

specimens of *C. insignis*,—approaching, therefore, in nowise to the stout bulbous form of the Moulmein shell.

In order to allow a comparison, I add Gould's published description, in which several material characters are omitted:—

“*Clausilia Vespa*. Testa solida, sinistrorsa, vespæformis, deflecta, lævis, intense rufa; anfr. 6, anteriori raptim attenuata, proxima corpulenta, apicalibus cito decrescentibus; sutura impressa, vix marginata: apertura ovata; columella biplicata; peritremate late reflexo, rufo.

“Long. 1, lat. $\frac{3}{10}$ poll. Inhabits Tavoy. Rev. F. Mason.

“This very singular wasp-like shell is allied to *C. insignis*, *Philippii*, *C. Cochinchinensis*, &c., but distinguished from all by its peculiar form.”

XLIV.—*On the Nomenclature of the Foraminifera.*

By W. K. PARKER, Esq., and Prof. T. R. JONES, F.G.S.

Part X.—*The Species enumerated by D'Orbigny in the 'Annales des Sciences Naturelles,' vol. vii. 1826.*

WE have now to take in hand a critical review of the many species and varieties of Foraminifera enumerated by D'Orbigny in his “Tableau Méthodique des Céphalopodes,” published in the 7th volume of the ‘Annales des Sciences Naturelles,’ 1826. The principles on which D'Orbigny grouped these Microzoa as “Cephalopoda Foraminifera” were long since known to himself to be erroneous; and the errors in his classification have been fully pointed out by Dr. Carpenter*. But we must never forget that D'Orbigny laboriously and conscientiously worked out an enormous mass of material, and reduced it to such order that naturalists could recognize hundreds of organic forms previously either quite hidden or vaguely known, and could advantageously add the results of their own research to his classified material, although his plan of arrangement† was artificial and defective. By his careful, though imperfect, elaboration of what earlier observers had done towards the elucidation of specific forms of Foraminifera, and his illustration of many of the most important species by means of a hundred large plaster models, and by the eight plates accompanying the ‘Tableau Méthodique,’ he opened the way towards a knowledge of these little creatures, thousands of which he had himself collected from sea-sands of every region and from many fossil strata. He adopted many already published specific determinations, often correcting the generic rela-

* Introduction to the Study of the Foraminifera, 1861, Ray Soc.

† Based on the arrangement of the chambers of the shell.

tionships; he made a selection of the Foraminifera figured in Soldani's great work ('*Testaceographia et Zoophytographia parva et microscopica*,' 1789-98), grouped, and named them; and he enumerated (with binomial appellations) a very large number of specific and varietal forms observed by himself, and many of which were subsequently described and figured in his several fine monographs on the Foraminifera of Cuba*, of South America†, of the Canaries‡, of the White Chalk of Paris§, and of the Vienna Tertiary Basin||.

D'Orbigny's views relating to the Foraminifera, in 1844, are expressed in the article "Foraminifères," in the '*Dict. Univers. Hist. Nat.*' vol. v. pp. 662, &c.; and his latest published determinations as to their generic and family relationships are to be found in his '*Cours Élémentaire de Paléontologie et de Géologie*,' vol. ii. fasc. 1. pp. 189-207 (1851).

In treating of the species accepted and determined by D'Orbigny, we propose, firstly, to enumerate the species adopted by him from earlier authors; secondly, to pass in review those that he illustrated, in 1826, by engraved figures (in the '*Ann. Sc. Nat.*' vol. vii.), and by models in 1823; thirdly, to determine the forms selected by D'Orbigny from Soldani's figures; and afterwards to enumerate the other species determined by him, as far as the means at our disposal serve.

In the determination of the right specific names for the several type forms indicated, we are guided, as heretofore, by the fitness of the several forms to stand as types, in accordance with their possession of some trace of all or nearly all the features characteristic of their species, priority of publication giving permanence to one of any two or more names of identical forms. The 'Models' having been published in 1823, the type forms represented by them take precedence of identical forms subsequently published in the '*Tabl. Céph.*' or elsewhere.

It should be recollected that, in our continued critical examination of the works of earlier labourers in this particular field of research, we still have in view only the careful elaboration of the several groups of Foraminifera that are sufficiently distinct

* *Histoire Physique, Politique, et Naturelle de l'île de Cuba*, par Ramon de la Sagra. Paris, 1839, 4to. *Foraminifères de Cuba et des Antilles*, par M. d'Orbigny.

† *Voyage dans l'Amérique Méridionale pendant les années 1826-33*. Paris, 4to, 1834-42: vol. v. partie 5, *Foraminifères*. 1839.

‡ *Histoire Naturelle des îles Canaries*, par MM. P. Barker-Webb et Sabin Berthelot. Paris, 4to, 1835-50: vol. ii. partie 2. p. 123, *Foraminifères*, par M. d'Orbigny, 1839.

§ *Sur les Foraminifères de la Craie blanche de Paris: Mémoires de la Soc. Géol. de France*, vol. iv. p. 1. 1840, 4to, Paris.

|| *Foraminifères fossiles du Bassin Tertiaire de Vienne*. Paris, 4to, 1846.

from other groups, as to their shell-tissue, the form and mode of growth of their shells, and their habits of life (as indicated by their habitats), to warrant our retaining for them "specific" names on zoological grounds. Having indicated these more or less exactly defined "species" (and, in many instances, their subspecies, varieties, and even subvarieties), we feel ourselves at liberty still to use, for convenience-sake, distinct binomial terms even for varieties of minor value in a zoological sense, because the whole tale of specific and subordinate denominations of not a few of the recognizable forms would be very cumbersome, and because even subvarietal forms are often characteristic of certain sea-zones and of certain fossil deposits, and therefore often the subjects of discussion.

I. *Species adopted by D'Orbigny in the 'Annales des Sc. Nat.'*
vii. (1826), from earlier Authors.

1. *Alveolina Boscii*, DeFrance, sp. Page 306, no. 5. Modèle no. 50. See Ann. Nat. Hist. ser. 3. viii. pp. 161, &c., for a notice of the *Alveolinæ*. This form was previously named *Miliolites sabulosus* by De Montfort.

2. *Alveolina Melo*, Fichtel & Moll, sp. Page 306, no. 2. Comprising the two varieties indicated by Fichtel & Moll. Ann. N. H. ser. 3. v. p. 181.

3. *Biloculina lævis*, DeFr. sp. Page 298, no. 8. The same subvariety of *Miliola ringens* that D'Orbigny has named *B. bulboides*, Ann. Sc. N. vii. p. 297, no. 1. Modèle no. 90. A common Biloculine *Miliola*. Ann. N. H. ser. 2. ii. p. 299; ser. 3. v. p. 469; & xii. p. 216.

4. *Biloculina ringens*, Lamarck, sp. Page 276, no. 2. A common *Miliola*. Ann. N. H. ser. 3. v. p. 469.

5. *Calcarina Spengleri*, Gmelin, sp. Page 276, no. 4. *Calcarina* is so closely allied to *Rotalia* that at first we thought the former to be subordinate to the latter (Ann. N. H. ser. 3. iii. p. 481); but we now regard *Calcarina* as of equal value with *Rotalia*. (Carpenter's 'Introd. Foram.' p. 223.) Among the synonyms of this species, D'Orbigny has "*Tinoporus baculatus*, Montf.;" this, however, according to Montfort's figure, has more of *Orbitolina* than of *Calcarina* in it; and Dr. Carpenter proposes to use the term "*Tinoporus*" instead of "*Orbitolina*" (Introd. Foram. p. 224).

6. *Cristellaria [acut-]auricularis*, Fichtel & Moll, sp. Page 292, no. 23. A subglobose *Cristellaria*. See Ann. N. H. ser. 3. v. p. 114.

7. *Cristellaria Cassis*, F. & M. sp. Page 290, no. 3. Modèles nos. 44 & 83. A more or less discoidal and foliaceous *Cris-*

tellaria, often of large size and elegant shape. Ann. N. H. ser. 3. v. p. 115.

8. *Cristellaria Galea*, *F. & M.* sp. Page 291, no. 6. An extremely outspread, flat *Cristellaria*. Ann. N. H. ser. 3. v. p. 115.

9. *Cristellaria* (*Saracenaria*) *Italica*, *Defrance*, sp. Page 293, no. 26. Modèles nos. 19 & 85. This is a trihedral *Cristellaria*. D'Orbigny regarded *Saracenaria* as of subgeneric value only. Ann. N. H. ser. 3. xii. p. 217.

10. *Fabularia Discolithus*, *Defrance*. Page 307, no. 1, pl. 17. f. 14–17. Modèle no. 100. This form was previously named by De Roissy *Nummulites ovata*. Ann. N. H. ser. 3. xii. p. 204.

11. *Frondicularia complanata*, *Defr.* Page 256, no. 5. For remarks on this subspecies, see Ann. N. H. ser. 3. xii. p. 204.

12. *Marginulina Raphanus*, *Linn.* sp. Page 258, no. 1, pl. 10. f. 7, 8. Modèle no. 6. This is a variety of *Nodosaria Raphanus*, *Linn.* sp., in which the septal aperture is excentric, and the early chambers arranged on a curved instead of a straight line; the shell, too, is more or less compressed, and the septal floors more or less oblique. In all these points the degrees of modification are gentle and indefinite, insensibly leading *Nodosaria* into *Marginuline*, *Vaginuline*, *Planularian*, and *Cristellarian* varieties,—all being members of the generic group (*Nodosarina*) of which *Nodosaria Raphanus* is a leading member. Ann. N. H. 1859, iii. p. 477, & 1863, xii. p. 213. The slightly *Marginuline* modification of *N. Raphanus*, having plain indications of all the chief characters found in the various members of the group, presents the best type of *Nodosarina*, as it has the rectilinear plan of *Nodosaria* combined (in the early chambers) with the curvature of *Cristellaria*: it has also a tendency to compression, and a variable eccentricity of the stolon-tube, and shows the characteristic costation of the genus.

13. *Nodosaria Bacillum*, *Defr.* Page 254, no. 34. This is *N. Raphanistrum*, *Linn.* sp.; the full development of symmetrical *Nodosarian* rectilinear growth. Ann. N. H. ser. 3. iii. p. 478.

14. *Nodosaria costata*, *Montagu*, sp. Page 253, no. 23. The same as *N. Raphanus*: probably from the London Clay. Ann. N. H. ser. 3. iv. p. 345.

15. *Nodosaria* (*Dentalina*) *Scorpiurus* (*Reophax Scorpiurus*, *Montfort*). Page 255, no. 40. We have explained that this is *Lituola nautiloidea*, *Lam.*, var. *Scorpiurus*, in Ann. N. H. ser. 3. vi. p. 346.

16. *Nodosaria Fascia*, *Linn.* sp. Page 253, no. 22. A variety of *N. Raphanus*.

Among the abundant and fine Foraminifera found in the sea-sand near Rimini, on the Adriatic, are some *Nodosarians* allied to the beautiful *Vaginulina Legumen*, *Linn.* sp., some smooth,

some gently striated, that have the septal lines coated with exogenous shell-matter to a great extent, or, in other words, are intensely limbate. One specimen in particular, a smooth form intermediate to *D. communis*, D'Orb., and *Vaginulina Legumen*, has the clear exogenous septal bands of nearly equal width with the intervening portions of the chamber-walls. Soldani has figured such a limbate Dentaline *Nodosaria* (named *N. interrupta* by D'Orbigny, Ann. Sc. N. vii. p. 252, no. 11) in his 'Testaceogr.' vol. i. pt. 2. pl. 102. vas 236. fig. B, and described it, at page 96, as fossil near Sienna.

At Rimini there are also other *Nodosarians* that are nearly as strongly limbate as the above-mentioned, and which might be classed, some with *Nodosaria Raphanus*, Linn. sp., others with *Dentalina Acicula*, Lam. sp., and others with *D. communis*, D'Orb.; but it is to be noticed that, whenever a specimen of either of these three groups (to the first or second of which *Nodosaria Fascia*, Linn. sp., probably belongs) becomes strongly limbate, it is sure to be passing into *Vaginulina Legumen*.

17. *Nodosaria* (*Orthocerina*) *Clavulus*, Lamarck, sp. Page 255, no. 48. Modèle no. 2. This is *Valvulina triangularis*, D'Orb., var. *Clavulus*; the same as *Spirolina cylindracea*, var. β (*recta*), Lamarck, and *Nodosaria Clavulus*, Lam. Ann. N. H. ser. 3. v. p. 287 & p. 468.

Though the one species here mentioned does not belong to it, yet *Orthocerina* is kept as a genus, to which *Orthocerina quadrilatera*, D'Orb. (For. Cuba, pl. 1. f. 11, 12), *O. Murchisoni*, Reuss, sp. (Denkschr. Akad. Wien, vii. pl. 25. f. 1, 2), *O. anomala*, Reuss, sp. (Sitzungs. Akad. Wien, xl. pl. vii. f. 5), *O. Ræmeri*, Reuss, sp. (*ibid.* f. 6), and *O. globulifera*, Reuss, sp. (*ibid.* f. 7), belong. We regard the second of these as the type. See Carpenter's 'Introd. Foram.' p. 166.

18. *Nodosaria Radicula*, Linn. sp. Page 252, no. 3. Modèle no. 1. A simple form of *Nodosaria*. Ann. N. H. ser. 3. iii. p. 479.

19. *Nodosaria spinulosa*, Montagu, sp. Page 253, no. 15. A delicate, spiny, Dentaline variety of *N. Raphanus*, Linn. sp. From the London Clay. Ann. N. H. ser. 3. iv. p. 346.

20. *Nonionina asterizans*, F. & M. sp. Page 294, no. 22. A Nautiloid *Nonionina* with a radiating growth of exogenous shell-matter around the umbilicus. As it stands between the smooth forms and those with much astral limbation, we take it as the type of the *Nonionine* subgroup of the *Polystomella* genus. Ann. N. H. ser. 3. v. pp. 101, 103.

21. *Nonionina Auricula*, F. & M. sp. Page 295, no. 24. This is *Pulvinulina repanda*, F. & M. sp., var. *Auricula*. Ann. N. H. ser. 3. v. p. 176.

22. *Nonionina crassula*, Walker & Jacob, sp. Page 294, no. 7. A subvariety of *N. asterizans*, with sunken septal lines and rather open spire. Ann. N. H. ser. 3. iv. p. 339.

23. *Nonionina Faba*, F. & M. sp. Page 295, no. 23. An oblong form of *N. striatopunctata*. With this D'Orbigny associates Fichtel and Moll's *N. Scapha*, which, however, is the same as D'Orbigny's *N. communis*, Ann. Sc. Nat. vii. p. 294, no. 20, and For. Foss. Vien. pl. 5. f. 7, 8. Ann. N. H. ser. 3. v. p. 102.

24. *Nonionina incrassata*, F. & M. sp. Page 293, no. 6. An umbonate subvariety of *N. asterizans*. Ann. N. H. ser. 3. v. p. 101.

25. *Nonionina pompilioides*, F. & M. sp. Page 294, no. 15. A subglobose form of *N. asterizans*. Ann. N. H. ser. 3. v. p. 102.

26. *Nonionina striatopunctata*, F. & M. sp. Page 294, no. 21. This is a link between *Polystomella* proper and its feeble member *Nonionina*. Ann. N. H. ser. 3. v. p. 102.

27. *Nummulina complanata*, Lamarck, sp. Page 296, no. 3. This is a good representative of the "sinuate" group of *Nummulinæ*: it ranges from Western Europe into Africa and Asia, and is one of the largest known. Lamarck had his specimens from Soissons, apparently. This is the *Camerina nummularia* of Bruguière, 1792. Ann. N. H. ser. 3. v. p. 296, & viii. p. 234.

28. *Nummulina lævigata*, Bruguière. Page 295, no. 1. Typical of the "reticulate" *Nummulinæ*, and of wide range. Ann. N. H. ser. 3. v. p. 290, viii. p. 232.

29. *Nummulina globularia*, Lamarck, sp. Page 296, no. 2. A variety of *N. lævigata*, Brug. Ann. N. H. ser. 3. v. p. 296.

30. *Nummulina lenticularis*, F. & M. sp. Page 296, no. 5. This is the var. β of Fichtel and Moll's "Nautilus lenticularis," and is regarded by D'Archiac and Haime as the same as *Nummulina Lucasana*, Defrance, sp. Ann. N. H. ser. 3. v. pp. 108, 110.

31. *Nummulina perforata*, Montfort, sp. Page 296, no. 7. "Nautilus lenticularis," var. ϵ , of Fichtel and Moll. The adult *N. perforata* is the same as *N. obtusa*, Sow., and is a good type of the "sinuate" Nummulites, and probably of the *Nummulinæ* generally. Ann. N. H. ser. 3. v. p. 108, & vi. p. 342.

32. *Nummulina planulata*, Lamarck, sp. Page 296, no. 4. Modèle no. 87, young specimen. A type of the "radiate" or "sinuo-radiate" group of *Nummulinæ*. Ann. N. H. ser. 3. v. p. 295.

33. *Nummulina radiata?*, Montfort, sp. Page 296, no. 6. "Nautilus lenticularis, var. δ ," of Fichtel and Moll: regarded by D'Archiac and Haime as the same as *N. Biaritzensis*, D'Arch. Ann. N. H. ser. 3. v. p. 111, & vi. p. 342.

34. *Nummulina rotulata*, Lamarck, sp. Page 296, no. 8. This is *Cristellaria rotulata*, Lam. sp. Ann. N. H. ser. 3. v. p. 296. D'Orbigny correctly placed this form under *Cristellaria* in his memoir on the Foraminifera of the White Chalk of Paris (Mém. Soc. Géol. France, 1840, iv. p. 26).

35. *Orbiculina numismalis*, Lamarck. Page 305, no. 1, pl. 17. f. 8–10. Modèle no. 20. This is *Orbiculina adunca*, F. & M. sp., including its modifications or varieties *angulata* and *Orbiculus*. Ann. N. H. ser. 3. v. p. 181.

36. *Operculina complanata*, Defrance, sp. (Erroneously referred to "Basterot" by D'Orbigny.) Page 281, no. 1, pl. 14. f. 7–10. Modèle no. 80. The history of *Operculina* and its relationship to *Nummulina* are treated of in Ann. N. H. ser. 3. viii. p. 229. See also Carpenter's 'Introd. Foram.' p. 247.

37. *Peneroplis opercularis*, Lamarck, sp. Page 286, no. 6. *Renulites* of Lamarck; misplaced in *Peneroplis* by D'Orbigny; and really a peculiar modification of *Vertebralina*. In Annals N. H. ser. 3. v. p. 471, we treated of it as *V. striata*, D'Orb., var. *opercularis*. See also Carpenter's 'Introd. Foram.' p. 74, pl. 5. f. 18.

38. *Peneroplis planatus*, F. & M. sp. Page 285, no. 1. Modèles nos. 16 & 48. Ann. N. H. ser. 3. v. p. 179; and Carpenter's 'Introd. Foram.' p. 84.

39. *Planularia Auris*, Defrance. Page 260, no. 5. Ann. N. H. ser. 3. xii. p. 215. *Planularia* is a noticeable member of the *Cristellarian* subgroup; and, for convenience-sake, several of the *Planularian* forms are recorded binomially. The form under notice may, however, be regarded as a very thin outspread variety of *Cristellaria Cymba*, D'Orb.

40. *Planularia Crepidula*, F. & M. sp. Page 260, no. 6. Ann. N. H. ser. 3. v. p. 114. Though really only a delicate, elongate, flattened *Cristellaria*, yet, like some others of the group, this pretty form enjoys a special name, for the convenience of collectors and others.

41. *Polystomella ambigua*, F. & M. sp. Page 285, no. 10. A flattish and crenulate variety of *P. crispera*. Ann. N. H. ser. 3. v. p. 103.

42. *Polystomella craticulata*, F. & M. sp. Page 284, no. 3. See Ann. N. H. ser. 3. v. p. 105, and Carpenter's 'Introd. Foram.' p. 279, for an account of this very thick, largely umbonate, and frequently gigantic *Polystomella*.

43. *Polystomella crispera*, Linn. sp. Page 283, no. 1. Modèle no. 45. Ann. N. H. ser. 3. v. p. 105, and Carpenter's 'Introd. Foram.' p. 278.

44. *Polystomella strigillata*, F. & M. sp. Page 284, no. 4. With Fichtel and Moll's two varieties of *P. strigillata*, D'Or-

bigny here unites their two varieties of *P. macella*. These are all more or less compressed forms of *P. crispa*. Ann. N. H. ser. 3. v. p. 105.

45. *Quinqueloculina birostris*, Lamarck, sp. Page 301, no. 2. A feeble variety of *Miliola* (*Saxorum*?). Ann. N. H. ser. 3. v. p. 471.

46. *Quinqueloculina Saxorum*, Lamarck, sp. Page 301, no. 1, pl. 16. f. 10–14. Modèle no. 33. A peculiar *Miliola*, a link with the subgroup *Hauerina*. Ann. N. H. ser. 3. v. p. 470.

47. *Quinqueloculina Seminulum*, Linn. sp. Page 303, no. 44. The typical *Miliola*. Ann. N. H. ser. iii. p. 480.

48. *Quinqueloculina subrotunda*, Montagu, sp. Page 302, no. 36. A feeble variety of *Miliola Seminulum*, Linn. sp. Ann. N. H. ser. 3. iv. pp. 336, 344.

49. *Robulina Calcar*, Linn. sp. Page 289, no. 12. *Robulina* is the same as *Cristellaria* with a triangular aperture—an unimportant variable feature. *C. Calcar* is a well-developed symmetrical form, with a more or less dentate keel, and typifies the *Cristellarian* subgroup of the genus *Nodosarina*. Ann. N. H. ser. 3. iii. p. 476; v. p. 112; & vi. p. 343.

50. *Robulina costata*, F. & M. sp. Page 289, no. 13. An important subvariety of *Cristellaria Calcar*. Ann. N. H. ser. 3. iii. p. 113.

51. *Robulina cultrata*, Montf. sp. Page 287, no. 1. Modèle no. 82. This is one of the most common of the whole-keeled varieties of the Nautiloid *Cristellariæ*: it often has a triangular aperture; but this is a feature of extreme variability, and insufficient for the differentiation of *Robulina* from *Cristellaria*. The keel itself, also, is a variable feature, sometimes reduced to a minimum. Ann. N. H. ser. 3. v. p. 112; & vi. p. 343.

52. *Robulina Vortex*, F. & M. sp. Page 288, no. 4. *Cristellaria Vortex* (Ann. N. H. ser. 3. v. p. 113): its chambers are very narrow and much curved.

53. *Rotalia trochidiformis*, Lamarck. Page 272, no. 1. This is *Discorbina Turbo*, D'Orb. sp., var. *trochidiformis*. See Ann. N. H. ser. 3. v. p. 294; and Carpenter's 'Introd. Foram.' p. 204.

54. *Rotalia* (*Turbinulina*) *Beccarii*, Linn. sp. Page 275, no. 42. Modèle no. 74. The common *Rotalia Beccarii*, Linn. sp. This is the same as D'Orbigny's *Turbinulina tortuosa* (*loc. cit.* no. 40), for which name he erroneously quotes Fischer as the authority. G. Fischer de Waldheim, in the 'Mém. Soc. Nat. Moscou,' 1817, vol. v. p. 449, pl. 13. f. 5 *a, b*, and in his 'Adversaria Zoologica', p. 75, amongst his "Cephalopoda conchylifera," has "Streblus (à στρεβλός, *tortuosus*), tab. 13 [pl. iii.]. fig. 5, *a b*," and pro-

* Fasc. I. et II. (Ex parte ex Actis Soc. Nat. Scrut. extractus.) Cum vii. tabulis æneis. Mosquæ, 1819.

ceeds to note that it comes from the Mediterranean, and is known to many authors, referring to the figures and descriptions given by Gualtieri, Linné, Gmelin, and Martini of *Ammonia* (*Nautilus*) *Beccarii*. Fischer therefore proposed a new generic name only, not a specific name, for this *Rotalia*, which was Linné's *Nautilus Beccarii* in 1758, and Lamarck's *Rotalia Discorbula* in 1804.

55. *Siderolina calcitrapoides*, Lamarck, sp. Page 297, no. 1. Essentially the same as *Calcarina Spengleri*, Gmelin, sp. Prof. Reuss prefers to keep these apart (Sitzungsber. Akad. Wien, 1861, xliv. p. 315). Ann. N. H. ser. 3. v. p. 65, & vi. p. 341. See also *Calcarina Spengleri*, above.

56. *Spirolina cylindracea*, Lamarck. Page 286, no. 1. Modèle no. 24. This is a very narrow *Peneroplis planatus*, F. & M. sp. Ann. N. H. ser. 3. v. p. 466.

57. *Spirolina depressa*, Lamarck. Page 287, no. 3. The same as *Peneroplis planatus*, F. & M. sp. Ann. N. H. ser. 3. v. p. 466.

58. *Spirolina nautiloides*, Lamarck. Page 287, no. 6. This is very distinct from the other "Spirolinæ" (*Peneroplides*); it is a *Lituola* (*L. nautiloidea*, Lam.), as is also *Spirolina agglutinans*, D'Orb. For. Foss. Vien. p. 137, pl. 7. figs. 10-12. The misplacement of this species as a "Spirolina" was corrected by Defrance. See also Ann. N. H. ser. 2. xix. p. 301; & ser. 3. v. p. 297.

59. *Textularia Sagittula*, Defrance. Page 263, no. 20. According to our view of the relationships of the *Textulariæ*, this is *T. agglutinans*, D'Orb., var. *Sagittula*. Ann. N. H. ser. 3. xii. p. 218.

60. *Triloculina oblonga*, Montagu, sp. Page 300, no. 16. Modèle no. 95. A very common modification of *Miliola Seminulum*; often it is rather a contracted ill-grown *Quinqueloculina* than a true *Triloculina*. Ann. N. H. ser. 3. iv. p. 343.

61. *Triloculina trigonula*, Lamarck, sp. Page 299, no. 1, pl. 16. f. 5-9. Modèle no 93. Ann. N. H. ser. 3. v. p. 470.

62. *Truncatulina refulgens*, Montfort, sp. Page 279, no. 5, pl. 13. f. 8-11. Modèle no. 77. We have given some particulars of this interesting variety of *Planorbulina farcta*, F. & M., in Ann. N. H. ser. 3. vi. p. 340.

63. *Vaginulina Legumen*, Linn. sp. Page 257, no. 2. See Ann. N. H. ser. 3. iii. p. 479.

I*. *The following Forms, already illustrated by Figures given by older authors (not including Soldani), received names from D'Orbigny, in the 'Annales des Sc. Nat.' vii. 1826.*

1. *Alveolina oblonga*. Page 306, no. 4. Fossil at Soissons.

This was figured by Parkinson (Org. Rem. 1811, pl. 10. f. 28–31). It is one of the elongate-oval varieties (such as *A. ovoidea*, D'Orb. Ann. Sc. N. vii. p. 306, no. 3) of *A. Melo*, F. & M. sp. Ann. N. H. ser. 3. viii. p. 165.

2. *Nodosaria Rapa*. Page 253, no. 27. Wrongly referred to by D'Orbigny as a Lamarckian species. D'Orbigny applied this term to the straight form of *N. Raphanus*, Linn. sp., and indicated its Marginuline condition by the name of *Marginulina Raphanus*, Ann. Sc. N. vii. p. 258, no. 1. See Ann. N. H. ser. 3. xii. p. 213, and above, p. 432.

3. *Robulina aculeata*. Page 289, no. 14. Under this name D'Orbigny grouped some more or less rowelled forms of *Cristellaria Calcar**, Linn. sp., figured by Fichtel and Moll,—namely, their *Nautilus Calcar*, Linn., var. *a* (pl. 11. f. *a–c*), keeled and rowelled (the type of this subspecies); var. *θ* (pl. 12. f. *i, k*), keelless, slightly rowelled; var. *κ* (pl. 13. f. *c, d*), keel slight, with some teeth (a specimen of *C. Calcar* developed but faintly in its several features); and var. *μ* (pl. 13. f. *h, i*), sharply rowelled. See Ann. N. H. ser. 3. v. p. 112.

4. *Rotalia* (*Turbinulina*) *tortuosa*. Page 275, no. 40. Modèle no. 74. For this name D'Orbigny erroneously quotes Fischer (who gives a figure of it under the name of *Streblus Beccarii*) as the authority. See above, “*Rotalia* (*Turbinulina*) *Beccarii*,” p. 436.

II. *Species of Foraminifera illustrated by D'Orbigny in the Plates 10–17 of the 'Annales des Sc. Nat.'* vol. vii. 1826.

1. *Amphistegina Lessonii*, D'Orb. Ann. Sc. N. vii. p. 304, no. 3, pl. 17. f. 1–4. Modèle no. 98. From the Isle of France. This differs from *A. vulgaris*, D'Orb., *ibid.* p. 305, no. 8, Modèle no. 40, in an exaggerated convexity of its faces; and although it stands before *A. vulgaris* in the ‘*Tabl. Méth.*’, yet the latter, being foremost in the Models, and being the better type, may well take precedence and bear the specific name. In 1825, DeFrance noticed an *Amphistegina* (fossil near Pisa and elsewhere) as *Nummulites? Lenticula*, which is not essentially distinct from *A. vulgaris*, D'Orb. (Ann. N. H. ser. 3. xii. p. 211). For a full account of *Amphistegina*, see Carpenter's ‘*Introd. Foram.*’ p. 241, &c.

2. *Anomalina punctulata*, D'Orb. Ann. des Sc. Nat. vii. p. 282, no. 1, pl. 15. f. 1–3 *bis*. From the Isle of France. With some exceptions, D'Orbigny's *Anomalinae* are somewhat biconvex Truncatuline *Planorbulinae* (*Truncatulina* being a term useful in indicating the arrested, few-chambered thickish plano-convex mem-

* D'Orbigny refers *C. Calcar*, Linn. sp., to *C. Cassis*, F. & M. sp. (Ann. Sc. N. vii. p. 291) as well as to *Robulina Calcar*, Linn. sp. (*op. cit.* p. 289).

bers of the Planorbuline genus), and *A. punctulata* is one of these subsymmetrical, bun-shaped arrested varieties of *Planorbulina farcta*, F. & M. sp. See Carpenter's 'Introd. Foram.' p. 208.

3. *Bigenerina Nodosaria*, *D'Orb.* Ann. Sc. N. vii. p. 261, no. 1, pl. 11. f. 9-12. Modèle no. 57. From the Adriatic. A dimorphous *Textularia*. Ann. N. H. ser. 3. xi. p. 97.

4. *Biloculina bulloides*, *D'Orb.* Ann. Sc. N. vii. p. 297, no. 1, pl. 16. f. 1-4. Modèle no. 90. From the Adriatic; and fossil near Paris and Bordeaux. The same as *B. lævis*, DeFrance, sp. *A Miliola*.

5. *Bulimina marginata*, *D'Orb.* Ann. Sc. N. vii. p. 269, no. 4, pl. 12. f. 10-12. From the Adriatic. This is one of the Bulimine varieties that have sharp edges to the chambers, sometimes produced into prickles (as in *B. aculeata*, *D'Orb.* Ann. Sc. N. vii. p. 269, no. 7). The best type of *Bulimina* is the form figured and described by Reuss as *B. Preslii*, Verst. Böhm. Kreid. 1846, pl. 13, f. 72.

6. *Calcarina Defrancii*, *D'Orb.* Ann. Sc. N. vii. p. 276, no. 3, pl. 13. f. 5-7 bis. From the Red Sea. This is a variety of *C. Spengleri*. Ann. N. H. ser. 3. iii. p. 481.

7. *Cassidulina lævigata*, *D'Orb.* Ann. Sc. N. vii. p. 282, no. 1, pl. 15. f. 4, 5 bis. Modèle no. 41. From a ballast-sand. See Carpenter's 'Introd. Foram.' p. 197.

8. *Clavulina angularis*, *D'Orb.* Ann. Sc. N. vii. p. 268, no. 2, pl. 12. f. 7. From the coast of Corsica. A dimorphous modification of *Valvulina triangularis*, *D'Orb.* It is the same as *Clavulina tricarinata*, *D'Orb.* For. Cuba, pl. 2. f. 16-18; and shows more triserial chambers in its first-formed portion than *Valvulina triangularis*, var. *Clavulus*, does. Ann. N. H. ser. 3. v. pp. 467-8.

9. *Dendritina Arbuscula*, *D'Orb.* Ann. Sc. N. vii. p. 285, no. 1, pl. 15. f. 6, 7 bis. Modèle no. 21. Fossil from Bordeaux. This arrested Nautiloid form of *Peneroplis planatus*, F. & M. sp., is not uncommon in warm seas. See Carpenter's 'Introd. Foram.' p. 89.

10. *Fabularia Discolithus*, *DeFrance*, Ann. Sc. N. viii. p. 307, no. 1, pl. 17. f. 14-17. Modèle no. 100. See above, p. 432.

11. *Marginulina Raphanus*, *D'Orb.* Ann. Sc. N. vii. p. 258, no. 1, pl. 10. f. 7, 8. Modèle no. 6. Marginuline condition of *N. Raphanus*, Linn. sp. From the Adriatic, and fossil at Castel-Arquato, Italy. See above, p. 432.

12. *Nodosaria (Glandulina) lævigata*, *D'Orb.* Ann. Sc. N. vii. p. 252, no. 1, pl. 10. f. 1-3. A short, acute-oval, smooth *Nodosaria*, from the Adriatic, and found fossil at Sienna. It is abundant also in the Lias and other strata, and is not rare in various parts of the existing seas.

13. *Nodosaria lamellosa*, *D'Orb.* Ann. Sc. N. vii. p. 253, no. 17, pl. 10. f. 4–6. From the Adriatic. A neat sharp-ribbed *N. Raphanus*, Linn. sp.
14. *Nonionina umbilicata*, *D'Orb.* Ann. Sc. N. vii. p. 293, no. 5, pl. 15. f. 10–12. Modèle no. 86. From the Adriatic and Mediterranean, and fossil at Bordeaux and Sienna. A variety of *N. asterizans*, F. & M. sp., closely related to *N. pompilioides*, F. & M. sp., *N. Soldanii*, *D'Orb.*, and several other modifications of the Nonionine subtype of the genus *Polystomella*. See Ann. N. H. ser. 3. v. pp. 101 *et seq.*
15. *Operculina complanata*, *Defrance*, sp. Ann. Sc. N. vii. p. 281, no. 1, pl. 14. f. 7–10. Modèle no. 80. See above, p. 435.
16. *Pavonia flabelliformis*, *D'Orb.* Ann. Sc. N. vii. p. 260, no. 1, pl. 10. f. 10–12. From Madagascar. We do not know this Foraminifer; possibly it is a symmetrical *Peneroplis*; more probably a semidiscoidal modification of *Orbitolites*.
17. *Planorbulina Mediterraneensis*, *D'Orb.* Ann. Sc. N. vii. p. 280, no. 2, pl. 14. f. 4–6 *bis*. Modèle no. 79. From the Mediterranean; parasitic. A delicate scale-like variety of *Pl. farcta*, F. & M. sp., having *Pl. nitida*, *D'Orb.*, between it and the type; whilst *Pl. vulgaris*, *D'Orb.*, stands next beyond it in divergence from *Pl. farcta*. Ann. N. H. ser. 3. v. p. 178.
18. *Planularia Cymba*, *D'Orb.* Ann. Sc. N. vii. p. 260, no. 4, pl. 10. f. 9. Modèle no. 27. A flattened, elongate, ribbed *Cristellarian* form, of variable width, standing between *Vaginulina* and *Cristellaria* proper. See above, p. 435.
19. *Planulina Ariminensis*, *D'Orb.* Ann. Sc. N. vii. p. 280, no. 1, pl. 14. f. 1–3 *bis*. Modèle no. 49. From the Adriatic. This is a flattened, limbate, and subsymmetrical variety of *Planorbulina farcta*, F. & M. sp. Ann. N. H. ser. 3. v. p. 178.
20. *Polymorphina* (*Guttulina*) *communis*, *D'Orb.* Ann. Sc. N. vii. p. 266, no. 15, pl. 12. f. 1–4. Modèle no. 62. From the Adriatic Sea; and fossil in the Tertiary beds of Paris, Bordeaux, and Castel-Arquato. A well-developed form of *P. lactea*, Walker & Jacob, sp., which has interminable degrees of size and shape.
21. *Polymorphina* (*Pyrulina*) *Gutta*, *D'Orb.* Ann. Sc. N. vii. p. 267, no. 28, pl. 12. f. 5, 6. Modèle no. 30. Fossil at Castel-Arquato. An elongate form, with the chambers more closely packed than in the common *P. lactea*, W. & J. sp.
22. *Quinqueloculina Saxorum*, *Lamarck*, sp. Ann. Sc. N. vii. p. 301, no. 1, pl. 16. f. 10–14. Modèle no. 33. Fossil near Paris. A *Miliola*. See above, p. 436.
23. *Robulina orbicularis*, *D'Orb.* Ann. Sc. N. vii. p. 288, no. 2, pl. 15. f. 8, 9 *bis*. Fossil near Sienna. A *Cristellaria*

nearly identical with *C. Vortex*, F. & M. sp. Ann. N. H. ser. 3. v. p. 113.

24. *Rosalina globularis*, *D'Orb.* Ann. Sc. N. vii. p. 271, no. 1, pl. 13. f. 1-4. Modèle no. 69. Widely distributed, fixed to seaweeds and corals. This is a variety of *Discorbina Turbo*, *D'Orb.* sp. Prof. Williamson figures it in his 'Monograph Brit. Rec. Foram.' pl. 4. f. 104, 105, as "*Rotalina concamerata*, young," and refers (p. 52) *D'Orbigny's Rosalina globularis* to *R. concamerata*, Montagu, sp.; but we believe that Montagu's *Serpula concamerata* is a variety of *Planorbulina farcta*, and that Williamson's adult *R. concamerata* (f. 101-103) is *Pulvinulina repanda*.

25. *Textularia aciculata*, *D'Orb.* Ann. Sc. N. vii. p. 263, no. 15, pl. 11. f. 1-4. From the Adriatic. The same as *T. pygmæa*, *D'Orb.*, *ibid.* p. 263, no. 13; and Modèle no. 7.

26. *Triloculina trigonula*, *Lamarck*, sp. Ann. Sc. N. vii. p. 299, no. 1, pl. 16. f. 5-9. Modèle no. 93. Fossil near Paris, Soissons, and Valognes. A *Miliola* of not uncommon occurrence.

27. *Truncatulina refulgens*, *Montfort*, sp. Ann. Sc. N. vii. p. 279, no. 5, pl. 13. f. 8-11. Modèle no. 77. This is *Planorbulina farcta*, F. & M. sp., var. *refulgens*. See above, p. 437.

28. *Uvigerina pygmæa*, *D'Orb.* Ann. Sc. N. vii. p. 269, no. 2, pl. 12. f. 8, 9. Modèle no. 67. Fossil near Sienna. The typical form of *Uvigerina*: its home may be said to be at about 100-300 fathoms in warm seas; smaller individuals are abundant in shallower as well as in deeper water; the ribbed shells, as here figured, are more abundant in shallow than in abyssal water.

29. *Vulvulina Capreolus*, *D'Orb.* Ann. Sc. N. vii. p. 264, no. 1, pl. 11. f. 5-8. Modèle no. 57. From the Adriatic. A Textularian form. Ann. N. H. ser. 3. xi. p. 93, &c.

XLV.—On new Species of Fishes from the Essequibo.

By Dr. ALBERT GÜNTHER.

A COLLECTION of freshwater fishes made in Guiana by Mr. Ehrhardt for the British Museum contained so many duplicate specimens, that probably a portion of them will reach other collections before the part of the 'Catalogue of Fishes' containing their descriptions will be published; therefore I add diagnoses to the names under which the new species are deposited in the British Museum, referring for detailed descriptions to the forthcoming parts of that work.

Acara punctulata.

D. $\frac{16}{9}$. A. $\frac{9}{8}$. L. lat. 26. L. transv. $\frac{3}{8}$.

Three series of scales on the cheek. The height of the body
Ann. & Mag. N. Hist. Ser. 3. Vol. xii. 29

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ZOOLOGY, BOTANY, AND GEOLOGY.

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