therefore I sent my paper on *Amoeba princeps* to the press with the few allusions which it contains to what Dr. Wallich had previously published on *A. villosa*.

As to this paper conveying the impression that "every one of the characters peculiar to the *Amoeba* of which Dr. Wallich wrote had been or were "for the first time" brought to notice by myself (p. 115, vol. xii.), that I have not been "just" to Dr. Wallich (*ibid.*), and that I have "assailed directly or indirectly nearly every opinion and statement" that he has made in the communications under reference (p. 151), I certainly do not think that my paper calls for any such expressions, and, without defending myself in long explanatory notes which no one would read, am quite content to receive the verdict which those acquainted with the subject may be disposed to give after reading Dr. Wallich's and my own papers respectively in the 'Annals' for 1863, Nos. 64 to 68 inclusive.

Dr. Wallich (p. 115) has completely distorted the application of the term "nomenclature" as I have used it in the commencement of my paper (p. 30). The passage runs thus:—"It may be remembered by those who have read my 'Notes on the Organization of Infusoria, &c.' [published in 1863], that I have therein proceeded upon a certain nomenclature of their parts generally; and I shall pursue the same course here in the description of *A. princeps* specially." Yet, to read Dr. Wallich's objections, it would appear that I had used the word "nomenclature" with reference to species. It was not until 1863 that I ever met with *A. princeps* in such numbers as to be able to make so much out of it as I have done of the other freshwater Rhizopods, viz. as regards its "reproductive cells." And as in this paper the *Amoebae* are not referred to generally, my remarks must be considered to apply to *A. princeps* specially, where it is not stated otherwise.

Of Dr. Wallich's criticisms on my "Communications" on the Infusoria generally previous to 1863, I must also leave the public to judge; and if I ever carry out my intention of writing more at length on the subject, I shall then, in the general review of what I have written since 1856 inclusive, hope to benefit by what my friend Dr. Wallich has written in 1863.

XXI.—On the Nomenclature of the Foraminifera.
By W. K. Parker, Esq., and Prof. T. R. Jones, F.G.S.

Part IX.—The Species enumerated by De Blainville and Defrance.

De Blainville, in the article "Mollusques" (Dictionnaire des Sciences Naturelles, xxxii. 1824), enumerates several forms
of Foraminifera under various names, obtained from Fichtel and Moll, Lamarck, Montfort*, and Defrance; but the nomenclature adopted requires revision, and the classification is necessarily erroneous, since these microzoa were at that time still grouped among the Cephalopods, and no clue had been obtained to the right understanding of their zoological relations. Defrance at the same time revised the several genera and species, especially those of which he had obtained specimens in the fossil state, and added accounts of some previously unrecognized forms.

Besides the Foraminifera thus treated of, there are several others which De Blainville and Defrance arranged as "Polypiers" (Dactylopora, Fabularia, Larvaria, Lycophris, Orbitolites, Oryzaria, Ovulites, Polytrema, and Polytrypa).

In his 'Malacologie'† and 'Actinologie' ‡, based on articles in the 'Dict. Sc. Nat.,' De Blainville also treats of these forms.

The publication of the 'Dict. des Sc. Nat.' (60 vols. 8vo, Paris and Strasbourg) extended from 1816 to 1830, during which time Alcide Dessalines D'Orbigny also was busy with the study of Foraminifera, and a systematic catalogue (in the "Tableau méthodique de la Classe des Céphalopodes") was published by him in the 'Annales des Sciences Naturelles,' vii. 1825–26. Defrance and Blainville, in the later volumes of the 'Dict. Sc. Nat.,' refer to D'Orbigny's work; whilst, in the latter, references are made to the early volumes of the 'Dict. Sc. Nat.'

De Blainville seems to have added very little to the knowledge of Foraminifera, having chiefly laboured in their systematization on false grounds. Defrance, by careful observation, added a few new forms, chiefly fossil, to those already known, and appears to have had a clearer perception of the relationships of certain of the Foraminifera than some of his contemporaries had.

1. Alvéolite. 1816. Dict. i. p. 557. Under this head G. L. Duvernoy here confounds Lamarck's genus of corals (Alveolites) and Bosc's "Alvéolite grain de fêtequipe" and "Al. grain de millet," the first of which is an Alveolina. In the Supplement to the same volume (art. "Alvéolites," p. 136) Defrance refers to these little fossil forms (see Ann. Nat. Hist. ser. 3, viii. p. 162); and

* Notes on the generic and specific names derived from the works of Linnaeus, Fichtel and Moll, Lamarck, and De Montfort, have already been published, in our papers on the Nomenclature of the Foraminifera, in the 'Annals of Natural History,' 1859 & 1860.


subsequently in 1820 (Dict. Sc. Nat. xvi. p. 103) he again treats of them, referring one to Oryzaria Boscii and the other to Fabularia Discolithus (loc. cit.). Alveolina Boscii, Defr., is illustrated by D'Orbigny's 'Modèle,' No. 50, and Fabularia Discolithes by Modèle No. 100. Defrance also alludes (Dict. i. p. 137) to another form of Alveolina under the provisional name of Alveolites Larva, fossil, from Valognes, smooth, pointed at the ends, and sometimes 8 lines in length.

2. Chrysaora damæcornis, Lamouroux. The specimen figured in the Atlas, Zooph. pl. 42. f. 2, and Blainv. Actinol. pl. 64. f. 2, is not described in the Dict. Sc. Nat., but is treated of by Blainville in his 'Actinologie,' 1834, p. 414, pl. 64. f. 2, as a zoophyte, and is probably a Carpenteria, which is a peculiar form of Rhizopod, related to the Globigerinida; it is tent-like, or like a small Barnacle, and fixed by the base; the frame is calcareous and basket-like, boldly perforate, and containing the sarcode, which appears to be full of spicules. It forms a link between the Foraminifera and the Spongiadæ. See Carpenter's 'Introduction to the Study of Foraminifera' (Ray Society), 1862.


6. Crepidulina elongata, De M. sp. Dict. xxxii. p. 188. This is a variety of Cristellaria Calcar. See Ann. Nat. Hist. ser. 3. vi. p. 344.

7. Cristellaria Calcar, Defr. Dict. xi. p. 615. Defrance adopted this name (used also by Linnaeus) for the rowel-like forms found on the Italian shores and in the Tertiary deposits of Tuscany, and figured by Soldani; and he defines them as being smaller and more convex than C. Cassis, and having the keel produced into projecting points. Defrance assures naturalists that this Cristellaria really occurs in both the recent and the fossil state.

9. Cristellaria lactis, Defrance, 1818. Dict. xi. p. 614. This is a subvarietv of C. Cassis, having no septal ribs, and a smaller umbonal knob. Defrance does not insist on its being specifically distinct.

10. Cristellaria producta, Lam. Dict. xi. p. 614. Under this name Lamarck placed two of Fichtel and Moll's varieties (β and γ) of Cristellaria Cassis; fossil, from Coroneina, Italy.

11. Dactylopore. Dict. xii. p. 443. Dactylopora cylindracea, Lamarck; Atlas, Zooph. pl. 47. f. 4, pl. 51. f. 6; Blainv. Actinol. pl. 72. f. 4, pl. 76. f. 6. Defrance obtained his specimens from the "Calcaire coquillier" of Grignon, near Versailles, and the sand of Pontoise. In the Ann. Nat. Hist. ser. 3. v. pp. 20-27, we described several varieties of Dactylopora, recent and fossil: these descriptions have since been revised and illustrated in Dr. Carpenter's 'Introduction,' pp. 127-137, pl. 10. The varieties now adopted are D. Eruca, D. Annulus, D. digitata, D. elypeina (Clupeina marginoporella, Michelin; Dactylopora marginoporella, P. & J. 1860), D. reticulata (Larvaria reticulata, Defrance), D. glandulosa (Prattia glandulosa, D'Archiac), and D. cylindracea, Lamarck.

The microscopic fossils (from Podolia and Volhynia) figured and described by A. Zborezewski in the 'Nouv. Mém. Soc. Nat. Moscou,' 1834, p. 308, pl. 26. f. 1-3, as Cellulina Eichwaldii, C. Besseri, and C. Puschi, are probably Dactylopora. Accompanying these, Polymorphina lactea, var. tubulosa, is figured both as Raphulina Humboldti (p. 211, pl. 28. f. 1 a) and as Apiopterina D'Orbignii (f. 2 a). Montfort's odd figure of his Lagenula is here also referred to Apiopterina; and an obscure two-celled form is figured and described as Lyrina Fischi.

The little annular Foraminifer from the "Sables IVres de Grignon," described by A. Zborezewski, under the name of Dactylinia Fischi, in 1843 (Bulletin de la Soc. Imp. des Naturalistes de Moscou, xvi. p. 363), appears to be the same as Dactylopora Annulus. Zukowa in Podolia is also given as a locality, with a note of interrogation. The woodcut illustrating D. Fischi is a rough diagram, but characteristic. A figure of what seems to be a Gyrogonite accompanies the woodcut above mentioned, and is named "Spirostegina;" but no description follows. The author also mentions some others of his species of Foraminifera under the names "Baphulina," "Cepiopterina," and "Phylomorpha" (p. 364).

12. Discorbites Pedemontanus, Debr. 1819. Dict. xiii. p. 347. Indeterminable from the description given—"Oribicular, discoidal; spire entirely visible on one side only; chambers smaller and
more numerous than in *D. vesicularis*; fossil in Piedmont and Italy.” Defrance mentions also having obtained three recent forms referable, he thinks, to *Discorbis*.


14. *Discorbites vesicularis*. Atlas, Conch. pl. 13. f. 3; Blainv. Malac. pl. 5. f. 3. This figure probably represents a *Dendritina*, that is, a Nautiloid form of *Peneroplis planatus*, F. & M. sp.


A full account of *Fabularia* is given by Dr. Carpenter in his ‘Introduction,’ p. 82 &c., pl. 6. f. 37, 38.


17. *Frondicularia complanata*, Defr. 1824. Dict. xxxii. p. 178; Atlas, Conch. pl. 14. f. 4; Blainv. Malac. p. 371, pl. 6. f. 4. This is a fine large *Frondicularian* form of *Nodosarina*; fossil; probably from Italy.

It was also termed *Renulina complanata* by De Blainville (xxxii. p. 178). “*Renulina*” was also applied by him (*loc. cit.*) to the reniform variety of *Vertebralina = V. opercularia* (see Ann. Nat. Hist. ser. 3. v. p. 471), a very different form.

*Frondicularia complanata* is one of the most beautiful of the Foraminifera, and often of a relatively large size in the Italian Tertiary clays and sands, and in those of Malaga, San Domingo, and the Vienna Basin. The Chalk, Chalk-marl, and Gault have numerous individuals of varieties of this form, but they are of less size than those of the Tertiary deposits. Similar forms, but still smaller, are also common in several of the older clays of the Secondary epoch. In the recent state it is not common, but occurs of full size at Jamaica (the late Mr. L. Barrett’s dredgings); and we have met with a long narrow *Frondicularia* (like *F. striatula*, Reuss) in Commander Dayman’s dredgings, made in July 1859, off Lisbon, at 700 fathoms. Prof. William-
son has figured two specimens of *Frondicularia* (regarded by him and Mr. Jeffreys as being recent, but most probably, we think, derived from the chalk cliffs) from the coast of Kent. In the sea-sand from Rimini worn specimens of *F. complanata* occur; some, however, are not more worn than many of the undoubted *Planularia Cymba* so common in, and characteristic of, the Rimini coast, while others are filled with ferruginous clay, and have been derived from Subapennine strata.

If we go back to the Liassic period, we find the *Nodosaria* (then forming a large proportion of the Rhizopodous fauna in certain clays) presenting innumerable gradations through somewhat flattened forms of *Nodosaria* (*Lingulina*) into true *Frondiculariae*, and through them to *Flabellina*, *Planulariae*, and *Cristellariae*. It seems as if, in later times, these minor varieties have become more specialized as to locality; and nowadays, having gradually lost its potency as a genus, *Nodosarina* seldom, in any recent deposit, shows such comprehensive suites of varying forms as we find in the Lias, one subspecies now predominating over the others in the several Rhizopodal faunae.

As regards size, the largest individuals of all the *Nodosarine* group are found in the Tertiary deposits above referred to,—the recent Jamaica specimens (dredged by the late Mr. L. Barrett in from 100 to 250 fathoms) alone rivalling them.

The passage from *Frondicularia* to *Flabellina* is very easy, as may be seen in many specimens from the Cretaceous and other deposits, in which the eccentricity of the primordial chamber is so slight, or, in other words, the tendency to coiling so weak, that the distinction between *Frondicularia* and *Flabellina* can scarcely be said to exist in them, the shell in other respects presenting the general characters common to the two forms. *Flabellina* is to *Frondicularia* as *Marginulina* and *Vaginulina* are to *Nodosaria* and *Lingulina*; that is, the shell is dimorphous, having had two successive plans of growth—the first spiral, like that of *Cristellaria*, the later rectilinear, like that of *Nodosaria*. The *Flabellinae* of the Gault and Chalk-marl rival the largest *Frondiculariae*, and have been figured and described by D'Orbigny, Reuss, and others. *Palmula sagittaria*, Lea (Contributions to Geology, 1833, p. 219, pl. 6. f. 228), from the Cretaceous deposits of Timber Creek, New Jersey, is either a *Frondicularia* or *Flabellina*, almost certainly the latter; for, although the early chambers are not shown, the later chevron-shaped chambers are not quite symmetrical. *Planularia cuneata*, S. G. Morton (Journ. Acad. Nat. Sc. Philadelphia, 1842, viii, pl. 11. f. 5), from the Middle Cretaceous Limestone of New Jersey, is also most probably a *Flabellina*, closely resembling *Fl. ovata*, Münster, sp. Reuss has pointed out that Von Münster's *Frondiculina* are
Flabellina: see N. Jahrb. 1849, p. 839, where Flabellina ovata M. sp., Fl. oblonga, M. sp., Fl. striata, M. sp., and Fl. cuneata M. sp., are figured in pl. 10 f. 23–26. In the 'Galerie des Mollusques, ou Catalogue méthodique, descriptif et raisonné de mollusques et coquilles du Muséum de Douai,' par V. L. V. Potiez et A. L. G. Michaud (2 vols. 8vo, Paris, 1858), pl. 9 f. 1–3 illustrate their Frondicularia scutiformis, which is a Flabellina; and f. 4–6 illustrate their Textularia scapelliformis, which is a Frondicularia. These are Belgian fossils from Autreppe, near Mons.


19. Helicites perforatus, De M. sp. Dict. xxxii. p. 179; Bl. Malac. p. 373. This is a small granulate Nummulina, the Nautilus lenticularis, var. e, of Fichtel and Moll, Test. Micr. pl. 7. fig. h. See Ann. Nat. Hist. ser. 3. v. p. 108 & p. 111. (See also Nummulites, further on.)

20. Helicites radiatus, De M. Dict. xxxii. p. 179; Bl. Malac. p. 373. This is a small Nummulina, the Nautilus lenticularis, var. δ, of Fichtel and Moll, Test. Micr. pl. 7. fig. g. See Ann. Nat. Hist. ser. 3. v. p. 108 & p. 111. (See also Nummulites, further on.)

21–23. Larvaire. Dict. xxv. p. 287. (Larvaria.) Defrance found, in the Calcaire grossier of the vicinity of Paris, and in the Tertiary sands at Bracheux and at Abbecourt, near Beauvais, some little cylindrical bodies, tubular, tapering at both ends, and composed of rings that readily fall apart, and grouped them, as three species of Larvaria, among the "Polypiers." These we have already recognized as allied to Dactylopora cylindracea (Ann. Nat. Hist. ser. 3. v. p. 473, and Carpenter's 'Introduction,' p. 132, pl. 10).

Larvaria reticulata, Defr. 1822. Dict. xxv. p. 287 (Bl. Actin. pl. 71. f. 3), has the axial hollow large.

L. limbata, Defr., ibid., has one end larger than the other, and a smaller central hollow; and its circular ranges of holes are less apparent.

L. Encrinula, Defr., ibid., is from the Tertiary beds of Hauterville (Manche), and has the central hollow very small; and the cylinder has its rings constricted at intervals.

Both L. limbata and L. Encrinula may well be varieties of L. reticulata. (See also Dactylopora and Polytrypa.)


27. Lenticulina cucullata, De M. sp. Dict. xxxii. p. 182. This is a variety of *Cristellaria Calcar*, Linn. sp. Ann. Nat. Hist. ser. 3. vi. p. 344.


32. Lenticulina querelans, De M. sp. Dict. xxxii. p. 182; Bl. Malac. p. 389. This is Fichtel and Moll’s *Cristellaria Calcar*, var. 7. See Ann. Nat. Hist. ser. 3. v. p. 112, and vi. p. 343. It is the same variety as *C. rotulata*.


34. Lenticulina rotulata, Lam. Dict. xxv. p. 453, xxxii. p. 181; Atlas, Zooph. pl. 15. fig. 7; Bl. Malac. pl. 7. f. 7. The common Cretaceous variety of *Cristellaria Calcar*.


* An interesting series of small individuals of this subspecies, varying in amount of convexity and other features, are figured and described by J. G. Bornemann, under the name of *Nummulina Germanica* (*Amphistegina nummularia*, Reuss), in the ‘Zeitschr. deutsch. geol. Gesell.’ 1860, xii. p. 158, pl. 6. f. 3-9.
38. Lenticulites rotulata, Lam. Dict. xxv. p. 453; Bl. Malac. p. 389. Cristellaria rotulata, from the Chalk of Meudon. This is the common form of Cristellaria Calcar as it occurs in the Chalk of Europe.

39. Lenticulites variolaria, Lam. Dict. xxv. p. 453. Nummulina variolaria, a small convex variety of N. planulata. See also Nummulites, further on.


44. Lycophris lentille [lenticularis]. Atlas, Zooph. pl. 49. f. 3; Bl. Actinol. pl. 74. f. 3. This is an Orbitoides, and is not Montfort’s Lycophris lenticularis (Fichtel & Moll’s Nautilus lenticularis, var. β), which is a small granulate Nummulina (N. Lucasana, Defrance, MS., according to D’Archiac and Haime). See Nummulites, further on.


46. Mélonie. Dict. xxx. p. 18. Defrance expresses the difficulty he finds in matching this with any of Lamarck’s “Mélonies” (An. s. Vert. vii. p. 615), or with the one figured in Encycl. pl. 467. f. 1 a, f, g & h.

47. Melonia sphærica, Lam. Dict. xxxii. p. 176; Atlas, Conch. pl. 15. f. 2; Bl. Malac. p. 369, pl. 7. f. 2.


49. Miliola birostris, Lam. Dict. xxxi. p. 69. (Quinqueloculina.)
50. Miliola Cor-anguinum, Lam. Dict. xxxi. p. 68; Bl. Malac. p. 369, pl. 4, f. 3. A swollen *M. trigonula*.

51. Miliola obscura, Defr. 1824. Dict. xxxi. p. 69. A flat discoidal shell with a rough surface; probably a *Spiroloculina*. Fossil; Italy.

52. Miliola opposita, Lam. Dict. xxxi. p. 69. (Quinqueloculina.)

53. Miliola planulata, Lam. Dict. xxxi. p. 68. (Spiroloculina.)

54. Miliola ringens, Lam. Dict. xxxi. p. 68. (Biloculina.)

55. Miliola Saxorum, Lam. Dict. xxxi. p. 69, xxxii. p. 176; Atlas, Conch. pl. 15. f. 1; Bl. Malac. p. 369, pl. 7. f. 1. (Quinqueloculina.)


For notes on the foregoing varieties of *Miliola Seminulum*, Linn. sp., see Ann. Nat. Hist. ser 3. v. p. 469 &c. See also Carpenter’s ‘Introduction,’ pp. 74 et seq.

57. Miliolite; Miliolites. Dict. xxxi. p. 69. De Blainville expresses a doubt as to what Montfort’s *Miliolites sabulosus* (which is an *Alveolina*) may be.


61. Nodosaria fragilis, Defr. 1825. Vélines du Mus. no. 48. f. 13; Dict. xxxv. p. 126. From the Maestricht Chalk of St. Peter’s Hill. Occurring in fragments; long, pointed, slightly curved towards one end, with small gibbose chambers, some of them slightly sulcated. A delicate form of *N. obliqua*, Linn., and equivalent to Lamarck’s *N. acicula*, which is a Dentaline variety of *N. Raphanus*.


A *Serpula.* See Ann. Nat. Hist. ser. 3. iii. p. 480. See also Orthocera and Orthoceras, further on.

64. *Nubecularia lucifuga,* Defr. 1825. Dict. xxv. p. 210; Atlas, Zooph. pl. 44. f. 3; Bl. Actinol. pl. 66. f. 3, 3 a–3 d. From the Calcaire grossier and the Falunière of Hauteville, Dép. de la Manche.

Blainville and Defrance here grouped the curious Miliolitic genus *Nubecularia* with the Zoophytes, giving some characteristic figures of it. Soldani has depicted numerous individuals in his great work ‘Testaceographia,’ placing them with the *Serpula.* We have found *Nubeculariae,* associated with other Foraminifera, in very many recent sea-sands from shallower water, and have been enabled to recognize their relations with the Miliolite group*. These are very protean shells: in deep water they are neither common nor large, but in the Algal belt they attain the size of hemp-seeds and even of split peas; and, growing attached to sea-weeds, shells, and other bodies, they become scale-like, or resemble lichens; or, winding about stalks and fronds, they form ring-like incrustations, shooting off into irregular processes and forming grotesque cervicorn figures (*N. lucifuga*). Similar forms occur in abundance in some of the French tertiaries. From the Clam-shells of the East Indian seas, and from the *Strombus gigas* of the West Indies, we get minute rectilinear individuals of *Nubecularia,* with a spiral commencement (*N. Tibia*). An allied variety, without a spiral beginning, is shown by D’Orbigny’s *Webbina rugosa* (For. Canar. pl. 1. f. 16–18; and For. Vien. p. 74, pl. 21. f. 11, 12). In several clays of the Oolitic formations we have met with these elongate varieties attached to *Gryphaeae,* &c.

All these Nubecularian forms have an opaque shell, frequently arenaceous, and are composed of minute, tent-like, plano-convex chambers, the base often being more or less imperfect; the aperture is produced, oval, and often lipped, and becomes enveloped in the base of the new chamber, as in the true *Miliolae.*

The foregoing varieties of *Nubecularia* (*N. lucifuga, N. Tibia, and N. rugosa*), however dissimilar among themselves, are all referable to the same specific type, which is sufficiently well represented by *N. lucifuga,* Defr., above referred to.

65. *Nummulites complanata,* Lam. Dict. xxv. p. 224. *Camerina nummularia,* Bruguière. Defrance notices one specimen having a width of 3 inches and a thickness of 3 lines; giving the following localities:—Egypt, Soissons, Languedoc, Transylvania, Mont Aubrey en Suisse, Vicentin, et Véronnais; and he remarks that “It is doubtful whether one and the same

species be spread over so great an extent of country; but no
difference can be established except on the size and thickness;
and so it is difficult to fix it in this respect.” See also Ann.

“White, like ivory.” Brought from the Crimea by Dr. E. D.
Clarke (“par le célèbre voyageur Klark”). “It has a little
round central cavity in the interior, is complanate;” “probably
those from Cairo are the same.” Hence probably it is a variety

globular variety of N. levigata, as Defrance judiciously suggested.

p. 224; Bl. Malac. p. 372. Nummulina levigata: a subtype,
characterized by inosculation of the septa of the alar lobes.

Defrance remarks,—“Il est extrêmement probable que c'est
la même espèce, modifiée par les localités, que l'on trouve en
Suisse, dans le Véronnais, en Dalmatie, sur le mont Pilate près
de Lucerne, à Stubbington dans le Hampshire, et dans d'autres
endroits.”

Sienna, Pisa, Vicentin, Oise, La Somme, Belgium, &c. This is,
according to D'Archiac and Haime, an Amphistegina (Monogr.
p. 161); and, judging from specimens brought from Pisa, we
are of the same opinion.

pl. 11. f. 2; Bl. Malac. pl. 4. f. 2. This is in the index to the
Atlas, not in the text. It is Nummulina levigata, Bruguière.

Malac. p. 373. Lycophris lenticularis, De M.; Fichtel & Moll's
Nautilus lenticularis, var. β. A small granulose Nummulina (N.
Lucasana, Defr. var. a, D'Archiac and Haime). De Blainville
says, “Of a species of this section (Lycophris, De M.) Defrance
makes a genus of ‘Polypiers.’” Apparently they mistook a
rough Orbitoides for the little granular Nummulite figured and
described by Fichtel and Moll, and subsequently by De Montfort.
p. 233.

One inch wide. Ronca; Dalmatia; lowest beds of the Isles of
Veglia, Pago, and Arbe; Croatia; Alicante. According to
D'Archiac and Haime, this is the N. Spira of Roissy, “Discolithe
no. 6” of Fortis. An Assiline form of Nummulina.

Mont Perdu; Montagne de Lex-d'Argentin; Valley of Auzeindre
audessus de Bex; Placenti?; Bayoune? A small *Nummulina* adopted by D’Archiac as a species (Monogr. p. 128, pl. 7. f. 15–17).


76. *Nummulites spissa*, Defr. 1825. Dict. xxxv. p. 225. Locality unknown. According to D’Archiac and Haime (Monogr. p. 115), this is a young *Nummulina perforata*, Montf. sp. See also Helicites and Lenticulites, for other Nummulites.

77. There is another *Nummulina* named specifically by Defrance, in MS., namely *N. Lucasana*, adopted by D’Archiac; see D’Archiac’s ‘Progres de la Geologie,’ 1850, iii. p. 238, and D’Archiac and Haime’s ‘Monograph,’ p. 124. It is included with a granulate *N. Spira* under the name *N. verrucosa* by De Roissy. Ann. Nat. Hist. ser. 3. viii. p. 238.

78. Another Nummulite, named by Defrance *N. nummisformis* in Alex. Brongniart’s ‘Vicentin’ (1823), p. 51, was not reproduced in the Dict. Sc. Nat. It is related to *N. complanata*, and is named *N. Brongniarti* by D’Archiac and Haime, ‘Monograph,’ p. 110, reasons for not using the name given by Defrance being advanced at p. 111.


82. *Ombiculites lenticulata*, Lam. sp. Atlas, Zooph. pl. 51. f. 5; Blainv. Actinol. pl. 76. f. 5. See Orbitolites.


84. *Orbitolites concava*, Lam. Dict. xxxvi. p. 295. This is *Patellina concava*, Lam. sp. In 1860 we referred this and other forms to D’Orbigny’s genus *Orbitolina* (Ann. Nat. Hist. ser. 3. vi. p. 29 &c.); but, in consequence of later researches by Dr.
Carpenter, our list of the Orbitolina at p. 38, *ibid.*, is considerably modified: thus—

**Orbitolina simplex**, *O. semianularis*, *O. corrugata*, and *O. annularis* now stand under *Patellina corrugata*; *Orbitolina concava* and *O. lenticularis* under *Patellina concava*; *Patellina Cooki* (fossil at Scinde) is an added species (Carter); *Orbitolina vesicularis*, *O. congesta*, *O. levis*, *O. sphaerulata*, and *O. sphaerulineata* are grouped under *Tinoporus vesicularis* ("Tinoporus" being preferred by Dr. Carpenter to "Orbitolina" as a generic term).


95. *Orthocera Raphanus*, Linn. sp. Dict. xxxvi. p. 486. *Nodosaria. Ibid.* p. 477. The typical *N. Raphanus* is termed *N. Rapa* by D’Orbigny (Ann. Sc. Nat. vii. p. 253, no. 27), probably from the intermediation and retranslation of the French word "rave." For its Marginuline form D’Orbigny used the term *N. Raphanus*: this often occurs in the Adriatic and else-
where (D’Orb. Ann. Sc. Nat. vii. p. 258; Modèles, No. 6), and is well figured by Soldani in his Testace. i. pt. 2, pl. 94, and by Ehrenberg in the Abhandl. k. Akad. Berlin, 1838 (1839), pl. 1. f. II. A, B, a, b, c. See also ‘Nodosaria,’ above.


97. Orthoceras Raphanus, Linn. sp. Dict. xxxii. p. 192; Bl. Malac. p. 379. This is the typical Nodosaria Raphanus, Linn. sp. Ibid. p. 478.


100. Ovulites elongata, Lam. Dict. xxxvii. p. 134; Atlas, Zooph. pl. 48. f. 3; Bl. Actinol. pl. 73. f. 3. This is the var. elongata of O. Margaritula, Lam. See Ann. Nat. Hist. ser. 3. v. p. 292; and Carpenter’s ‘Introduction,’ p. 179, pl. 12. f. 9, 10.

101. Ovulites globulosa, Deffr. 1825. Dict. xxxvii. p. 134. (Véins du Mus. no. 48. f. 9.) This is described as being smaller than a mustard-seed, almost spherical, the apertures at each end scarcely discernible. Fossil at Grignon and Villiers (Seine et Oise), and Courtagon near Rheims. Defrance also speaks of a similar little globular fossil, of the same size, but solid and more spherical, found in the same bed at Villiers, and also at Rimini.

The first of these is most probably a globular Ovulites, such as occur in the Grignon deposits; and the latter may be spherical atoms of carbonate of lime, not unusual in some marine deposits.


103. Peneroplis Auris, Deffr. sp. Dict. xxxii. p. 178; Atlas, Conch. pl. 14. f. 5; Blainv. Malac. pl. 6. f. 5. This, wrongly referred by De Blainville to Peneroplis, is the Planularia Auris of Defrance, which see.

104. Peneroplis dilatata, Lam. sp. Dict. xxxii. p. 178; Bl. Malac. p. 372. This is a variety of Nautilus planatus, F. & M.; misnamed by Lamarck “Cristellaria,” and rightly referred to Peneroplis by De Blainville.

105. Placentula asterizans, F. & M. sp. Dict. xxxii. p. 180,
106. Placenta pulvinata, Lam. Dict. xxxii. p. 180, xli. p. 193; Atlas, Conch. pl. 15. f. 5; Bl. Malac. pl. 7. f. 5. This is the Pulvinulina repanda, F. & M. sp.

107. Planulata auris, Defr. 1824. Dict. xxxii. p. 178, xli. p. 244; Atlas, Conch. pl. 14. f. 5; Bl. Malac. p. 371, pl. 6. f. 5. This is a very thin outspread variety of Cristellaria Cymba, D'Orb. (Planulata Cymba, Ann. des Sc. Nat. vii. p. 260, no. 4, pl. 10. f. 9; Modeles, no. 27; Soldani, Testae. i. pt. 1, pl. 58. f. c, c.) It is the same as Soldani's Orthoceras auris (Testae. i. pt. 2, pl. 104. f. A).

Defrance's term Planulata is applicable to a group of elegant forms connecting the Nautiloid Cristellaria with their Marginuline varieties and with Vaginulineae, and thus constituting a noticeable member of the great genus Nodosarina.


114. Polytrema miniacea, Esper, sp. Polytrème rouge, Bl. Atlas, Zooph. pl. 44. f. 4, 4 a; Actinol. p. 410, pl. 69. f. 4, 4 a. This was first recognized as Millepora miniacea, Esper, Zooph. i. pl. 17; Gmel. Syst. Nat. 3784; afterwards as M. rubra, Lamarck, Hist. An. s. Vert. ii. p. 202, no. 8; Polytrema corallina, Risso, Eur. Mérid. v. p. 340, no. 91; Polytrema miniacea, Blainville, Actinol. p. 410, pl. 69. f. 4, 4 a. It is a fixed, reddish, often branching Rhizopod, related to Orbitolina (Tinoporus), Patellina, and other Rotulinae. See Carpenter's 'Introduction,' p. 233, pl. 13. f. 18-20.

Polytrypa was referred by Defrance to the "Polypiers à réseau;" and his specimens were obtained from the Eocene Tertiaries of France. He acutely observed that the individuals "vary according to the localities." From Grignon he had it 5 lines long and about 1 line thick; from Orglandes (Manche) half as thick again, and shorter; from Villiers, near Grignon, scarcely a line long; and from Mortefontaine (Oise), from the Grès marin supérieur, 4 lines long, not half a line in diameter. He justly remarks that "these are probably varieties of one species"—a conclusion at which we have arrived by a careful examination of numerous specimens, as explained in the Ann. Nat. Hist. ser. 3. v. pp. 473 &c., where Polytrypa, Larvaria, and Dactylopora are shown to be one. See also Carpenter's 'Introduction,' p. 127 &c.

116. Pyrgo lævis, Defr. 1824. Dict. xxxii. p. 273; Atlas, Zool. pl. 88. f. 2; Bl. Malac. p. 482, pl. 62 bis, f. 2. Referred by De Blainville to the Pteropods. This is the common Miliola (Biloculina) ringens, Lam., var. bulloides, D'Orb., and was regarded by Defrance as belonging to the same group (the Sphcerulacea of De Blainville).

117. Renulina complanata, Defr. sp. Dict. xxxii. p. 178. This is Blainville's name for Frondicularia complanata, Defrance (which see).


123. Rotalites discorbula, Lam. Dict. xlvi. p. 303. This is Rotalia Beccarii, Linn. sp.


125. Rotalites (et Rotulites) trochidiformis, Lam. Dict. xxxii.
Nomenclature of the Foraminifera. 217


This is a well-developed variety of Discorbina Turbo, D'Orb. See Ann. Nat. Hist. ser. 3. v. p. 294; and Carpenter's 'Introduction,' p. 204.

126. Saracenaria italica, Defr. 1824. Diet. xxxii. p. 177, xlvi. p. 344; Atlas, Conch. pl. 13. f. 6; Bl. Malac. p. 370, pl. 5. f. 6. Fossil; from Italy: a trihedral Cristellaria. Defrance likens it to "un petit grain de sarrasin:" i line to 1½ line in diameter.

This is found, both recent and fossil, where Cristellariae are abundant. D'Orbigny had this from Rimini in the Adriatic, and recognized it as a Cristellarian form, making it a subgenus of Cristellaria, and illustrating it by his Models, nos. 19 & 85 (Ann. Sc. Nat. vii. p. 293).


128. Siderolites Spengleri, Gmel. sp. Dict. xxxii. p. 179; Bl. Malac. p. 373. This is Calcarina Spengleri, Gmel. sp.

129. Spirolina (et Spirolinites) cylindracea, Lam.* Dict. vol. i. p. 298; Atlas, Conch. pl. 13. f. 1; Bl. Malac. pl. 5. fig. 1; and

130. Spirolina (et Spirolinites) depressa, Lam. Dict. vol. i. p. 298; Atlas, Conch. pl. 13. f. 2; Bl. Malac. pl. 5. f. 2. Defrance alludes also to a recent species, apparently identical with Sp. cylindracea, and living in the Mediterranean. He remarks that, in the 'Tabl. Méth. Céph.' (Ann. Sc. Nat. vii. p. 287), D'Orbigny notices also Spirolina striata, Sp. levigata, and Sp. Pedum, found fossil near Paris, and groups these with Lituola (Lituolites) nautiloides; but he thinks the difference in the aperture does not depend on age, as D'Orbigny thinks. In this indication of D'Orbigny's mistake, Defrance is correct; the Lituola are very distinct from the so-called Spirolinae, which are narrow forms of Peneroplis planatus, F. & M. sp. See Ann. Nat. Hist. ser. 3. v. pp. 297 & 466 &c.


132. Spirula cylindracea, Lam. sp. Dict. xxxii. p. 190; Bl.

* Lamarck figured two distinct forms under this name, namely Peneroplis cylindracea, and a Clavuline variety of Valvulina triangularis (Valvulina Clavulus). See Ann. Nat. Hist. ser. 3. v. p. 467 &c.
This is a common Textularia—indeed, the most common variety. It is not the type of the genus, however, which is best typified by *T. agglutinans*, D'Orb., a more inflated form, and generally of a larger size. *T. gibbosa*, D'Orb., attains still larger proportions, being a more exaggerated variety.

The figure given by Blainville and Defrance (Atlas, Zooph. pl. 13. fig. 5) differs somewhat from that in Soldani's book. The specimen was of smaller size, flatter, the earlier chambers smaller, and the newest chambers more contracted—the shell well representing an unbarbed arrow-head in miniature. Soldani's figure seems to indicate the presence of a third series of chambers on one of the sides; but we think that this feature was probably only a low ridge arising from an irregular form of the chambers on the unattached surface of the shell, and not really due to an intercalated series of chambers. The specimen figured by Soldani was of rather large size; and we have met with several in the Mediterranean of equal magnitude: they take on the more regularly sagittate form in their smaller condition; when largely developed, they often approximate to *T. agglutinans*, D'Orb.

*T. Sagittula* is very common, ranging from shallow water to a depth of 150 fathoms. The subgroup typified by Defrance's and Soldani's figures, above referred to, comprises a large and variable series of forms, recent and fossil, which have been abundantly supplied with names. *T. Sagittula* and *T. agglutinans* are the commonest of all the Textulariae; they are worldwide, and go far back in time. Of the Textulariae on our own coasts they are the most abundant. In Prof. Williamson's Monograph, figs. 158 & 159 afford, we think, a good example of the small *T. Sagittula* (although that author refers it to *T. cuneiformis*, D'Orb., which appears to us to be a distinct variety). *T. Sagittula* and its larger allies become sandy in their adult state; smaller varieties of *T. agglutinans* (the type), such as *T. pygmea*, D'Orb. (*T. aciculata*, D'Orb.), remain hyaline and poriferous. See also Ann. Nat. Hist. ser. 3. xi. p. 91 &c., and Carpenter's 'Introduction,' p. 189 &c.
Mr. R. Swinhoe on Formosan Reptiles.


135. Vorticialis crispa, Linn. sp. Dict. xxxii. p. 181; Bl. Malac. p. 375. This is the Polystomella crispa, Linn. sp. Lamarck’s generic name “Vorticialis” is not required.


137. Vorticialis strigilata, F. & M. sp. Dict. xxxii. p. 181; Bl. Malac. p. 375. Polystomella crispa, var. strigilata. This, like the foregoing, is a somewhat flattened variety.

XXII.—A List of the Formosan Reptiles; with Notes on a few of the Species, and some Remarks on a Fish (Orthagoriscus, sp.).

By R. Swinhoe, F.Z.S., F.G.S. &c., H.M. Vice-Consul at Formosa.

I procured at Formosa the following fifteen species of Reptilia, which have since been deposited in the British Museum. Dr. Günther has determined their species, and is describing the novelties in the British Museum Catalogue now publishing. To that gentleman’s kindness I am indebted for the names.

CISTUDINA (Tortoises).

1. Emys sinensis, Gray.

Abundant about the pools and inland waters of South-west Formosa, near Taiwanfoo. They were brought to me by the natives there in large numbers. I forwarded five live specimens to England as a present to the Gardens of the Zoological Society. Three of them arrived safe, and are now exhibited in the menagerie at the Regent’s Park.

2. Trionyx sinensis, Coregm.

Very abundant in the rivers near Amoy, but rather rare in South-west Formosa, where I procured but a very few examples. It has a long projectile neck, and very sharp teeth, with which it can inflict a severe bite. When once it seizes an object,

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