

scarcely a tinge of olive-green; feathers of the middle of back, uropygium, and upper tail-coverts dark ashy at base, with yellowish olive-green tips; quills brown, with bright yellowish-green outer edges; rectrices above paler brown, edged near their insertion and more or less throughout their length with the bright yellowish green of the quills; outer rectrices decidedly darker brown than the middle pair; the middle pair, which is longest, with a faint subterminal bar or drop; the next pair with an obvious dark subterminal drop, which is still more evident in the remaining rectrices; all the rectrices with a narrow albescent terminal fringe; on their under surfaces the green edgings appear brighter than when seen from above; a few of the chin-feathers fulvous; throat and cheeks ashy white; feathers of the breast pale ash, with broad luteous or yellowish-white centres, giving the breast a striped appearance; the remainder of the feathers of the under plumage silky white, ashy at the base; those of the flanks with a faint yellowish tinge; shoulder-edge and under carpals yellowish white; axillaries silky white, tipped with yellowish green; thigh-coverts pale ferruginous; maxilla pale horn-brown; mandible yellowish white; legs like the maxilla, only paler. A large species with a long and stout bill.

Longitudo

Rostr. a nar.	Alæ.	Caudæ.	Tarsi.
0.50	2	2.20	0.85

Obtained in the Philippine island of Guimaras by Dr. B. Meyer during the month of March. The single example procured is labelled a "male."

XXXIX.—*On the Nomenclature of the Foraminifera.* By W. K. PARKER, F.R.S., and Prof. T. RUPERT JONES, F.R.S., F.G.S.

Part XV. *The Species figured by Ehrenberg.*

[Continued from p. 200.]

XIX. MISCELLANEOUS RECENT FORAMINIFERA.

§ 1. *Tripoli* from San Francisco. (Monatsber. 1853, p. 216.)

Pl. XXXIII. XIII. fig. 27, *Grammostomum simplex*, seems to be a young *Bolivina dilatata* (?).

§ 2. *Blown Sand, Libyan Desert.*

Pl. XXXIV. X. A. 6. *Triloculina*? Indeterminable.

§ 3. *Blown Sand, Baltic, near Wismar, Mecklenburg.*

Pl. XXXIV. X. B. 1. *Rotalia globulosa* = *Planorbulina globulosa*.

Magnified 300 diameters :—

Figs. 1 & 2. *Ptygostomum Orphei*. From 840 feet. = *Globigerina bulloides*, rough shell.

Figs. 3 & 4. *Phanerostomum atlanticum*. From 6480 feet. *Glob. cretacea*, smooth.

Figs. 5 & 6. *Globigerina ternata*. From 840 feet. *Glob. bulloides*, ordinary heaped var.

Fig. 7. *Spiropleurites nebulosus*. From 10800 feet. *Pulvinulina repanda*, outspread form.

Fig. 26 represents a small *Globigerina* on a living *Conferva* (*Hygrocrocis Erebi*) from 12000 feet (about $2\frac{1}{4}$ miles) depth.

§ 9. *Volcanic May-dust, of May 1812; Barbadoes, West Indies.* (Monatsb. 1850, p. 359.)

Pl. XXXVIII. XXI. fig. 22. *Rotalia globulosa*. This appears to be a *Globigerina*.

§ 10. *Halibiolithic Volcanic Mud, Moya, Scheduba, Eastern Archipelago.* (Monatsb. 1846, pp. 171, 207.)

Pl. XXXVIII. XXIII. fig. 1. *Rotalia globulosa*. *Planorbulina*.

fig. 2. *Textilaria leptotheca*. *Virgulina Schreibersii*, Cz.

fig. 3. *T. globulosa*. *Text. globulosa*, Ehr.

fig. 4. *Textilaria*. *T. gibbosa*, D'Orb.

fig. 5. *T. aculeata*. *T. subangulata*, D'Orb.

§ 11. *Storm-dust.*

Pl. XXXIX. fig. 140. *Textilaria globulosa*. Small *T. gibbosa* or *T. globulosa*.

§ 12. *Sirocco-dust in Malta, 1830.*

Pl. XXXIX. III. e. *Rotalia globulosa* (senaria?). This is probably a *Globigerina*; but perhaps it is *Planorb. globulosa*.

§ 13. *Coloured Rain in Ireland, April 14, 1849.* (Monatsb. 1849, p. 200.)

Pl. XXXIX. XIV. g. *Textilaria globulosa*? This seems to be either a small rough-shelled *T. gibbosa*, or a *Globigerina* of irregular shape.

XX. MISCELLANEOUS FOSSIL FORAMINIFERA.

§ 1. *Polycystina-deposits of Barbadoes and Nicobar Islands**.

* We refer the student to the beautiful plates of Dr. Conrad Schwager's memoir on the fossil Foraminifera of Kar Nikobar ('Novara-Expedition,' Geol. Theil, vol. ii. 1864, and 'Quart. Journ. Geol. Soc.' vol. xxviii. p. 125) for more abundant illustrations.

(Monatsb. 1846, p. 382, with illustrations; 1847, pp. 40–60; 1850, p. 476, &c. Schomburgk, 'History of Barbadoes,' 1848, p. 556, pls. 1, 2, p. 560.)

Pl. XXXVI. fig. 67. *Planulina mica*. Young *Planorbulina*.
fig. 68. *Rotalia*? *Planorbulina ammonoides*.

§ 2. *Nummulitic Limestone of Traunstein, Bavaria*. (Monatsb. Juli 1854.) Magnified 300 diam.

- Pl. XXXVII. IV. 1. *Guttulina turrita*? *Verneuilina pygmæa* (Egger).
2. *Mesopora chloris*. (A green internal cast.)
Some early segments of a *Haplophragmium*.
3. *Planulina ammonis*. *Operculina*. Compare
Op. lævis, Gümbel, 1868, 'Foram. nordalp. Eocäengeb.' pl. ii. fig. 113.
4. *Rotalia rudis*. Obscure; probably a prickly
Globigerina coated with calcareous granules.

§ 3. *Pläner (Lower Chalk) Limestone, Teplitz, Bohemia*. (Monatsb. 1844, p. 414.) Magnified 300 diam.

- Pl. XXXVII. VI. 1. *Cenchridium oliva*. An entosolenian *Lagena globosa*.
2. *Proroporus cretæ*? Probably a *Polymorphina*.
3 & 4. *Rotalia globulosa tenuior*. } *Globigerina*.
5. ——— *pertusa*? }
6. *Textilaria globulosa*. } *Text. globulosa*.
7. ——— *ampliata*. }

§ 4. *Hornstone (Cretaceous) pebble, Delitzsch, Saxony*. (Abhandlungen, 1836, p. 110 &c. pl. i.)

Pl. XXXVII. VII. 12. *Textilaria globulosa*. (A cast; magn. 100 diam.) Indeterminable.

Together with *Xanthidia*, *Peridinia*, &c.

§ 5. *Hornstone of the Coral-rag, Cracow*. (Monatsb. 1836, p. 196; 1843, p. 161; Abhandl. 1838, pp. 39, 76, 78.) Magnified 300 times linear.

Pl. XXXVII. VIII. 5. *Nodosaria urceolata*, 1838. A cast. *Nodosaria*.

6. *Soldania elegans*, 1838. A cast. *Cristellaria*.

Together with *Xanthidia* &c.

§ 6. *Yellow Jurassic Melonia-limestone from the Kaiserstuhl, Baden*. (Monatsb. 1843, p. 105.)

Pl. XXXVII. IX. A. A small piece, of the natural size, consisting of minute, globular, uniform bodies, lying in contact without calcareous cement. Fig. 1, *Borelis* (*Melonia*) *sphæroidea* (1842); figs. 2 & 3, sections. Magnified 20 diam. These have externally the appearance of *Alveolina*, prolately spheroidal in shape; the internal structure, however, though obscure, is not that of *Alveolina* (*Borelis* of Montfort and Ehrenberg), but is like that seen in *Fusulina*, *Endothyra*, and *Involutina*. Regarding Ehrenberg's specimens as *Endothyra*, and taking the rock for Jurassic, these are the youngest known of that genus*.

§ 7. *Yellow Jurassic Melonia-limestone, York, England.* (Monatsb. l. c.)

This is said to have the same appearance as IX. A., but to differ by containing some few extraneous objects, such as B. 1, *Nodosaria*, sp.?; 2, *Textilaria*, sp.?; 3, *Cypris*? These are figured of the natural size. Figs. 1 & 2 are clearly as stated. Fig. 3 is a simple, convex, oval object, possibly a *Cytherella* (?). As to the presumed Alveoline character of this Oolite we have no further evidence than the statement quoted above.

§ 8. Pl. XXXVII. IX. C. A brown "Melonia-limestone" from the Oolites of Bath is also alluded to, and a minute *Trochus* or *Pleurotomaria*? is figured from it (c. 1). There is, however, no figured evidence of the presumed Alveoline character of this rock.

§ 9. *Melonia- and Alveolina-limestones and hornstones of Russia.* (Monatsb. 1842, p. 273; 1843, pp. 79, 106.) *A white friable Bellerophon-limestone from Witegra on the Onega Lake.*

Pl. XXXVII. X. A. A piece figured nat. size. Figs. 1-4, *Textilaria palæotrochus*, nat. size and 4 diam. This is a *Valvulina* (compare XI. 12 & 13). Together with small Polyzoan(?) stems (figs. 5 & 6).

X. B is a similar rock, with minute helicoid shells (B. 1, *Euomphalus*? *nanus*, and B. 2, *Eu.*? *inversus*), which are much like *Spirorbis*.

§ 10. *Melonia- and Alveolina-hornstone of the Mountain-limestone of the Pinega (Dwina), Archangel.* (Monatsb. 1842, p. 273; 1843, p. 106.)

Pl. XXXVII. X. C. A piece, nat. size. c. figs. 1-4, *Borelis prin-*

* In a sketch of the range of Foraminifera in time, by one of us, in the 'Proceed. Geol. Assoc.' vol. iii. pp. 180 & 182, *Fusulina* was inadvertently made to take the place of *Endothyra* in this Jurassic stage.

ceps, nat. size and magn. 4 diam. Ovoid in shape. Figs. 5, *a, b*, *Alveolina montipara*, nat. size and magn. 4 diam. Fusiform. [In the plate, fig. 5, outline or longitudinal section, nat. size; fig. 6, longitudinal section, opened by weathering, magn.] There can be no doubt of these shells being (fig. 5) *Fusulina cylindrica*, Fischer, and (fig. 4) its short sphaeroidal variety.

§11. *Melonia-hornstone of the Mountain-limestone of Witegra.*

Pl. XXXVII. X. D. A piece, nat. size. D. figs. 1-4, *Borelis sphaeroidea?* (1842), nat. size, and views and section magn. Very small, oblately spheroidal, deeply and evenly furrowed longitudinally; chambers small (or nearly filled), decidedly Fusuline in character. Figs. 5, 6, *B. constricta*, nat. size and magn. Such a *Fusulina* as this has been found fossil in the Arctic Regions*. Figs. 7-9, *Alveolina prisca* (1842); nat. size and magn. This is a *Fusulina* like c. 5. Figs. 10, 1 *a-f*, represent *Borelis (Melonia) melo*, from the Karst, near Trieste, for comparison. This is a true simple *Alveolina*, with a section very different from that of any of the above.

§12. *Hornstone of the Mountain-limestone, with Spirifer mosquensis, from Tula, Russia.* (Monatsb. 1843, pp. 79, 106.)

Pl. XXXVII. XI. A-D. The material variously shown.

Figs. 1, 2. *Alveolina prisca?* These are internal casts of *Fusulina cylindrica*; but the shape of the chambers is not so definitely quadrangular as in figs. 5 & 8. This may be due either to mineralization or to some obliquity in the section.

Fig. 3. *Borelis labyrinthiformis* (1843). A vertical section of the internal cast of a *Fusulina*, of an oblate-spheroidal shape.

Figs. 4, 5. *B. palaeophus*. Casts of a *Fusulina*, with short alar prolongations of the chambers, and therefore to some extent Nummuline in shape, being discoidal with keeled edge.

Fig. 6. *B. palaeophacus*. A cast of a similar but thicker *Fusulina*.

Figs. 7, 8. *B. palæosphæra*. Casts of a somewhat similar *Fusulina*, but barrel-shaped, having considerably produced alæ. In shape it corresponds with X. D. 1-4.

* *Fusulina hyperborea*, Salter, in Belcher's 'Arctic Voyage,' 1855, vol. ii. p. 380, pl. xxxvi. figs. 1-3.

- Fig. 9. *Grammostomum bursigerum*. Embedded cast of a *Textilaria* (to all appearance), with oval segments.
- Fig. 10. *Nodosaria index*. Chamber-casts of a doubtful Foraminifer, in a row, with indications of a narrow straight shell, but showing no stolons.
- Fig. 11. *Rotalia antiqua*. A rotaliform *Endothyra*; with chamber-casts like those of small *Planorbulinae* (Mantell, Philos. Transact. 1846, pl. xxi.), and at the same time like those of Phillips's *Endothyra Bowmani* (Proc. Geol. Polytech. Soc. W. Riding Yorkshire, 1846, vol. ii. p. 277, pl. vii. fig. 1).
- Fig. 12. *Tetrataxis conica* (1843); fig. 13. *T. conica*?, side view ("compare *Textilaria palæotrochus*"). As before intimated, this is a *Valvulina*, or at least a Valvuline modification of *Trochammina*.
- Fig. 14. *Textilaria falcata*. Probably the edge view of fig. 17.
- Fig. 15. *T. lagenosa*. The same as fig. 9.
- Figs. 16 & 16*. *T. lunata* (1843). Apparently a broad pyramidal *Textilaria*.
- Fig. 17. *T. recurvata*. Side view of *T. falcata*, fig. 14.

Forms similar to figs. 11, 12, 13, 14, and 17, besides others, have been found in the Mountain-limestone of England and Scotland by Messrs. Tennant, Darker, Phillips, Sorby, Harkness, Holl, Young, Moore, and Brady. The last-named has made a preliminary notice of them in the Brit. Assoc. Report for 1869, Trans. Sect. p. 381, and has elaborated one form in particular (*Saccammina Carteri*) in the Ann. Nat. Hist. ser. 4, vol. vii. p. 177 &c., pl. xii. See also "Monogr. Polymorph.," Linn. Soc. Trans. vol. xxvii. p. 199.

Fusulina.—With regard to the Fusuline specimens, Prof. Ehrenberg has evidently taken *Alveolina melo*, var. β (F. & M.), the *Melonia sphæroidea* of De Blainville (1824), as the type for those having a prolately spheroidal shape. This is also the *Borelis melonioides* of De Montfort (1808); hence the use also of the latter generic term†. But the Carboniferous specimens are not of this genus, and had been rightly discriminated by Fischer de Waldheim‡.

† For a bibliographic history of *Alveolina*, see our memoir in Ann. Nat. Hist. ser. 3, vol. viii. pp. 161 &c.

‡ 'Oryctograph. Moscou,' 1830, p. 17, pl. xiii. Figs. 1–5 illustrate his *Fusulina cylindrica*; and figs. 6–11 are devoted to his *F. depressa*, which is the same as *F. cylindrica*, but showing a different aspect of interior, being opened at a different portion of the surface by weathering. See also D'Orbigny in 'Geol. Russia, &c. vol. ii. p. 15; and D'Eichwald's 'Lethæa Rossica,' 5^e livr. 1859, pp. 349 &c.

In treating of *Fusulina* in the Ann. Nat. Hist. ser. 3, vol. viii. p. 166 (1861), we regarded it as an *Alveolina*; but Dr. Carpenter's researches have settled its higher rank as a hyaline and tubuliferous shell near *Nonionina* and *Nummulina**, as intimated by D'Orbigny. Prof. Ehrenberg seems to have adopted the terms "*Alveolina*" and "*Borelis*" for the long and short *Fusulinæ* respectively†. If arranged in order, according to the amount of compression or the diminishing length of axis, the *Fusulinæ* figured in the plate before us would stand thus:—

- | | |
|--|--|
| 1. <i>Alveolina prisca</i> . x. d. 7-9. | } { Fusiform. The same as
Fischer's <i>Fusulina cylindrica</i> and <i>F. depressa</i> . |
| 2. ——— <i>montipara</i> . x. c. 5, a, b. | |
| 3. ——— <i>prisca</i> ? xi. 1, 2. | Long barrel-shaped. |
| 4. <i>Borelis constricta</i> . x. d. 5, 6. | Cylindrical, but constricted in the middle. |
| 5. ——— <i>princeps</i> . x. c. 1-4. | Ovoid. |
| 6. ——— <i>sphæroidea</i> . x. d. 1-4. | } Oblately spheroidal;
barrel-shaped. |
| 7. ——— <i>palæosphæra</i> . xi. 7, 8. | |
| 8. ——— <i>labyrinthiformis</i> . xi. 3. | Deeply oblate; thick disk with rounded edges. |
| 9. ——— <i>palæophacus</i> . xi. 6. | Biconvex, with flattened faces; a disk with attenuate margin. |
| 10. ——— <i>palæophus</i> . xi. 1-5. | Lenticular. |

Thus, with every possible gradation of shape between them, the longitudinal section of the first is of the same outline as the vertical cross section of the last; whilst all present the same spiral arrangement of chambers (subquadrangular in section) when exposed by a median section across the long specimens, and parallel to the two faces in the discoidal and lenticular forms.

Fusulina cylindrica has been found in the Carboniferous rocks on the Ohio‡ and of Upper Missouri (Marcou, 'Geol. Map U. S. and Canada,' text p. 36, 8vo, Boston, 1853; and Meek and Hayden, 'Palæontol. Upper Missouri,' 1865, pl. i. figs.

* 'Introd. Study Foram.' 1862, p. 304 &c.; 'Month. Microscop. Journ.' 1870, p. 180.

† We are obliged to come to this conclusion, although our respected author had a decidedly different opinion in 1842. In the Monatsb. 1842, p. 274, he states that "1. *Melonia (Borelis) sphæroidea*, 2. *B. constricta*, 3. *B. princeps* (2 lines long), and 4. *Alveolina prisca* (1 line long, fusiform), occurring mixed up together in the white Carboniferous Miliolite-limestone of the Oneida Lake, are very different as to species from the evidently allied *Fusulinæ* of Russia."

‡ De Verneuil, 'Silliman's Amer. Journ.' ser. 2, vol. ii. 1846, p. 293; Bullet. Soc. Géol. France, ser. 2, vol. iv. pp. 682, 684, & 708.

6a-6i). Also in California (Meek and Gabb, 'Geol. Surv. California, Palæont.' vol. i. 1864, p. 4, pl. ii. fig. 2), together with *F. gracilis* (fig. 1, p. 4) and *F. robusta* (fig. 3, p. 3). Abich found his *Fusulina spherica* in the Caucasus: "Vergleich. Grundzüge Kaukas." &c., Mém. phys.-math. Acad. St.-Pétersb. vol. vii. pl. iii. fig. 13. B. F. Shumard found a Permian *Fusulina* (*F. elongata*) in New Mexico and Texas: Transact. Acad. St. Louis, vol. i. no. 2, 1858, p. 297; see also Hayden's 'Reports.' *F. robusta* has also been found in the Upper Carboniferous Limestone of the Southern Alps (Canal-Thal, Uggo-witz). Prof. Suess regards it as the same as *F. spherica*, Abich, and notes its occurrence, with *F. cylindrica*, in Russia*.

There can be little doubt, with the evidence of gradational forms given in the 'Mikrogeologie,' pl. xxxvii., that all these and even other *Fusulinæ* may belong to one and the same zoological species. It is highly probable also that, on strict comparison, one and the same variety would be found to have claim to two or more of the names quoted above and in the foregoing list, made from the 'Mikrogeologie.'

In a specimen of white *Fusulina*-limestone, brought from Russia by the late Sir R. I. Murchison, we have found well-characterized fragments of *Dentalina communis* and a conical *Valvulina*. Such a form, recent, passes into *Trochammina squamata*; and *Tr. inflata* passes into *Lituola*; and *Lituola*, through *Trochammina*, becomes *Involutina* and *Endothyra* †. This low Rotaliiform shell (*Endothyra*) occurs in specimens collected by Dr. Holl from some clay-seams of the English Carboniferous Limestone, in sections of Carboniferous Limestone made by Prof. Phillips, of oolitic Mountain-limestone made by Mr. H. C. Sorby, and in several other collections. As *Valvulina* passes gradually into *Trochammina* by traceable links (Brady), and as the last and *Involutina* are closely related, we are not surprised to find a variety of modifications, even Textilariiform, of this low group in the Palæozoic strata, and, on the other hand, Endothyran modifications higher up in the series, as Ehrenberg's Jurassic "*Borelis sphaeroidea*" (IX. A. 1-3) above noticed (p. 257).

*Miscellaneous Fossil Foraminifera figured by Ehrenberg in the
'Mikrogeologie.'*

I. *Barbadoes (late Tertiary).*

Planorbulina (young), and Pl. ammonoides (*Rss.*).

* See Suess's valuable note on the distribution of *Fusulina* in America, Europe, and Armenia, Proc. Geol. Inst. Vienna, Jan. 4, 1870; Quart. Journ. Geol. Soc. vol. xxvi. Miscell. p. 3.

† See above, p. 259; also H. B. Brady's notes on these Foraminifera, Ann. Nat. Hist. ser. 4, vol. vi. pp. 50-52.

2. *Nummulitic Limestone, Traunstein, Bavaria.*

1. Haplophragmium.
2. Verneulina pygmæa (Egger).
3. Globigerina?
4. Operculina ammonis (Ehr.).

3. *Pläner-Kalk, Teplitz, Bohemia.*

1. Lagenæ (Entosolenia) globosa (Montag.).
2. Polymorphina?
3. Textilaria globulosa, Ehr.
4. Globigerina.

4. *Hornstone (Cretaceous), Saxony.*

1. Textilaria globulosa, Ehr.

5. *Coral-rag, Cracow.*

Nodosaria and Cristellaria.

6. *Jurassic Limestone, Kaiserstuhl, Baden.*

1. Endothyra sphæroidea (Ehr.).

7. *Jurassic Limestone, York, England.*

Nodosaria and Textilaria.

8. *Jurassic Limestone, Bath, England.*9. *Carboniferous Limestone, Witegra, Russia.*

1. Valvulina (Tetrataxis) palæotrochus (Ehr.).

10. *Carboniferous Hornstone of the Pinega, Archangel.*

1. Fusulina cylindrica, Fisch.
2. ——— princeps (Ehr.). This is probably the same as *F. sphærica*, Abich, and *F. robusta*, Meek.

11. *Carboniferous Hornstone, Witegra, Russia.*

1. Fusulina cylindrica, Fisch.
2. ——— constricta (Ehr.).
3. ——— sphæroidea (Ehr.).

12. *Carboniferous Hornstone, Tula, Russia.*

1. Nodosaria? index, Ehr.
2. Fusulina cylindrica, Fisch.
3. ——— palæosphæra (Ehr.).
4. ——— labyrinthiformis (Ehr.).
5. ——— palæophacus (Ehr.).
6. ——— palæophus (Ehr.).
7. Textilaria bursigera, Ehr.
8. ——— falcata (vel recurvata), Ehr.
9. ——— lunata, Ehr.

10. *Valvulina* (*Tetrataxis*) *palæotrochus* (*Ehr.*).

11. *Endothyra antiqua* (*Ehr.*). Possibly the same as *E. Bowmani*, Phil.

We have now finished the critical examination of the illustrated Foraminifera so liberally and magnificently set forth in the 'Mikrogeologie.' There remain, however, some equally beautiful drawings and coloured engravings of Foraminifera and their internal casts in the 'Abhandlungen' of the Berlin Academy, illustrative of the great microscopist's researches in green sand resulting from the infillings of these minute shells and other little cavernous organisms and the subsequent decay of the enclosing tissues, and of his successful work in the artificial production of analogous casts. In the 'Monatsberichte' for 1858 are still later researches on such siliceous casts, with some illustrations. We proceed, therefore, with the examination of these plates, as part of the *Miscellaneous Fossil Foraminifera* figured by Dr. Ehrenberg.

§ 13. *On Green Sand* and its elucidation of Organic Life.* (Abhandl. preuss. Akad. Wiss. aus dem Jahre 1855, 4to, Berlin, 1856, pp. 85-176; read in July and August 1854, and in February, March, May, and July 1855.)

In this memoir are described foraminiferal shells and internal casts from:—

I. & II. 1. Tertiary glauconitic sand of Pontoise, France, p. 104; 2. Tertiary glauconitic sand of Pierre-Laie, near Paris, p. 105; 3. Tertiary green sand from Westeregeln, Hanover, p. 105; 4. Nummulitic Limestone of Traunstein near the Chiem-See, Bavaria, p. 105; 5. Nummulitic Limestone of Montfort, Département des Landes, France, p. 106; 6. Nummulitic Limestone of Fontaine-de-la-Medaille, near Montfort, p. 107; 7. Green sand from beneath the *Zeuglodon*-limestone, Alabama, North America, p. 107; 8. Chloritic Limestone of the Pläner, near Werl, Westphalia, p. 107; 9. Upper Greensand, Compton Bay, Isle of Wight, p. 109; 10. Greensand of Haldon Hill, Exeter, p. 109; 11. Upper Greensand, Handfast Point, Swanage Bay, England, p. 109; 12. Lower Greensand, Handfast Point, p. 110; 13. Gault, Escragnolles, Dép. du Var, France, p. 110; 14. Neocomian, Lales, Dép. du Var, p. 110; 15. Loose green sand of the Middle Jurassic beds near Moscow, p. 111; 16. Compact green sand of the Jura, near Moscow, p. 111; 17. Lower Silurian green sand of St. Petersburg, p. 112.

* See also Prof. J. W. Bailey's Memoir "On the Origin of Green Sand, and its formation in the Oceans of the present Epoch," in the Quart. Journ. Microsc. Soc. no. xviii., 1857, pp. 83-87.

III. "Remarks on the green sand of the *Zeuglodon*-limestone of Alabama" (read February 1855), pp. 112-116. IV. "New advance of knowledge of the green sand, and on the abundant brown-red and coral-red stone casts of the Polythalamian Chalk of North America" (read March 1855), pp. 116-129. V. "Further recognition of the higher organization of the Polythalamia by means of their ancient stone casts" (read May 1855), pp. 130-145. VI. "The successful exposition of perfect stone casts of Nummulites, with abundant organic structure" (read July 1855), pp. 146-148. VII. "The successful transparent colouring of colourless organic siliceous bodies for microscopical purposes" (read July 1855), pp. 148-157. The explanation of plates, pp. 158-176.

Plate I. figs. I.-III. represent chlorite &c.

Fig. IV. A group of green siliceous casts and portions of casts from the Nummulitic Limestone of the Traunstein. They are numbered (1-11) in the text, p. 159, and lettered (*a-l*) in the plate and its explanation, p. 160: fig. *a* ("Rotalia") probably belongs to an *Operculina*; fig. *g* ("Rotalia") may be part of the cast of a simple *Alveolina*. The others are very uncertain. Fig. v. (p. 160), *Nodosaria*, *Zeuglodon*-limestone, Alabama. Fig. VI., *Nodosaria monile* (Glauc. Limestone, Montfort), = *N. pyrula*, D'Orb. VII. & VIII., *Nodosaria javanica* (Gua Linggo-manik, Java), has parallel grooves in each segment, and is a *Bigenenerina* that had a set of internal ribs on the chamber-wall (incipient labyrinthic structure): see also a grooved cast in *Textilaria trilobata*, pl. IV. figs. xv., xvi. Fig. IX. *Vaginulina*, *Zeuglodon*-limestone. Fig. x. *Vaginulina subulata*, Glauc. Limestone, Montfort.

Pl. II. fig. I. (p. 161), *Textilaria globulosa*, Num. Limest. Traunstein. Fig. II., *Grammostomum attenuatum*, and fig. III., *Gr. angulatum* (Num. Limest. Montfort), are *Textilaria sagittula*. Fig. IV., *Text. euryconus?* (*Zeugl.-l.*), is *Text. agglutinans*. Fig. v., *Grammostomum* (*Zeugl.-l.*), is *Text. sagittula*. Fig. VI., *Oncobotrys buccinum* (*Zeugl.-l.*), is the cast of probably a *Poly-morphina*, possibly of a *Bulimina*. Fig. VII., *Rotalia umbilicata* (Glauc. L. Montfort), is a young nautiloid form possibly Rotaline, probably Operculine. Fig. VIII. (p. 162), *Mesopora chloris* (Traunstein), is an *Operculina*, and not the same as is figured in the 'Mikrogeologie,' which is a *Haplophragmium* (*Lituola*). Fig. IX., *Planulina micromphala* (*Zeugl.-l.*), is *Rotalia Beccarii*. Fig. x., *Phanerostomum?*, and fig. XI., *Planulina polysolenia* (*Zeugl.-l.*), are *Planorbulina vulgaris*. Fig. XII., *Cristellaria eurythalama* (*Zeugl.-l.*), is a *Lituola* (*Haplophragmium*). Fig. XIII. (p. 163), *Globigerina crassa* (*Zeugl.-l.*),

is *Glob. bulloides*. Fig. XIV. *Geoponus zeuglodontis* (Zeugl.-l., is *Planorbulina vulgaris**.

Pl. III. (p. 164), fig. I.-IV., *Nonionina? bavarica* (Traunstein), is a young *Amphistegina*. This is the earliest recorded appearance of the genus in the geological series. Fig. v., *Rotalia* (Zeugl.-l.), is a young *Operculina* or *Nummulina?* Fig. VI., peculiar triangular dentate cast (Zeugl.-l.), is like the septal plane of a *Polystomella*. Figs. VII.-IX. (p. 165), *Amphistegina javanica*, and fig. x., *Heterostegina clathrata*, both from the Orbitoidal Limestone of Gua Linggo-manik, Java, are both the same *Amph. javanica*.

Pl. IV. (p. 166), fig. I. (p. 167), not named, is an *Amphistegina* with parasitic borings. Figs. II.-VII. (p. 168), *Orbitoides Prattii*. Figs. VIII.-X., *Orbitoides javanicus*, and fig. XI., *Orbitoides microthalama*, both from Java, are the same *Orbitoides*. Fig. XII., *Cyclosiphon?*, from Java, is part of an *Orbitoides* (referred elsewhere by Ehrenberg to *Orb. Mantelli*). Fig. XIII. (p. 169), *Spiroplecta?* (Zeugl.-l.), is a *Spiroplecta*. Figs. XIV.-XVI., *Textilaria trilobata* (Java, Orb. L.), is an interesting sublabrynthic *Text.*, already referred to (p. 264). Fig. XVII., *Spiroloculina?* (Traunstein), seems to be a *Quinqueloculina*. Fig. XVIII., *Quinqueloculina*, and fig. XIX., *Quinqueloculina* (Traunstein), are undeveloped young *Miliolæ*. Fig. XX., *Quinq. saxorum* (Calcaire grossier, Pontoise), is a *Quinqueloculina*, but not of that species which has a thick shell grooved within. Fig. XXI., *Triloculina* (Orb. L., Java), has been parasitically bored. Fig. XXII., *Spiroloculina* (Orb. L., Java), is very interesting in having lateral stolons from segment to segment, showing a prolepsis of the more complicated and closely related *Orbitolites*, the outside of the quasi-annular segments being multistoloniferous. These supernumerary stolons begin by few and become many in later segments. Fig. XXIII. *Cerithium?* (Zeugl.-l.). Fig. XXIV. *Spirillina?*, or young Mollusk?, or *Spirorbis?* (Alabama); decidedly a young Mollusk.

Pl. V. figs. I-VIII. *Nummulites striata* (Couizac, Dép. de l'Aude); fig. VII. is *Nummulina planulata* (Lam.). Figs. IX., x. (p. 171), *N. Murchisoni* (Traunstein). Fig. XI. *N. Dufrenoyi* (Traunstein). Fig. XII., *Polystomatium?* (Traunstein), is a *Polystomella*. Figs. XIII.-XV., *Polystomatium lepactis* (Orb. L., Java), is *Polystomella craticulata* (compare pl. xvi. fig. 9, of 'Introd. Study Foram.' 1862). Fig. XVI. (p. 172), *Physomphalus porosus* (Orb. L., Java), is *Operculina*. Fig. XVII. *Alveolina* (Java),

* Two casts of this species from North-American Tertiary beds were figured by Prof. Bailey in Amer. Journ. Sc. 1845, vol. xlviii. no. 2, pl. iv. figs. 30, 31.

I. *Foraminifera from the Nummulitic Limestone, Traunstein, Bavaria.* See also above, page 256.

1. *Textilaria globulosa*, Ehr.
2. *Polystomella*.
3. *Operculina*.
4. *Amphistegina*.
5. *Nummulina Murchisoni*.
6. ——— *Dufrenoyi*.
7. *Alveolina*.
8. *Quinqueloculina*?

II. *Nummulitic Limestone, Montfort, France.*

1. *Nodosaria pyrula*, D' Orb.
2. *Vaginulina subulata*, Ehr.
3. *Textilaria sagittula*, Defr.
4. *Operculina*?

III. *Nummulitic Limestone, Couizac, France.*

1. *Nummulina striata*, D' Orb.
2. ——— *planulata* (Lam.).

IV. *Zeuglodon-beds, Alabama.*

1. *Nodosaria*.
2. *Vaginulina*.
3. *Polymorphina*.
4. *Textilaria agglutinans*, D' Orb.
5. ——— *sagittula*, Defr.
6. *Spiroplecta*.
7. *Globigerina bulloides*, D' Orb.
8. *Planorbulina vulgaris*, D' Orb.
9. *Rotalia Beccarii* (Lin.).
10. *Polystomella*?
11. *Operculina*?
12. *Haplophragmium*.

V. *Orbitoides Limestone, Java.*

1. *Textilaria trilobata*, Ehr.
2. *Bigenerina javanica* (Ehr.).
3. *Polystomella craticulata* (F. & M.).
4. *Orbitoides javanicus*, Ehr.
5. ——— *Mantelli*? (Morton).
6. *Operculina*.
7. *Amphistegina javanica*, Ehr.
8. *Alveolina*.
9. *Spiroloculina* (stoloniferous).
10. *Triloculina*.

Pl. VI. Lower Silurian green sand of Petersburg. Fig. I. *a* (p. 173), *Textilaria globulosa*?, in a piece of brownish siliceo-calcareous green sandrock (treated with acid), from under the Orthoceratite Limestone, Narwa, and fig. *b*, *Guttulina*, are both small *Textilaria*. Fig. *c*, *Rotalia*, from the same; a Rotaline or Endothyran form. Fig. II. (p. 174), a thin slice of the same rock (green), showing minute shaped bodies; 19, *Solenolithis simplex*; 20, *Dermatolithis subtilis*; 21, *D. granulatus*: said to be brownish calcareous and microscopic, belonging to the structure of *Obolus*, and abundantly scattered throughout the green sandstone of Narwa.

Pl. VII. Yellow, red, and brown sand casts of the yellowish Chalk of Alabama, equivalent to that of the Mississippi. Figs. 1, 2 (p. 175), *Textilaria americana*. Fig. 3, *T. striata*. Figs. 4, 5, *Guttulina turrita* α, β , are *Verneuilina pygmæa*. Fig. 6, *Spiroplecta americana*? Fig. 7, *Textilaria americana*? Fig. 8, *T. euryconus*?, is *T. agglutinans*. Fig. 9, *T. globulosa*? Fig. 10 (p. 176), *Dimorphina* (*Text.*?) *saxipara*, is *Text. globulosa*. Fig. 11, *Phanerostomum hispidulum*, and fig. 12, *Ph.*?, are *Globigerina cretacea*. Fig. 13, *Rotalia*?, is a young limbate *Planorbulina*. Fig. 14, *Phanerostomum senarium*?, fig. 15, *Ph. porulosum*?, and figs. 16, 17, *Ph. dilatatum*, are *Globigerina cretacea*. Figs. 11 & 12 have more chambers than figs. 14–17, but belong to the same species.

Foraminifera from the Chalk, Alabama.

1. *Textilaria agglutinans*, *D'Orb.*
2. — *globulosa*, *Ehr.*
3. — *striata*, *Ehr.*
4. — *americana*, *Ehr.*
5. *Spiroplecta americana* (?), *Ehr.*
6. *Verneuilina pygmæa* (*Egger*).
7. *Globigerina cretacea*, *D'Orb.*
8. *Planorbulina*, young.

§ 14. “On organic siliceous sand, and Herr Ignatz Beissel’s observations on such beds near Aix-la-Chapelle” (*Monatsber.* 1858, pp. 118–128). See also ‘Literary Gazette,’ 1857, p. 1220, for a notice of Herr Beissel’s researches on the Glauconiferous sand-grains of Aix-la-Chapelle.

§ 15. I. “On the progress of knowledge of important microscopic organic forms in the lowest Silurian clay-beds near St. Petersburg” (*Monatsber.* 1858, pp. 295–311). See also ‘Neues Jahrb. für Min.’ &c., 1858, 5. Heft; Murchison’s ‘Siluria,’

edit. 1867, p. 356; Bigsby's 'Thesaurus Siluricus,' 1868, p. 6; and "Monogr. *Polymorph.*," Trans. Lin. Soc. vol. xxvii. p. 199.

II. "On further important microscopic organic forms from the oldest Silurian clay near St. Petersburg." With a plate. (Monatsber. 1858, pp. 328 &c., pl. i.)

A (p. 306). White marl-casts or marl-morpholites. 1. *Miliolina?*, and 2. *Textilarina?*

B. Green siliceous internal casts.

3. *Vaginulina?*, in pl. I. fig. I.

4 (p. 307). *Nodosaria?*, fig. II.

5. *Textilaria?* imitatrix, fig. III.

6. *Polymorphina abavia*, fig. IV.

7. *P. avia*, fig. v.

8 (p. 308). *Guttulina silurica*, fig. VI.

9. *Rotalia palæotrias.* } Figs. VII. & VIII. No. 9 is omitted
10. *R. palæotetras.* } in the later list.

11 (p. 309). *R.?* palæoceros. ("Like *R. Hemprichii*," 'Mikrog.' pl. xxxiv. f. 62.) Fig. IX.

12. *Dexiospira triarchæa*, fig. x.

13. *D. hexarchæa*, fig. XI., *a*, *b*.

14 (p. 310). *Aristerospira octarchæa*, fig. XII.

15. *Nonionina?* archetypus, fig. XIII.

16. *Spirocerium priscum*. ("New genus near *Spirobotrys*, but has not the two openings in the later chambers.")

Fig. XIV.

These figured glauconitic grains are magnified 56 diam. Their relationship to Foraminifera is very uncertain. They are not nearly so clear and definite as the usual inner moulds of foraminiferal shells; but, like the green grains in our Upper and Lower Greensand, some may be such casts, and many are probably of concretionary or derivative origin. As Dr. Ehrenberg at first stated, little can be said of them except that they have Rotaline and Textilarian appearances. Some may have belonged to *Eozoon* (as fig. I.). Figs. IV., v., VI. look Bulimine; VII., VIII., x. look Globigerine; IX. somewhat Nonionine; XI., XII., more or less Rotaline. They are all doubtful.

C (p. 311). "Calcareous shale casts from the Devonian strata near St. Petersburg."

17. *Miliola* (*Holococcus*) *Panderi*. ("*Trochiliscus*, Pander: orbicular or oval; hollow; compressed in the middle or on the side; with a single opening; furrowed longitudinally with 18-20 sulci, which in some cases are spiral.") = *Lagena?*

APPENDIX.

Generic names of Foraminifera used by Ehrenberg, and their probable equivalents.

- Allothea, 1854. *Globigerina?*
 Alveolina, D' Orb. *Alveolina*; *Fusulina*.
 Amphisorus, 1838. *Orbitolites* (old).
 Aristeropora, 1859. *Planorbulina?*
 Aristerospira, 1859. *Planorbulina?*
 Aspidospira, 1844. *Planulina*.
 Asterodiscus, 1838. =?
 Bigenerina, D' Orb. *Polymorphina*.
 Biloculina, D' Orb. *Adesoline* *Quinqueloculina*. *Biloculina?*
 Borelis, Mtf. *Alveolina*; *Fusulina*; *Endothyra*.
 Calcarina, D' Orb. *Planorbulina?*
 Cenchridium, 1843? *Entosolenian* *Lagena*.
 Ceratospirulina, 1859. *Dimorphous* *Miliola?*; *Vertebralina?*
 Cimelidium, 1859. *Valvulina?*
 Clidostomum. *Textilarian* [Reuss].
 Colpopleura, 1844. *Planorbulina*.
 Coscinospira, 1838. *Peneroplis* and *Lituola*.
 Cristellaria, Lamk. *Cristellaria*; *Planulina*; *Haplophragmium*.
 Cyclosiphon, 1856. *Orbitoides*.
 Dentalina, D' Orb. *Dentalina*.
 Dexiospira, 1859. Indeterminable.
 Dimorphina, D' Orb. *Dimorphine* *Virgulina*.
 Encorycium, 1859. *Nodosaria*.
 Frondicularia, Defr. *Nodosaria*; *Glandulina*.
 Geoponus, 1838. *Polystomella*; *Planorbulina*.
 Globigerina, D' Orb. *Globigerina*.
 Grammobotrys, 1854. *Virgulina*; *Sphæroidina*.
 Grammostomum, 1839. *Textilaria*; *Vulvulina*; *Bolivina*; *Virgulina*; *Polymorphina*.
 Guttulina, D' Orb. *Verneuilina*; *Textilaria*.
 Heterohelix (1843) changed to *Spiroplecta* (1844).
 Heterostegina, D' Orb. *Amphistegina*.
 Heterostomum, 1854. *Textilaria*; *Virgulina*.
 Holococcus, 1859. *Lagena?*
 Lenticulina, Lamk. *Planorbulina*; *Pulvinulina*.
 Loxostomum, 1854. *Heterostomella*; *Vulvulina*; *Polymorphina*.
 Megathyra, 1854. Mentioned in 'Mikrogeol.' p. 13, without figure or description.
 Melonia, Blainv. *Fusulina*; *Alveolina*.

- Mesopora, 1854. *Lituola* (*Haplophragmium*); *Operculina*.
 Miliola, Lamk. *Lagena*; *Orbulina*.
 Monetulites, 1856. *Nummulina*.
 Nodosaria, Lamk. *Nodosaria*; *Bigenerina*.
 Nonionina, D' Orb. *Nonionina*; *Rotalia*?; *Planorbulina*?;
Cristellaria?; *Amphistegina*.
 Omphalophacus, 1838. *Pulvinulina*.
 Oncobotrys, 1856. *Polymorphina*?
 Ovulina. *Lagena*.
 Phanerostomum, 1854. *Globigerina*.
 Physomphalus, 1856. *Operculina*.
 Planularia, Deffr. *Planularia*.
 Planulina, D' Orb. *Planorbulina*, including *Planulina* and
Truncatulina; *Globigerina*; *Rotalia*; *Pulvinulina*; *Nonio-*
nina?; *Operculina*; *Cristellaria*.
 Platycæcus, 1854. *Pulvinulina*?
 Pleurites, 1854. *Sphæroidina*?; *Virgulina*; *Polymorphina*?
 Pleurostomum. Textilarian [Reuss].
 Pleurotrema, 1838. *Calcarina*?
 Polymorphina, D' Orb. *Polymorphina*; *Bolivina*; *Virgulina*;
Textilaria.
 Polystomatium, 1856. *Polystomella*.
 Proroporus, 1844. *Polymorphina*; *Bolivina*; *Textilaria*.
 Prorospira, 1844. *Planorbulina*.
 Ptygostomum, 1854. *Planorbulina*; *Globigerina*.
 Pylodexia, 1859. *Globigerina*.
 Pyrulina, D' Orb. *Pyrulina* (*Polymorphina*).
 Quinqueloculina, D' Orb. *Quinqueloculina*.
 Rhynchoplecta. Textilarian [Reuss].
 Rhynchopleura, 1856. Textilarian?
 Rhynchospira. Globigerine [Reuss].
 Robulina, D' Orb. *Cristellaria*.
 Rosalina, D' Orb. *Planorbulina*; *Globigerina*.
 Rotalia, Lamk. *Globigerina*; *Planorbulina* and *Planulina*;
Pulvinulina?; *Cristellaria*; *Operculina*?
 Rotalina, D' Orb. *Pulvinulina*.
 Sagraia, D' Orb. *Heterostomella*.
 Selenostomum, 1859. *Rotaline*?
 Siderospira. *Calcarina* [Reuss].
 Soldania, D' Orb. *Cristellaria*.
 Sorites, 1838. *Orbitolites*.
 Sphæroidina, D' Orb. *Sphæroidina*; *Virgulina*.
 Spirillina, 1841. *Spirillina*; *Cornuspira*?
 Spirobotrys, 1844. *Planorbulina*?
 Spirocerium, 1859. Indeterminable.
 Spiroloculina, D' Orb. *Spiroloculina*; adelosine *Quinqueloculina*.

Spiroplecta, 1844 (*olim* Heterohelix). *Spiroplecta*.
 Spiropleurites, 1854. *Pulvinulina*.
 Strophoconus, 1844. *Bolivina*; *Virgulina*.
 Synspira, 1854. *Synspira* (?).
 Tetrataxis, 1854. *Tetrataxis* (*Valvulina*).
 Textilaria, *Defr.* *Textilaria*; *Bolivina*.
 Triloculina, *D' Orb.* *Miliola*?
 Uvigerina, *D' Orb.* *Planorbulina*?
 Vaginulina, *D' Orb.* *Vaginulina*.

XL.—On the Habits of some Madeiran Spiders.

By FREDERICK POLLOCK, Esq.

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,

In the number of your Magazine for June 1865 there is an article by me on the *Epeïra Aurelia* spider.

I had some doubts, at the time I wrote it, upon one fact therein stated; and having had the opportunity of making further observations, in the season just passed, in Madeira, I find that I was mistaken in what I originally supposed to occur.

As it is an important point in arachnology, and as it differs from all Mr. Blackwall's observations, I should like to be able to contradict my former statement in the same publication in which it was made, and to add a few remarks on the economy of two other sorts of Madeiran spiders, which, if you will allow me, I will now proceed to do.

Epeïra Aurelia, now called *Nephila Aurelia*.

In the article above alluded to I said that the spider changes its skin for the last time about a week after making its fifth cocoon; but from more recent observations I have come to the conclusion, that there is no change of skin at all, after the spider becomes adult. This reduces the number of changes of integument to nine, in the female, viz. one in the cocoon and eight after leaving it. The male, on the other hand, has only four changes of integument after leaving the cocoon.

Unlike most spiders of the *Nephila* (*Epeïra*) kind, *N. Aurelia* does not make for itself any chamber to retire to when wishing to escape observation, but remains constantly in the centre of its web, and is therefore very easily watched. I have mentioned (in the previous article on this subject) that in the construction of this web there is always a space left between the adhesive spiral line, which extends from the circumference



Parker, W K and Jones, T. Rupert. 1872. "XXXIX.—On the Nomenclature of the Foraminifera." *The Annals and magazine of natural history; zoology, botany, and geology* 10, 253–271. <https://doi.org/10.1080/00222937208696695>.

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