Sea.

Rotalia nitida, Williamson, sp.

Rotalia nitida, Williamson, 1858, Rec. For. Gr. Br. p. 54, pl. 4, figs. 106–108.

Frequent.

Sub-family.—TINOPORINÆ.

Gypsina, Carter.

Gypsina vesicularis, Parker and Jones, sp.

Orbitolina vesicularis, Parker and Jones, 1860, Ann. and Mag. Nat. Hist. 3rd Ser. vol. vi. p. 31, No. 5; *Tinoporus lævis*, Carpenter, 1860, Phil. Trans. p. 559, pl. 21, figs. 1–3.

Very rare in the Dublin gatherings, and the specimens small. This interesting form is not unfrequent off the west coast of Ireland, where it often attains a large size.

Gypsina inhærens, Schultze, sp.

Acervulina inhærens, Schultze, 1854, Organ. der Polysthal. p. 68, pl. vi. fig. 12.

Only a few broken specimens found in the Dublin gatherings. This species is abundant and very fine off the west coast of Ireland.

Family.—NUMMULINIDÆ.

Sub-family.—POLYSTOMELLINÆ.

Nonionina, d'Orbigny.

Nonionina turgida, Williamson, sp.

Rotalina turgida, Williamson, 1858, Rec. For. Gr. Br. p. 50, pl. 4, figs. 95–97.

Rare.

Nonionina scapha, Fichtel and Moll, sp.

Nautilus scapha, Fichtel and Moll, 1803, Test. Micr. p. 105, pl. 19, figs. d–f.

Very rare.

Nonionina pauperata, nov. sp. (Pl. XIII. figs. 25, 26).

Shell spiral, equilateral, lenticular, revealing only the outermost convolution, which consists of about nine smooth, somewhat ventricose segments; peripheral margin angular; septal lines deeply excavated; aperture transversely oblong, close to the periphery of the preceding convolution; septal plane sagittate. Rather frequent.

Nonionina depressula, Walker and Jacob, sp.

Nautilus depressulus, Walker and Jacob, 1798, Adams' Essay, 2nd ed. p. 641, pl. 14, fig. 33.

Abundant everywhere.

Nonionina boueana, d'Orbigny (Pl. XIII. fig. 27).

Nonionina boueana, d'Orbigny, 1846, For. Foss. Vien. p. 108, pl. 5, figs. 11, 12.

Only one specimen found.

Nonionina stelligera, d'Orbigny.

Nonionina stelligera, d'Orbigny, 1839, Foram. Canaries, p. 128, pl. 3, fig. 12.

Generally distributed, but rare at most places. Immature specimens of this species often occur with a deep umbilicus; these forms are liable to be mistaken for *N. umbilicatula*, Montf.

Polystomella, Lamarck.

Polystomella crispa, Linn., sp.

Nautilus crispus, Linn., 1767, Syst., Nat. 12th ed. p. 1162.

Frequent at most localities.

Polystomella striato-punctata, Fichtel and Moll, sp.

Nautilus striato-punctatus, Fichtel and Moll, 1803, Testac. Micr., p. 61, pl. 9, figs. a–c.

Abundant almost everywhere.

Haliphysema tumanowiczii, Bowk., was found by Professor A. Haddon, off Dalkey Island, and was abundant in a small quantity of material gathered by him.

Reophax difflugiformis (?) Brady—A small, flask-shaped, arenaceous organism, apparently referable to this species, was met with in one of the Dublin gatherings, but as the only example found was broken whilst being examined under the microscope, for the present at least we consider its occurrence off the Dublin coast should be regarded as somewhat doubtful.

Miliolina venusta (?) Karrer, sp.—Shell, thin, depressed, of a long oval shape; margin bicarinate; aperture, tri-forked. Rare. The specimens were not sufficiently well grown to name with certainty; the choice however appears to be between *M. venusta*, Kar., and *M. cuveriana*, d'Orb. sp.

TABLE

OF THE

DISTRIBUTION OF RECENT FORAMINIFERA

OFF THE COAST OF DUBLIN AND IN THE IRISH SEA.

Key to localities indicated by the figures (1, 2, 3, 4, a, b, c, &c.), at the heads of the columns in the accompanying Table.

Between tides.

1. Dollymount and Clontarf.
2. Ringsend and Sandymount.
3. Booterstown and Seapoint.
4. Malahide, Portmarnock and Baldoyle.
5. Howth.
6. Sandycove and Ballybrack.
7. Dalkey Island.

Dublin Bay.

8. Off Dollymount, 4 fathoms.
9. Off Kingstown, 7 fathoms.
10. Dalkey Sound, 5 fathoms.
11. Off Dalkey, 8 fathoms.

Within 3 miles of the coast.

12. Off Ireland's Eye, 7–9 fathoms.
13. Off Ireland's Eye, 14 fathoms.
14. Off Howth Head, 18 fathoms.
15. Off Bailey L. H., Howth, 17 fathoms.
16. Between Howth and Dalkey, 13 fathoms.
17. Off Dalkey, 16 fathoms.
18. Off Dalkey Island, 18 fathoms.
19. Off Dalkey Island, 15 fathoms.
20. Killiney Bay, 8–14 fathoms.
21. Off Ballybrack Station, 12–15 fathoms.
22. Off Bray Head, 14 fathoms.

3–10 miles off land.

23. 3 miles S. of Lambay Island, 12 fathoms.
24. 4 miles E. of Howth, 13 fathoms.
25. 6 miles S.E. of Howth, 11 fathoms.
26. Kish Bank, 5 fathoms.
27. Kish Bank, 4 fathoms.
28. Off Kish Bank, 24 fathoms.
29. Off Kish Bank, 21 fathoms.
30. Off Kish Bank, 15 fathoms.
31. Off Kish Bank (Rock May), 25 fathoms.
32. Off Bray Bank, 21 fathoms.
33. Off Bray Head, 19–27 fathoms.

10–20 miles off land.

34. Lambay Deep, 45 fathoms.
35. Lambay Deep, 50 fathoms.
36. 18 miles S.E. by S. of Lambay Island, 48 fathoms.
37. 19 miles S.E. by S. of Lambay Island, 40 fathoms.

Irish Sea, Collected by Mr. Voysey.

a. Off Isle of Man, 45 fathoms.
b. Off Isle of Man, 43 fathoms.
c. Off Hen and Chickens, Isle of Man, 30 fathoms.
d. 12 miles off Carlingford, 25 fathoms.
e. Off Drogheda, 8 fathoms.
f. Off Mourne Mountains (fish's jaws).
g. 14 miles off Howth (fish's jaws).
h. 14 miles off Bray Head, 24 fathoms.
i. 8 miles off Skerries, 17 fathoms.
j. Off Drogheda, 16 fathoms; and Lambay Deep, (?) 70 fathoms—mixed.

LIST OF ABBREVIATIONS.

vr, very rare; r, rare; f, frequent; c, common; vc, very common. Species marked * are new to the British Fauna.

	Species.	Plates.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Biloculina ringens, *Lamk.*,	.. ..	r	f	f	r	..	..	r	..	vr	vr	f	f	r	vr	vr	r
2	ringens, *Lamk.* var.,	Pl. xii. f. 6, 7,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	depressa, *d'Orb.*,	.. ..	r	r	f	vr	r	..	vr	vr	vr	vr	r	f	r	..	r	r
4	Spiroloculina limbata, *d'Orb.*,	.. ..	vr	vr	vr	vr	..	..	vr	..	r	vr	r	r	r	..	..	..
5	planulata, *d'Orb.*,	.. ..	vr	vr	..	..	..	..	vr	..	vr	vr	r	r	vr	..	..	..
6	*acutimargo, *Brady*,	Woodcut, p. 323.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	Miliolina trigonula, *Lamk.*,	.. ..	r	f	f	r	r	..	r	r	f	f	f	f	f	..	f	r
8	tricarinata, *d'Orb.*,	.. ..	vr	vr	vr	vr	vr	..	vr	..	..	r	..	r	vr	..	..	vr
9	oblonga, *Montagu*,	.. ..	r	f	f	r	r	r	f	r	f	r	r	f	r	r	f	r
10	seminulum, *Linn.*,	.. ..	c	c	vc	vc	c	c	c	c	vc	vc	vc	vc	vc	c	vc	c
11	tenuis, *Czjzek.*,	Pl. xii. f. 3–5,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	subrotunda, *Montagu*,	Pl. xii. f. 8, 9,	vc	vc	vc	vc	vc	vc	vc	vr	vc	vc	vc	vr	vc	vc	vc	c
13	secans, *d'Orb.*,	.. ..	f	r	vc	vc	vc	vc	vc	r	r	vc	..	f	r	f	r	r
14	bicornis, *W. & J.*,	.. ..	r	f	f	r	vr	r	c	r	r	c	c	f	r	r	f	f
15	ferussacii, *d'Orb.*,	.. ..	r	f	f	r	..	..	r	..	r	r	f	f	r	..	r	r
16	ferussacii, *d'Orb.* var., near M. sclerotica, *Karrer*,	Pl. xii. f. 10–12,	r	r	f	vr	..	..	f	..	f	r	..	..	f	..	..	..
17	pulchella, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	vr	r	..	..	..	..	vr	..
18	agglutinans, *d'Orb.*,	Pl. xiii. f. 1–3,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	fusca, *Brady*,	.. ..	..	..	vr	vr	vr	..	vr	..	..	..	..	vr	vr	..	..	..
20	*Ophthalmidium carinatum, nov. sp.,	Pl. xii. f. 13–16,	..	..	..	..	..	..	r	..	..	r	..	..	r	..	..	..
21	Cornuspira foliacea, *Philippi*,	Pl. xii. f. 1,	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..
22	involvens, *Reuss.*,	Pl. xii. f. 2,	r	r	f	r	f	r	r	r	r	c	..	f	r	r	vr	..
23	Technitella legumen, *Norman*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	Psammosphæra fusca, *Schulze*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	Hyperammina elongata, *Brady*,	Pl. xiii. f. 4,	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..
26	Reophax fusiformis, *Will.*,	.. ..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..
27	scorpiurus, *Montf.*,	Pl. xiii. f. 5,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	(?) sp.,	Pl. xiii. f. 9, 22–24	..	..	..	vr	..	r	..	..	r	vr	f	r	r	..	vr	vr
29	Haplophragmium glomeratum, *Brady*,	.. ..	..	..	..	..	..	..	..	..	..	vr	..	r	vr	..	vr	..
30	globigeriniforme, *P. & J.*,	.. ..	vr	..	r	r	vr	..	vr	r	r	r	..	f	r	vr	r	f
31	pseudospirale, *Will.*,	Pl. xiii. f. 6–8,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
32	*agglutinans, *d'Orb.*,	Pl. xiii. f. 18–20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
33	canariense, *d'Orb.*,	.. ..	f	r	f	f	f	r	c	r	vc	c	f	c	f	c	f	f

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	a	b	c	d	e	f	g	h	i	j	
r	r	r	r	c	..	r	f	f	r	c	r	r	f	f	r	vr	vc	c	r	r	c	f	c	c	f	r	r	f	r	vc	1
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	c	f	..	..	..	..	..	..	..	r	..	..	..	..	2
r	r	r	r	r	r	r	f	f	r	vr	f	f	r	r	r	r	c	c	f	r	vc	vc	vc	f	f	r	f	f	r	vc	3
..	..	vr	vr	r	vr	..	vr	..	..	..	..	..	..	vr	..	vr	r	r	r	..	r	r	r	vr	vr	..	vr	..	r	r	4
..	vr	..	r	r	..	..	..	vr	..	..	..	..	..	vr	..	..	r	r	..	..	vr	vr	vr	f	vr	..	..	..	r	r	5
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..	..	..	vr	..	..	..	..	..	..	6
r	r	f	f	f	r	r	r	f	..	f	r	r	..	r	r	r	r	vr	vr	vr	r	r	f	f	f	..	r	vr	f	r	7
vr	vr	vr	vr	vr	r	vr	r	vr	vr	..	vr	..	..	r	..	vr	r	r	..	..	r	r	r	r	..	r	r	vr	r	f	8
r	r	r	r	r	r	r	f	r	r	..	r	r	..	r	r	r	r	f	r	..	r	f	f	r	r	r	..	f	r	f	9
c	c	c	c	vc	c	c	c	vc	c	vc	f	c	c	f	c	c	vc	vc	c	c	f	c	c	c	vc	c	c	c	vc	vc	10
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	f	r	vr	..	..	..	..	..	..	f	c	r	..	..	11
vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	vc	c	vc	vc	vc	vc	vc	vc	vc	vc	c	r	vc	vc	vc	12
f	..	r	f	r	vr	r	..	..	..	..	..	r	..	..	..	vr	vr	vr	vr	..	..	r	r	..	vr	..	r	r	r	r	13
f	r	f	f	c	c	r	f	c	f	c	f	c	f	c	c	c	r	f	c	c	c	vc	c	r	r	..	r	c	r	f	14
r	vr	r	r	f	vr	r	f	f	..	r	r	f	r	r	r	r	r	f	f	r	c	c	f	r	r	..	..	c	r	f	15
..	..	..	vr	..	..	..	..	..	..	..	r	r	r	r	..	..	..	..	vr	..	..	vr	..	r	r	..	..	..	..	..	16
vr	..	..	..	r	..	..	..	..	..	..	..	..	..	..	..	vr	vr	vr	..	..	..	..	..	r	..	..	..	..	..	..	17
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	r	..	18
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	vr	..	..	..	..	..	..	..	..	..	..	..	..	19
r	..	..	r	..	..	..	..	..	..	..	f	..	r	..	..	..	f	c	vr	f	..	vr	vr	..	..	r	vr	..	r	..	20
..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	f	f	..	..	r	..	..	r	vr	..	vr	..	..	r	21
r	r	r	r	vr	r	r	r	..	r	..	r	r	r	r	f	r	f	f	r	r	r	r	r	r	r	r	vr	f	r	f	22
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	r	23
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..	..	..	..	..	..	..	..	..	..	24
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vc	vc	r	..	vr	..	..	f	r	..	f	..	vr	..	25
..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	r	c	c	vr	vr	r	26
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vc	vc	f	..	..	..	..	..	..	..	r	vr	..	..	27
..	..	vr	..	..	..	..	..	vr	vr	..	r	vr	r	r	r	r	..	r	r	vr	r	f	r	r	r	..	..	r	vr	r	28
..	..	..	..	..	..	r	..	..	..	..	r	..	..	r	..	vr	r	r	f	r	vr	r	vr	vr	..	..	..	r	vr	f	29
r	r	vr	r	vr	f	r	f	vr	vr	..	f	r	r	f	f	r	r	f	f	f	f	c	f	f	f	r	r	f	r	f	30
r	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vc	vc	..	..	..	..	..	c	..	..	c	..	r	..	31
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	f	..	32
f	f	vc	f	c	c	c	c	r	r	..	c	c	r	c	vc	vc	r	f	f	c	f	vc	c	f	f	r	r	c	f	c	33

	Species.	Plates.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
34	Ammodiscus incerta, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	vr	..	..	vr	vr	..	vr	vr
35	gordialis, *J. & P.*,	.. ..	vr	vr	r	vr	..	vr	vr	..	..	r	..	vr	..	..	..	..
36	charoides, *J. & P.*,	Pl. xiii. f. 10.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	shoneana, *Siddall*,	.. ..	..	..	..	..	..	..	vr	..	..	..	..	..	vr	..	..	..
38	Trochamminata squamata, *J. & P.*,	.. ..	vr	vr	r	r	r	vr	c	vr	r	f	..	f	f	r	r	c
39	inflata, *Montagu*,	.. ..	r	..	vr	vr	vr	..	r	..	..	..	..	r	vr	..	..	vr
40	inflata, *Montagu* var.,	Pl. xiii. f. 11, 12.	..	..	..	vr	vr	..	..	..	..	..	..	..	..	..	..	..
41	macrescens, *Brady*,	.. ..	vr	..	..	..	vr	..	vr	..	..	..	..	vr	..	..	..	..
42	Textularia sagittula, *Defrance*,	Pl. xiii. f. 15–17,	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..
43	gramen, *d'Orb*,	Pl. xiii. f. 13, 14,	r	r	r	f	r	..	r	r	r	f	f	f	f	f	f	f
44	agglutinans, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..
45	globulosa, *Ehrenb.*,	.. ..	..	..	..	..	..	..	..	..	..	vr	..	..	..	vr	..	..
46	Verneuilina polystropha, *Reuss*,	.. ..	c	r	f	c	r	r	vr	..	f	c	c	f	f	f	r	f
47	spinulosa, *Reuss*,	.. ..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..
48	Spiroplecta biformis, *J. & P.*,	Pl. xiii. f. 21,	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..
49	Gaudryina filiformis, *Berthelin*,	.. ..	vr	vr	r	vr	vr	vr	vr	..	..	r	vr	f	r	..	..	vr
50	Bulimina pupoides, *d'Orb.*,	.. ..	c	c	c	f	f	r	r	f	c	f	c	c	f	c	c	c
51	marginata, *d'Orb.*,	.. ..	r	r	r	r	r	vr	vr	r	vr	r	r	r	r	r	f	r
52	aculeata, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
53	ovata, *d'Orb.*,	.. ..	r	vr	f	f	f	..	f	vr	f	r	vr	f	f	r	f	f
54	elegantissima, *d'Orb.*,	.. ..	r	..	r	r	f	..	r	f	r	r	vr	f	r	r	f	r
55	subteres, *Brady*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
56	Virgulina schreibersii, *Czjzek*,	.. ..	vr	vr	r	vr	..	..	..	..	r	vr	..	r	r	..	..	..
57	Bolivina textilarioides, *Reuss*,	.. ..	..	..	..	..	..	..	vr	..	..	vr	..	..	r	..	vr	..
58	punctata, *d'Orb.*,	.. ..	r	r	f	r	f	r	r	r	r	f	r	c	f	r	f	f
59	plicata, *d'Orb.*,	.. ..	vr	r	f	vr	f	..	r	vr	f	f	f	c	f	r	f	f
60	dilatata, *Reuss*,	.. ..	..	..	..	..	vr	..	vr	..	vr	vr	vr	r	f	r	..	vr
61	difformis, *Will.*,	.. ..	..	..	vr	..	..	..	vr	..	..	vr	..	..	vr	..	..	..
62	Cassidulina lævigata, *d'Orb.*,	.. ..	..	..	..	..	..	..	vr	..	vr	vr	..	r	r	..	..	..
63	crassa, *d'Orb.*,	.. ..	vr	..	vr	r	vr	..	vr	vr	vr	vr	r	r	r	r	vr	r
64	Lagena globosa, *Montagu*,	.. ..	r	c	f	f	r	r	r	..	f	r	r	c	f	f	r	f
65	lineata, *Will.*,	Pl. xiv. f. 13–16,	r	f	f	f	r	r	f	f	f	f	r	c	f	c	f	f
66	lævis, *Montagu*,	.. ..	c	f	c	f	f	f	f	f	f	f	f	c	c	f	f	r

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68	hispida, *Reuss*,	.. ..	vr	..	vr	vr	..	..	..	..	..	..	..	vr	..	..	..	..
69	striata, *d'Orb.*,	.. ..	vr	vr	r	f	..	vr	vr	..	vr	vr	vr	f	f	..	r	..
70	*curvilineata, nov. sp.,	Pl. xiv. f. 21–24,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
71	gracilis, *Will.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..
72	sulcata, *W. & J.*,	Pl. xiv. f. 1, 2,	c	c	c	f	r	r	f	f	f	f	f	f	f	r	c	f
73	costata, *Will.*,	Pl. xiv. f. 3–5,	r	r	r	f	vr	..	vr	..	r	vr	f	r	..	..	r	r
74	williamsoni, *Alcock*,	Pl. xiv. f. 6–8,	c	c	c	c	f	f	c	c	c	f	c	vc	c	c	c	c
75	semistriata, *Will.*,	.. ..	c	f	c	f	r	vr	r	f	r	r	f	c	f	r	r	f
76	crenata, *P. & J.*,	Pl. xiv. f. 17, 18,	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..
77	striato-punctata, *P. & J.*,	Pl. xiv. f. 20,	..	..	vr	vr	..	..	..	..	vr	r	..	..	vr	..	..	..
78	*feildeniana, *Brady*,	Pl. xiv. f. 19,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
79	squamosa, *Montagu*,	Pl. xiv. f. 9,	c	c	vc	f	r	r	f	c	c	r	f	c	c	f	c	f
80	melo, *d'Orb.*,	.. ..	vr	vr	..	vr	..	..	..	..	..	..	..	..	..	..	..	..
81	hexagona, *Will.*,	.. ..	r	f	f	r	r	..	r	r	r	f	r	c	f	f	f	f
82	lævigata, *Reuss*,	.. ..	f	c	c	f	vc	r	f	f	f	f	c	c	c	c	f	f
83	marginata, *W. & J.*,	.. ..	vr	..	vr	vr	vr	..	r	vr	r	r	vr	f	f	r	..	..
84	lagenoides, *Will.*,	Pl. xii. f. 22,	..	..	vr	vr	vr	..	vr	vr	vr	vr	..	r	r	..	..	..
85	orbignyana, *Seg.*,	.. ..	c	c	c	f	r	r	f	r	r	f	c	c	f	c	f	f
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88	pulchella, *Brady*,	Pl. xii. f. 19,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
89	Nodosaria raphanus, *Linn.*,	Pl. xii. f. 26,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
90	scalaris, *Batsch.*,	.. ..	r	vr	r	r	vr	..	vr	r	r	r	vr	r	r	..	r	vr
91	pyrula, *d'Orb.*,	Pl. xii. f. 23,	vr	..	vr	..	..	..	vr	..	..	vr	vr	vr	r	..	..	..
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93	*hispida, *d'Orb.*,	Pl. xii. f. 31,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
94	communis, *d'Orb.*,	.. ..	r	vr	r	r	..	..	vr	vr	vr	r	vr	f	r	..	..	vr
95	consobrina, *d'Orb.*,	.. ..	..	..	..	vr	..	..	..	..	..	..	..	vr	r	..	..	..
96	obliqua, *d'Orb.*,	.. ..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..
97	Lingulina carinata, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
98	(?) *Rhabdogonium tricarinatum, *d'Orb.*,	Pl. xii. f. 17, 18,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
99	Marginulina glabra, *d'Orb.*,	Pl. xii. f. 24, 25,	vr	..	..	vr	..	..	..	..	..	..	..	..	vr	..	..	..

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c	c	c	c	c	vc	c	c	c	f	r	c	c	f	c	c	c	vc	vc	vc	c	c	c	c	c	c	r	f	c	c	vc	74
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103	Cristellaria rotulata, *Lamk.*,	.. ..	vr	vr	vr	r	vr	..	vr	..	vr	vr	vr	r	r	r	r	..
104	cultrata, *Montfort*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..
105	crepidula, *F. & M.*,	.. ..	r	r	r	vr	vr	..	vr	vr	..	vr	r	r	..	..	..	r
106	Polymorphina lactea, *W. & J.*,	.. ..	r	r	r	r	..	..	vr	..	vr	..	vr	r	r	..	..	r
107	gibba, *d'Orb.*,	.. ..	c	f	f	f	r	r	r	f	r	r	c	c	r	r	f	f
108	fusiformis, *Roemer*,	.. ..	vr	vr	vr	r	..	..	..	..	vr	..	..	..	..	..	..	..
109	oblonga, *Will.*,	.. ..	vr	vr	vr	vr	r	..	vr	..	..	vr	r	r	vr	..	vr	f
110	compressa, *d'Orb.*,	.. ..	..	..	vr	..	r	..	..	..	..	..	..	..	..	..	..	..
111	rotundata, *Bornemann*,	.. ..	..	..	..	vr	..	..	..	..	..	..	vr	..	..	..	..	..
112	concava, *Will.*,	.. ..	vr	..	vr	vr	vr	..	..	vr	vr	..	vr	vr	..	..	..	..
113	myristiformis, *Will.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
114	spinosa, *d'Orb.*,	Pl. xii. f. 27, .	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
115	Uvigerina pygmæa, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
116	angulosa, *Will.*,	.. ..	r	..	f	..	..	..	r	r	r	r	r	f	f	r	..	r
117	Globigerina bulloides, *d'Orb.*,	.. ..	vr	r	r	r	r	..	r	r	f	r	..	r	r	r	r	f
118	inflata, *d'Orb.*,	.. ..	vr	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..
119	Orbulina universa, *d'Orb.*,	.. ..	vr	..	vr	..	..	..	..	..	..	..	..	..	vr	..	..	..
120	Pullenia sphæroides, *d'Orb.*,	Pl. xii. f. 28, .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
121	*quinqueloba, *Reuss*,	Pl. xii. f. 29, .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
122	Spirillina vivipara, *Ehrenb.*,	Pl. xii. f. 32, .	..	..	vr	..	..	..	r	..	vr	r	..	r	r	..	vr	vr
123	tuberculata, *Brady*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..
124	Patellina corrugata, *Will.*,	.. ..	vr	..	vr	vr	vr	..	r	..	vr	vr	vr	r	r	f	vr	r
125	Discorbina rosacea, *d'Orb.*,	.. ..	r	c	c	f	r	r	r	f	r	f	f	c	f	f	r	f
126	globularis, *d'Orb.*,	.. ..	vc	c	c	c	f	f	vc	c	c	c	f	c	c	c	c	c
127	*orbicularis, *Terquem*,	Pl. xiii. f. 31–33,	vr	vr	vr	f	vr	..	vr	..	..	f	..	vr	..	..	..	..
128	bertheloti, *d'Orb.*,	.. ..	..	..	..	..	..	..	vr	..	..	r	..	vr	r	..	..	..
129	wrightii, *Brady*,	.. ..	..	..	vr	..	..	..	..	..	..	r	r	vr	..	..	..	..
130	parisiensis, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	r	..	..	..	..	..	..
131	*tuberculata, nov. sp.,	Pl. xiii. f. 28–30,	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..
132	Planorbulina mediterranensis, *d'Orb.*,	.. ..	c	c	c	f	r	r	r	f	f	f	f	c	f	f	c	c

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	a	b	c	d	e	f	g	h	i	j	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	100
..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	101
..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	102
vr	vr	vr	vr	r	vr	vr	..	vr	..	..	vr	..	vr	vr	vr	vr	r	r	r	r	r	r	r	r	r	f	vr	r	r	r	103
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	r	..	..	..	..	104
..	..	vr	..	r	vr	r	vr	..	..	..	r	vr	..	vr	..	r	f	f	r	..	r	c	f	r	r	r	r	..	r	r	105
r	r	r	r	r	r	..	vr	f	..	..	r	..	..	f	vr	r	f	f	r	..	..	c	c	r	f	r	..	r	r	r	106
r	..	r	c	f	f	r	f	c	r	vr	r	r	f	c	c	c	f	f	f	r	c	vc	vc	r	f	r	r	c	f	r	107
..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	vr	..	..	..	vr	f	f	..	..	r	..	..	r	..	108
..	..	r	vr	vr	..	vr	r	r	vr	..	r	r	..	r	..	vr	f	f	r	..	r	c	c	r	f	vr	.	f	r	f	109
..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	r	vr	vr	..	..	..	..	vr	..	..	..	..	..	..	110
..	..	vr	vr	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..	..	vr	vr	..	..	..	..	..	..	..	111
vr	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	vr	r	r	..	..	vr	vr	vr	vr	..	vr	..	r	vr	..	112
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	113
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	114
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	vr	..	..	..	..	..	..	115
r	f	r	..	r	vr	vr	..	r	..	vr	r	..	..	r	r	r	f	f	r	vr	vr	..	..	f	r	f	f	r	r	r	116
f	r	f	r	r	r	f	r	r	r	..	..	r	..	f	r	f	f	f	r	r	f	f	f	f	r	r	r	r	r	f	117
..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	vr	..	..	..	vr	vr	..	vr	..	..	..	..	..	118
..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	vr	r	..	..	vr	r	r	..	..	..	..	..	..	r	119
..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	120
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	121
vr	vr	vr	..	..	vr	..	..	vr	..	..	r	..	..	r	..	..	r	f	r	vr	vr	..	..	r	vr	..	..	..	vr	vr	122
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	vr	vr	123
r	vr	vr	r	vr	r	vr	..	vr	..	vr	..	vr	..	r	vr	vr	c	f	r	r	r	vr	r	r	r	r	r	r	r	r	124
f	c	f	c	c	f	r	f	f	r	f	f	r	f	c	f	f	f	f	r	r	c	r	r	f	r	r	r	r	c	r	125
c	c	c	f	c	c	c	c	c	f	f	vc	c	c	c	vc	c	c	c	c	vc	c	vc	c	c	c	r	f	c	c	c	126
..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	127
..	..	..	..	r	vr	..	..	..	..	..	r	..	..	..	..	..	r	r	..	vr	..	..	..	..	..	..	..	..	..	..	vr	128
..	r	..	..	r	vr	..	..	r	..	..	..	..	..	..	vr	..	r	vr	..	..	..	..	..	r	..	..	..	..	r	vr	129
..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	vr	..	130
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	..	vr	..	..	..	..	vr	..	..	..	..	vr	..	131
c	f	c	f	c	f	f	f	c	r	r	f	f	r	f	c	f	f	c	r	r	f	f	c	f	c	r	r	c	r	c	132

	Species.	Plates.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
133	Truncatulina lobatula, *W. & J.*,	.. ..	vc	vc	vc	vc	f	c	vc	vc	vc	vc	vc	vc	vc	vc	vc	c
134	Pulvinulina auricula, *F. & M.*,	.. ..	vr	..	..	vr	..	..	vr	..	vr	vr	..	r	r	..	r	..
135	karsteni, *Reuss*,	.. ..	..	..	vr	..	..	..	vr	..	..	vr	..	r	r	..	..	..
136	menardii, *d'Orb.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
137	Rotalia beccarii, *Linn.*,	.. ..	vc	c	c	c	f	f	f	c	f	f	c	c	f	f	c	c
138	nitida, *Will.*,	.. ..	r	c	c	r	r	r	f	f	f	f	f	c	f	f	c	f
139	Gypsina vesicularis, *P. & J.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..
140	inhærens, *Schultze*,	.. ..	vr	..	..	r	..	..	r	..	..	r	..	r	r	..	..	..
141	Nonionina turgida, *Will.*,	.. ..	..	..	vr	vr	vr	..	vr	..	vr	r	vr	r	vr	vr	r	..
142	scapha, *F. & M.*,	.. ..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..
143	*pauperata, nov. sp.,	Pl. xiii. f. 25, 26,	r	vr	r	r	vr	vr	r	..	vr	f	vr	f	f	r	r	r
144	depressula, *W. & J.*,	.. ..	vc	vc	vc	vc	vc	c	c	vc	vc	vc	vc	vc	c	f	vc	c
145	*boueana, *d'Orb.*,	Pl. xiii. f. 27,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
146	stelligera, *d'Orb.*,	.. ..	..	..	vr	vr	..	..	vr	..	vr	r	..	r	vr	vr	r	vr
147	Polystomella crispa, *Linn.*,	.. ..	c	c	c	vc	vc	vc	c	vc	c	vc	f	c	f	f	f	c
148	striato-punctata, *F. & M.*,	.. ..	vc	vc	vc	vc	vc	vc	vc	vc	vc	f	vc	vc	c	c	vc	c

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	a	b	c	d	e	f	g	h	i	j	
vc	vc	vc	vc	vc	vc	vc	vc	c	vc	vc	vc	vc	vc	vc	vc	c	vc	vc	vc	c	vc	vc	vc	vc	f	f	vc	c	vc	133
vr	..	..	vr	vr	..	..	vr	..	..	..	..	..	f	..	r	f	r	r	vr	r	r	r	vr	..	..	..	r	r	f	134
..	..	..	..	..	..	..	..	..	..	f	vr	..	vr	..	..	f	r	vr	f	..	vr	..	vr	..	f	vr	vr	..	r	135
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	136
c	c	c	vc	c	c	c	c	r	f	f	c	c	c	c	c	vc	vc	c	c	c	f	c	c	c	f	c	c	vc	c	137
c	c	f	f	c	c	c	f	r	r	f	f	f	f	c	c	c	c	f	f	f	f	f	f	c	..	f	f	c	c	138
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	r	r	..	..	..	..	..	..	..	..	..	..	..	..	139
..	vr	r	vr	vr	vr	vr	r	..	..	..	..	r	vr	..	..	r	vr	r	r	vr	vr	vr	r	..	..	..	r	r	r	140
..	vr	vr	vr	r	r	..	vr	..	..	r	r	..	r	vr	r	f	f	r	r	r	r	..	f	r	f	r	vr	vr	f	141
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	vr	vr	..	..	..	r	r	vr	..	..	..	..	..	r	142
r	f	vr	r	f	r	r	r	..	..	r	r	r	f	r	f	f	c	r	r	r	r	r	r	r	r	r	r	r	r	143
vc	vc	c	vc	f	vc	vc	vc	c	f	c	c	c	c	f	c	vc	f	c	c	r	c	c	vc	vc	f	c	c	vc	vc	144
..	..	..	..	..	..	..	..	..	..	vr	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	145
vr	f	vr	r	r	vr	..	vr	..	..	..	r	..	f	vr	r	f	f	f	f	r	r	..	r	r	r	r	vr	vr	f	146
f	f	f	f	c	f	f	f	f	r	r	f	f	c	c	c	f	f	r	r	..	f	f	f	f	r	f	f	c	f	147
c	c	c	vc	vc	vc	vc	vc	f	r	vc	c	vc	vc	vc	vc	f	c	vc	ve	vc	vc	vc	vc	vc	f	c	c	vc	vc	148

LIST OF LOCALITIES, WITH PARTICULARS OF DEPTH, &c.

	Localities.	Bathymetrical Range.	Sea Bottom.	Relative quantities of material examined in pounds.	Number of Species from each Locality.
1	Dollymount and Clontarf, Dublin Bay,	Between tides.	Fine sand—several gatherings,	48	76
2	Ringsend and Sandymount, Dublin Bay,	Between tides.	Fine sand—several gatherings,	56	60
3	Booterstown and Seapoint, Dublin Bay,	Between tides.	Fine sand—several gatherings,	20	79
4	Malahide, Portmarnock, and Baldoyle, coast,	Between tides.	Fine sand—several gatherings,	42	79
5	Howth,	Between tides.	Mud and sand—several gatherings,	14	61
6	Sandycove and Ballybrack, coast,	Between tides.	Coarse sand—several gatherings,	7	36
7	Dalkey Island, rock pools,	Between tides.	Sand and sea-weeds,	7	82
8	Dollymount, 3 miles E. of,	4 fathoms.	Fine sand,	13	46
9	Off Kingstown; 30 yards E. of East Pier Lighthouse,	7 fathoms.	Mud, sand and shells,	14	71
10	Dalkey Sound,	5 fathoms.	Mud, stones and star-fish,	2	88
11	Off Dalkey; 400 yards N. of the town,	8 fathoms.	Fine sand,	13	60
12	Off Ireland's Eye; 200 yards N. E. of Martello Tower,	7–9 fathoms.	Fine muddy sand,	12	92
13	Off Ireland's Eye; ½ mile N. E. of Coastguard Station,	14 fathoms.	Mud, gravel and dead shells,	4½	87
14	Howth Head, 1 mile N. E. of,	18 fathoms.	Fine sand, sertularians and shells,	½	49
15	Off Howth; 1½ mile S. E. of Bailey Lighthouse,	17 fathoms.	Fine sand and sertularians,	21	69
16	Between Bailey Lighthouse and Dalkey,	13 fathoms.	Sand and shells,	12½	69
17	Dalkey, 2 miles N. E. of,	16 fathoms.	Mud, sand and dead shells,	4½	65
18	Dalkey Island, ½ mile E. of,	18 fathoms.	A little sand; star-fish and dead shells,	¼	60
19	Dalkey Island, 2 miles S. E. of,	15 fathoms.	Mud, sand and dead shells,	8½	77
20	Killiney Bay,	8–14 fathoms.	Sand—2 gatherings,	23½	68
21	Off Ballybrack Station,	12–15 fathoms.	Sand and shells—2 gatherings,	31½	76
22	Bray Head, 1 mile E. of,	14 fathoms.	A little mud; dead shells and star-fish,	3	68
23	Lambay, 3 miles S. of,	12 fathoms.	Fine muddy sand,	13½	70

24	Howth, 4 miles E. of,	13 fathoms.	Fine sand,	15		54
25	Howth, 6 miles S. E. of,	11 fathoms.	Fine sand,	14		63
26	Kish Bank, N. end of (9 miles off Howth),	5 fathoms.	Fine sand,	—		41
27	Kish Bank, middle of (2 miles E. of second Buoy),	4 fathoms.	Fine sand,	13½		29
28	Off Kish Bank; 3 miles of Old Kish Ship (7 mls. E. of Bailey Lighthouse),	24 fathoms.	Fine sand,	9½		70
29	Off Kish Bank; 1 mile N. of Kish Ship (new place) (Rock Migh),	21 fathoms.	Sand, scollops and sertularians,	14½ 12½	}	58
30	Off Kish Bank; 1 mile W. of last station,	15 fathoms.	Sand,	15		49
31	Off Kish Bank; 10 miles S. E. of Howth (Rock May),	25 fathoms.	Mud and star-fish,	6		77
32	Off Bray Bank; 2 miles N. of No. 3 Buoy,	21 fathoms.	Mud and scollops,	3½		53
33	Bray Head, 4 to 6 miles S. E. of,	20–27 fathoms.	Mud, sand, gravel and dead shells—3 gatherings,	27		73
34	Lambay Deep; 7 to 8 miles E. of Lambay Island,	45 fathoms.	Mud—several gatherings,	67		118
35	Lambay Deep, near; 13 miles E. by N. of Lambay Island,	50 fathoms.	Mud—2 gatherings,	22		108
36	Lambay Deep, near; 19 miles S. E. by E. of Lambay Island,	48 fathoms.	Mud, sand and sertularians,	22		88
37	Lambay Deep, near; 2 miles S. of last station,	40 fathoms.	Sand,	15		62

IRISH SEA, collected by Mr. VOYSEY.

a	Isle of Man, 14 miles S. of,	45 fathoms.	Fine sand, sertularians and broken shells,	40		82
b	Isle of Man, 16 miles S. W. of,	43 fathoms.	Sand,	21		85
c	Isle of Man; off Hen and Chickens,	30 fathoms.	Mud and fine sand,	28		82
d	Carlingford, 12 miles E. of,	25 fathoms.	Mud and fine sand,	20		96
e	Off Drogheda,	8 fathoms.	Mud and fine sand,	20		69
f	Off Mourne Mountains (taken from fish's jaws),	60 fathoms.	Fine sand,	5		78
g	Howth, 14 miles off (taken from fish's jaws),	35 fathoms.	Sand,	1½		79
h	Bray Head, 14 miles off (where "Vanguard" was lost),	24 fathoms.	Mud and fine sand,	10		75
i	Skerries, 8 miles S. W. of,	17 fathoms.	Mud and fine sand,	20		88
	Off Drogheda, 16 fathoms, and Lambay Deep, (?) 70 fathoms (mixed),	16 fms. & 70 fms.	Mud and sand,	20		95

EXPLANATION OF PLATE XII.

Figure 1. Cornuspira foliacea, Phil., 1 *a*, lateral aspect; 1 *b*, periphero-lateral aspect. × 50 diam. Lambay, 45 fathoms.

,, 2. Cornuspira involvens, Reuss, 2 *a*, lateral aspect; 2 *b*, periphero-lateral aspect. × 50 diam. Lambay, 50 fathoms.

,, 3–5. Miliolina tenuis, Czjzek, 3, 4, lateral aspects; 5, oral aspect. × 75 diam. Off Mourne Mountains (taken from jaws of a fish).

,, 6, 7. Biloculina ringens, Lamk., var. nov., 6, periphero-lateral aspect; 7, lateral aspect. × 75 diam. Lambay, 45 fathoms.

,, 8, 9. Miliolina subrotunda, Montagu, 8, lateral aspect; 9, periphero-lateral aspect. × 75 diam. Lambay, 50 fathoms.

,, 10–12. Miliolina ferussacii, d'Orb., var. near M. sclerotica, Karrer, 10, 11, lateral aspects, both sides; 12, oral aspect. × 50 diam. Killiney Bay, 14 fathoms.

,, 13–16. Ophthalmidium carinatum, nov. sp., 13, 15, lateral aspects; 16, periphero-lateral aspect. × 75 diam. Lambay, 45–50 fathoms.

,, 17, 18. (?) Rhabdogonium tricarinatum, d'Orb., 17, lateral aspect; 18, oral aspect. × 150 diam. Lambay, 45 fathoms.

,, 19. Lagena pulchella, Brady, trigonal, 19 *a*, lateral aspect; 19 *b*, oral aspect. × 100 diam. Off Drogheda, and Lambay (mixed).

,, 20, 21. Lagena castrensis, Schwager. × 100 diam. Lambay, 45–50 fathoms.

,, 22. Lagena lagenoides, Will., trigonal. × 100 diam. Lambay, 45 fathoms.

,, 23. Nodosaria pyrula, d'Orb, × 25 diam. Lambay, 45 fathoms.

,, 24, 25. Marginulina glabra, d'Orb. × 25 diam. Lambay, 45 fathoms.

,, 26. Nodosaria raphanus, Linn. × 25 diam. Lambay, 45 fathoms.

,, 27. Polymorphina spinosa, d'Orb. × 100 diam. Dollymount, between tides.

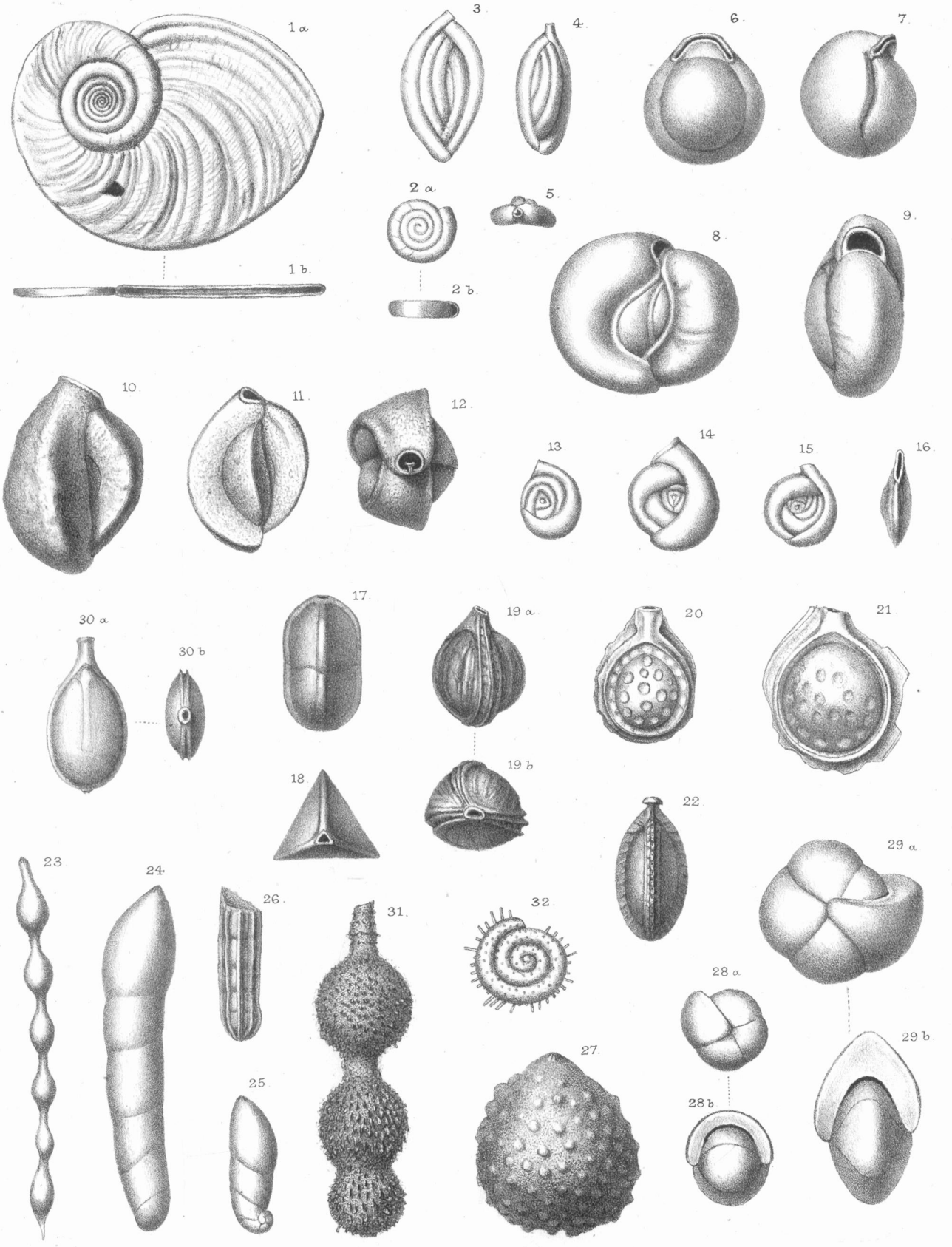
,, 28. Pullneia sphæroides, d'Orb., 28 *a*, lateral aspect; 28 *b*, periphero-lateral aspect. × 100 diam. 6 miles S.E. of Howth, 11 fathoms.

,, 29. Pullenia quinqueloba, Reuss, 29 *a*, lateral aspect; 29 *b*, periphero-lateral aspect. × 100 diam. Lambay, 45 fathoms.

,, 30. Lagena bicarinata, Terquem, 30 *a*, lateral aspect; 30 *b*, oral aspect. × 100 diam. 14 miles off Howth (taken from jaws of a fish).

,, 31. Nodosaria hispida, d'Orb. × 50 diam. 30 miles E. of Mourne Mountains, 75 fathoms. In the collection of Mr. Charles Elcock.

,, 32. Spirillina vivipara, Ehrenb., hispid. var. × 100 diam. Dalkey Sound, 5 fathoms.



EXPLANATION OF PLATE XIII.

PLATE XIII.

Figure 1–3. Miliolina agglutinans, d'Orb., 1, 2, lateral aspect, both sides; 3, oral aspect, × 75 diam. Off Kingstown, 7 fathoms.

,, 4. Hyperammina elongata, Brady, 4 *a*, lateral aspect; 4 *b*, oral aspect. × 25 diam. Lambay, 45 fathoms.

,, 5. Reophax scorpiurus, Montf., 5 *a*, lateral aspect; 5 *b*, oral aspect. × 25 diam. Lambay, 45 fathoms.

,, 6–8. Haplophragmium pseudospirale, Will., 6, 7, lateral aspects; 8, oral aspect. × 25 diam. Lambay, 45 fathoms.

,, 9. (?) Reophax sp. × 50 diam, 10 miles S.E. of Howth, 25 fathoms.

,, 10. Ammodiscus charoides, P. and J., 10 *a*, lateral aspect; 10 *b*, periphero-lateral aspect. × 150 diam. Off Kish Bank, 24 fathoms.

,, 11. Trochammina inflata, Montagu, var. nov., 11 *a*, superior lateral aspect; 11 *b*, inferior lateral aspect. × 150 diam. Off Drogheda, 16 fathoms.

,, 12. Trochammina inflata, Montagu, var. nov., 12 *a*, superior lateral aspect; 12 *b*, inferior lateral aspect. × 150 diam. Killiney Bay, 8–14 fathoms.

,, 13, 14. Textularia gramen, d'Orb., 13, lateral aspect; 14, periphero-lateral aspect. × 25 diam. Lambay, 45 fathoms.

,, 15–17. Textularia sagittula, Defrance, 15, 16, lateral aspects; 17, periphero-lateral aspect. × 25 diam. Off Ballybrack Station, 15 fathoms.

,, 18–20. Haplophragmium agglutinans, d'Orb., 18, 19, lateral aspects; 20, oral aspect. × 75 diam. Off Skerries, 17 fathoms.

,, 21. Textularia (Spiroplecta) biformis, P. and J. × 100 diam. Off Drogheda, 8 fathoms.

,, 22. (?) Reophax sp. × 50 diam. Off Skerries, 17 fathoms.

,, 23. (?) Reophax sp. × 50 diam. Off Ireland's Eye, 7–9 fathoms.

,, 24. (?) Reophax sp., end view. × 50 diam. 6 miles S.E. of Howth, 11 fathoms.

,, 25, 26. Nonionina pauperata, nov. sp., 25, lateral aspect; 26, periphero-lateral aspect. × 100 diam. Lambay, 45 fathoms.

,, 27. Nonionina boueana, d'Orb., 27 *a*, lateral aspect; 27 *b*, periphero-lateral aspect. × 75 diam. Off Kish Bank, 24 fathoms.

,, 28–30. Discorbina tuberculata, nov. sp., 28, superior lateral aspect; 29, inferior lateral aspect; 30, periphero-lateral aspect. × 150 diam. Lambay, 45 fathoms.

,, 31–33. Discorbina orbicularis, Terquem, 31, superior lateral aspect; 32, inferior lateral aspect. × 75 diam. Dalkey Sound, 5 fathoms; 33, periphero-lateral aspect. × 75 diam. Dollymount, between tides.

A. T. Hollick lith.

West, Newman & C° imp.

EXPLANATION OF PLATE XIV.

PLATE XIV.

All the Figures on this Plate are enlarged 100 diameters.

Figs. 1, 2. Lagena sulcata, W. and J., 1, lateral aspect; 2, oral aspect. Lambay, 50 fathoms.

,, 3, 4. Lagena costata, Will., 3, lateral aspect; 4, oral aspect. Lambay, 50 fathoms.

,, 5, Lagena costata, Will., bilocular. Lambay, 50 fathoms.

,, 6, 7. Lagena williamsoni, Alcock, 6, lateral aspect; 7, oral aspect. Lambay, 50 fathoms.

,, 8. Lagena williamsoni, Alcock, bilocular. Lambay, 45 fathoms.

,, 9. Lagena squamosa, Montagu, bilocular. Dalkey Sound, 5 fathoms.

,, 10. Lagena aspera, Reuss. Lambay, 45 fathoms.

,, 11. Lagena aspera, Reuss, abnormal. Lambay, 45 fathoms.

,, 12. Lagena aspera, Reuss, abnormal. Off Drogheda, 16 fathoms.

,, 13, 14. Lagena lineata, Will. Lambay, 50 fathoms.

,, 15, 16. Lagena lineata, Will., abnormal. Lambay, 50 fathoms.

,, 17. Lagena crenata, P. and J., form with very few crenations. Dalkey Sound, 5 fathoms.

,, 18. Lagena crenata, P. and J. (typical form). Dog's Bay, Connemara, between tides. In the collection of Dr. Alcock.

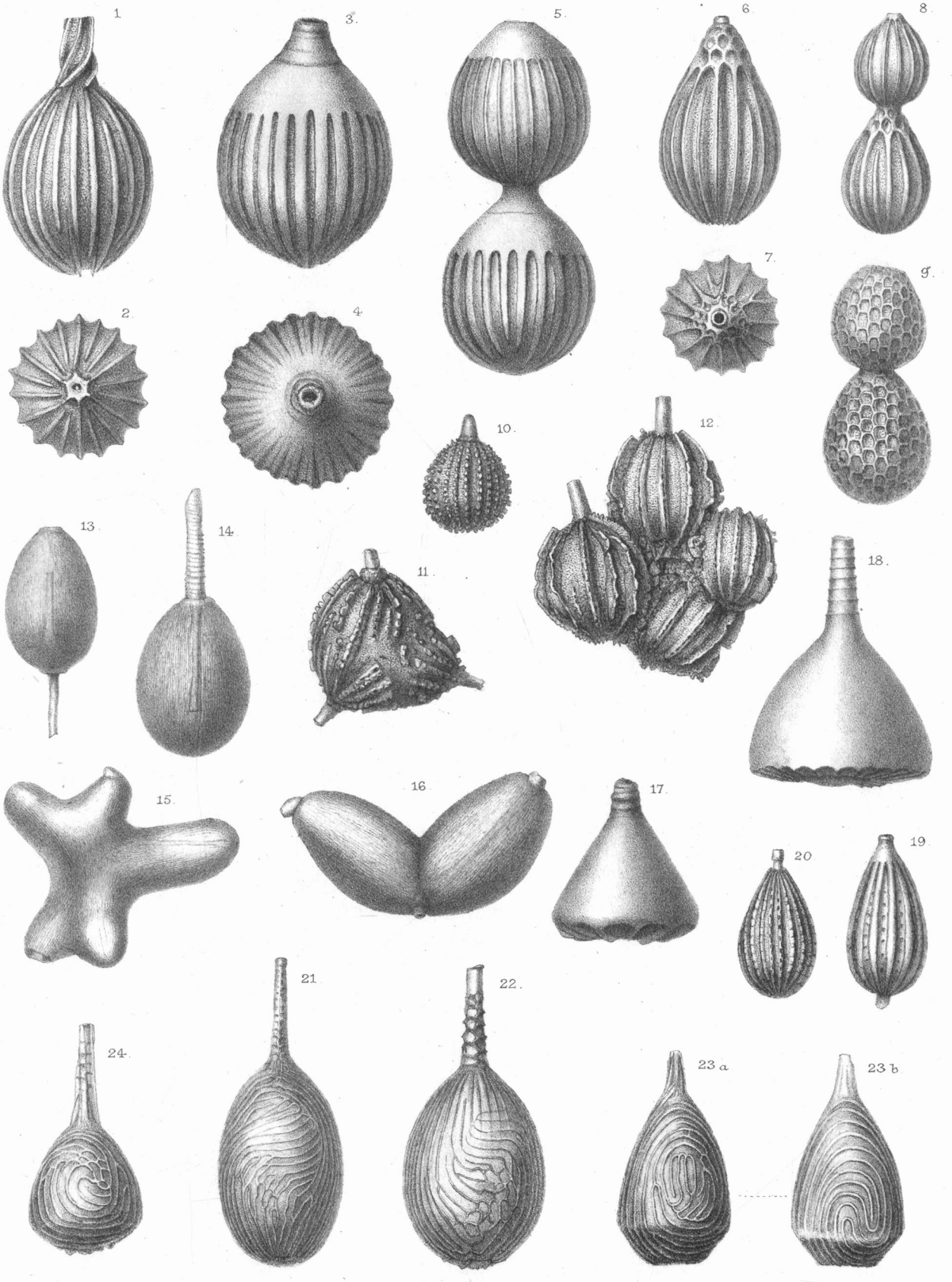
,, 19. Lagena feildeniana, Brady. Lambay, 45 fathoms.

,, 20. Lagena striato-punctata, P. and J. Dalkey Sound, 5 fathoms.

,, 21. Lagena curvilineata, nov. sp. Lambay, 50 fathoms.

,, 22, 23. Lagena curvilineata, nov. sp. Off Mourne Mountains (taken from jaws of a fish).

,, 24. Lagena curvilineata, nov. sp. Lambay, 45 fathoms.



A.T. Holliek lith. West, Newman & Co imp.