

CATALOGUE OF THE PIRULIDAE IN THE RIJKSMUSEUM VAN NATUURLIJKE HISTORIE

by

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Since the paper by Smith in 1894 (A list of the recent species of the genus *Pirula*) no monograph, review, or catalogue of the recent species of the genus *Pirula* has been published, as far as I am able to state.

Besides the species of which our Museum possesses specimens, I have quoted again, as in my former catalogues, all the other species, as far as I could find these mentioned in literature, whilst I added the principal synonyms.

After those species of which we possess material there follows a list of the specimens stating: 1) the letter which indicates specimens from the same locality and collector (donor), as far as they are kept dry; in the case of specimens preserved in spirit the number of the jar is given instead, 2) the number of specimens, 3) the locality, 4) the collector or donor. When the locality or collector (donor) is unknown, I have placed instead a question mark.

I am greatly indebted to Dr. E. Leloup and especially to Dr. W. Adam for their kindness and helpfulness shown during my stay in the Musée Royal d'Histoire Naturelle de Belgique.

Genus **Pirula** Lamarck, 1799

Pyrula Lamarck, 1822

Ficula Swainson, 1840

Sycotypus, Adams, 1853

P. dussumieri (Kiener)

(?)*Pyrula elongata* Gray, Zool. Beechey's Voy., Moll. anim., p. 115; 1839.

Pyrula Dussumieri Kiener, Icon. coq. viv., *Pyrula*, p. 25, N° 17, pl. 11; 1840.

Pyrula Dussumieri, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 521, N° 30; 1843.

Ficus Dussumieri, Rousseau, Chenu, Illustr. conchyl., vol. 3, *Ficus*, pl. 1, figs. 2, 2a; 1846.

Ficula Dussumieri, Reeve, Conch. Icon., *Ficula*, sp. 2, pl. 1, fig. 2; 1847.

Ficus Dussumieri, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 149; 1852.

- Sycotypus Dussumieri*, Adams, Genera rec. Moll., vol. 1, p. 198, pl. 21, fig. 1a; 1858.
Ficula Dussumieri, Sowerby, Thesaurus Conchyl., vol. 4, p. 110, pl. 423, fig. 5; 1880.
Ficula Dussumieri, Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, Ficula, p. 10, N° 4, pl. 1, fig. 1; 1881.
Pyrula Dussumieri, Tryon, Manual of Conch., vol. 7, p. 266, pl. 5, fig. 30; 1885.
Sycotypus Dussimieri, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Pirula gracilis, Smith (non Philippi), Journ. of Malac., vol. 3, p. 67 (4); 1894.
Pirula gracilis, Schepman, Siboga-Exped., 49¹ b, Prosobranchia, part 2, p. 126; 1909.

I do not know why Paetel (Cat. Conch. Samml., vol. 1, p. 222; 1887) regards *P. elongata* Gray as a synonym of *Busycon pyrum* (Dillw.). The former is described as "elongate, fig-shaped", whilst the latter is rather "pyriformis". The word "cancellated", used by Gray in relation to the sculpture, then would not apply to a *Busycon* ornated with closely placed spiral ridges. The fact that in the statement "spire conical, convex, blunt" mention is made of a conical spire, might indicate that *B. pyrum* was meant, the words "convex" and "blunt" in this connection, however, prove this to be incorrect. Moreover Gray does not mention at all the canaliculate suture, which especially in this species is very conspicuous. Neither do the localities give, at last, any hold to solve the question: *B. pyrum* inhabits the Gulf of Mexico, whereas *P. elongata* is from China. Therefore in my opinion it is not probable that *P. elongata* Gray is the same as *B. pyrum* (Dillw.) and I am inclined to regard Paetel's opinion as incorrect. More probably Kobelt, Tryon and Smith are right, who regard it as identical with *P. dussumieri* (Kien.), for the diagnosis of this species corresponds sufficiently with that of *P. elongata* (Gray). As, however, Gray's description is not clear in every respect, and as there is not a figure completing the diagnosis, elucidating the obscure parts, it cannot be decided with certainty whether really this author did mean *P. dussumieri* with his *P. elongata*.

Smith and Schepman use the name *P. gracilis* (Sow.) for *P. dussumieri* (Kien.). The diagnosis of Sowerby (Catal. shells collect. Tankerville, Append., p. 17; 1825) indeed suggests a similar species, but it is not distinct enough to warrant the conclusion that the described shell really is *P. dussumieri*. The lack of locality and the absence of a figure in Sowerby's paper make the identification still more difficult. A comparison of the length to the diameter ($4\frac{4}{10}$ unc.: $2\frac{3}{10}$ unc.), shows that this *Pirula* is too much inflated for a *P. dussumieri* and more nearly approaches *P. papyratia* (Say) of which Petit de la Saussaye (Journ. de Conch., vol. 3, p. 149; 1852) considers it to be a synonym¹).

1) This author namely writes as a note to *P. gracilis* Sow.: "M. Philippi a décrit cette espèce sous le même nom, et presque dans les mêmes termes, dans le Journal Zeitschrift für Malakozoologie, année 1848, pag. 97." *P. gracilis* (Phil.), however, is a synonym of *P. papyratia* (Say).

If Smith and Schepman were right and *P. gracilis* (Sowerby) 1825 indeed was the same as *P. dussumieri* (Kiener) 1840, the former name ought to have priority. In relation to the reasons mentioned above, it is advisable to keep the name given by Kiener.

a. 2. ?, from Dalen's collection & Turner.

var. **aspilla** (De Gregorio)

F. Dussumieri Valenc. Fa. *aspilla* De Gregorio, Bull. soc. malac. italiana, vol. 11, p. 64; 1885.

P. ficus (Linné), partim, Lamarck

- Murex Ficus* Linné (pars), Syst. nat., ed. 10, p. 752, N° 475; 1758. — Mus. Ulricaе, p. 637, N° 314; 1764.
Bulla Ficus Linné (pars), Syst. nat., ed. 12, p. 1184, N° 382; 1767.
Ficus maculata & fasciata Martini, Syst. Conch. Cab., vol. 3, p. 17 and p. 22, pl. 66, figs. 734, 735; 1777.
Bulla Ficus Linné (pars), Gmelin, Syst. nat., ed. 13, p. 3426, N° 14; 1790.
Ficus variegatus Roeding, Bolten, Mus. Boltenianum, p. 148; 1798 (fide Mörch).
Pirula ficus, Montfort, Conchyl. syst., vol. 2, p. 487, fig. p. 486; 1810.
Pyrula ficus Lamarck, Anim. s. Vert., vol. 7, p. 141, N° 10; 1822.
Pyrula Ficus, Schubert & Wagner, Martini & Chemnitz, Neues syst. Conch. Cab., vol. 12, p. 96; 1829.
Pyrula ficus, Kiener, Icon. coq. viv., *Pyrula*, p. 30, N° 21, pl. 13, fig. 1; 1840.
Pyrula ficus, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 510, N° 10; 1845.
Ficus Bulbiformis Rousseau, Chenu, Illustr. conch., vol. 3, *Ficus*, pl. 3, figs. 1, 1a—c; 1846.
Ficula laevigata Reeve, Conch. Icon., *Ficula*, sp. 4, pl. 1, fig. 4; 1847.
Sycotypus ficus, Mörch, Catal. conch. Yoldi, p. 110, N° 2050; 1852.
Ficus laevigatus, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 148; 1852.
Sycotypus ficus, Adams, Genera rec. Moll., vol. 1, p. 198, pl. 21, fig. 1; 1858.
Ficula ficus, Sowerby, Thesaurus Conchyl., vol. 4, p. 109, pl. 423, fig. 4; 1880.
Ficula ficus, Kobelt (exclus. var.), Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, *Ficula*, p. 8, N° 2, pl. 1, figs. 2, 3 and pl. 24, figs. 6, 7; 1881.
Pyrula ficus, Tryon (exclus. var.), Manual of Conch., vol. 7, p. 266, pl. 5, fig. 29 and pl. 6, fig. 36 (tantum); 1885.
Sycotypus ficus, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Pyrula ficus, Sowerby, Conchol., vol. 2, p. 73; 1892.
Pirula ficus, Smith, Journ. of Malac., vol. 3, p. 64 (1); 1894.

As is well known, Linné included several species of the genus *Pirula* in his *Murex ficus*. This appears not only from his description in the Systema Naturae and in the Museum Ulricaе, but also from his citations which refer to figures of several (at least three) *Pirula* species together.

In the 10th edition of Systema Naturae we find:

List. conch. 4. s. 10. c. 8. t. 2. f. 3. This decidedly cannot refer to *P. ficus* auct., on account of the rather oblong ventricose form, the depressed spire, the straight or at least scarcely curved columella and, moreover, the some-

what reticulated aspect, attention to which is drawn also in the legend of the figure with the words: "Rhombus maculatus, cancellatus, et asper". It is true that *P. ficus* is also decussated under slight magnification, but in this case the vertical lines are limited to the interstices between the spiral ribs only.

Bonan recr. t. 15. neither is *P. ficus* auct. This specimen apparently is a juvenile *P. subintermedia* (Orb.) (= *P. ficoides* Lm.), on account of its more slender form, the nearly straight columella and the flatly depressed spire, the sculpture, which consists of a reticulation formed by the longitudinal and transverse ridges, as is also indicated by the words of the text "reticulato quodam opere distincta" (p. 115).

Rumph. mus. t. 27. f. K. gives a rather moderate drawing, but which nevertheless is recognizable as the *P. ficus* auct. The figure shows spiral ridges alternating with lighter bands only, whereas, moreover, the shell is decorated with darker spots, a pattern which sometimes occurs in *P. ficus*.

Petiv. amboin. t. 6. f. 9. This is a very bad illustration of a *Pirula* with spiral lirae only,—which at regular intervals are interrupted by a somewhat larger white line,—and maculated with dark spots. Perhaps it is *P. ficus* auct.

Gualt. test. t. 26. f. I, M. Fig. I may represent *P. ficus* auct., especially on account of the strongly curved columella; it shows, however, a pattern of spots which is rather uncommon for this *Pirula*. The illustration marked M does not represent *P. ficus*, but probably *P. reticulata* (Lm.).

Argenv. conch. t. 20. f. o. This figure shows an abbreviately pyriform and ventricose shell, which has a rather short canal and a sculpture of small spiral ridges only, and which certainly is a *P. ficus* auct. This is, moreover, confirmed by the violet colour of the interior of the aperture, as is mentioned in the text ("la couleur violette qui regne au dedans").

Klein. ostr. t. 5. f. 93. According to this author (p. 79. §. 208. 8) the cited figure seems to be a copy of one of Lister's illustrations: "Cancellata. List. Tab. 750. f. 46. Icon exstat in Tab. Nostra V. n. 93". It is very difficult to decide anything after this badly executed reproduction, but Lister's copper certainly is not *P. ficus* auct.

Hanley (*Ipsa Linnaei Conchylia*, p. 206; 1855) already in 1855 pointed to the contradiction between the different parts of Linné's diagnosis of *Murex ficus*, and added: "the details of the 'Museum Ulricae' are equally contradictory". Among the illustrations of other authors referred to by Linné in the Museum (p. 637, No 314; 1764), two (Rumph. mus. t. 27. f. K. & Argenv. conch. t. 20. f. O.) represent *P. ficus* auct.; and, as I remarked previously, fig. I of Gualtieri (test. t. 26.) probably shows *P. ficus* too,

but fig. M of the last named author is a quite different species of *Pirula*. Hanley (Proc. Linn. Soc., vol. 4, p. 77; 1860), who examined the Linnean manuscript of the Museum Ulricae, remarks: "'Pet. Amb. t. 6. f. 9' was an omitted synonym." This cited illustration probably represents a *P. ficus* auct., as mentioned above.

In the 12th edition of his *Systema Naturae* Linné retains the original conception of his *Bulla (Murex) ficus*, as appears from a new "synonym" added to the former, viz., Seb. mus. 3. The citation Seb. mus. 3. t. 38. f. 13—24 is a lapse, as Hanley (*Ipsa Linnaei Conchylia*, p. 207; 1855) already showed: "The reference to plate 38 of Seba was an error; nine out of the twelve cited figures were again quoted, and more properly so, for the succeeding species (*Bulla rapa*), of which the remaining three are likewise representations." On plate 68. f. 1—6 of Seba, also quoted by Linné, there are figured, besides *P. ficus*, one or two other species of *Pirula*.

Gmelin, in the 13th edition of the *Systema Naturae*, with reason suppressed the erroneous reference to Seba from the 12th edition (Seb. mus. 3. t. 38. f. 13—24), but adds some new citations to those mentioned by Linné in his last edition, which shows that Gmelin too under the name *Bulla ficus* included a group of very different species. He quotes, e.g., Knorr Vergn. 1. t. 19. f. 4., which is an illustration of a *P. ficus* auct., the vertical lines of this figure probably are lines of growth, although their mutual distance is very regular. Vergn. 3. t. 23. f. 1. is a typical specimen of *P. reticulata* (Lm.); whilst Vergn. 6. t. 27. f. 7., also mentioned by Gmelin, is placed by Lamarck (*Anim. s. Vert.*, vol. 7, p. 142; 1822), in my opinion erroneously, among the synonyms of *P. subintermedia* (Orb.) (= *P. ficoides* Lm.).

Gmelin even included another species among the synonyms of *P. ficus* as appears from the citation Martin. Conch. 3. t. 66. f. 733., which in reality is an illustration of a specimen of *P. ventricosa* Sow. (= *P. decussata* Wood).

From the group of these different species, included by Linné under the name *Bulla* or *Murex ficus*, Lamarck has separated the *P. ficus* (= *P. laevigata* Rv.), as it is now generally understood by most authors. Of course he could have selected just as well for instance, *P. subintermedia* (Orb.) (= *P. ficoides* Lm.), as nothing shows that Linné meant specially *P. ficus* auct. and not *P. subintermedia* (Orb.) or *P. reticulata* (Lm.). The diagnosis and citations of Lamarck characterise *P. ficus* very clearly. Only the reference Bonanni, Recr. 3. f. 15. seems erroneous to me for, as remarked above, the species represented in this illustration certainly is

not a *P. ficus* auct. It is remarkable that Deshayes maintains this quotation in his edition of the Animaux sans Vertèbres.

a. 13. Indian Ocean, from Dalen's collection. — b. 3. Padang (W. Sumatra), S. Müller. — c. 1. Banka Isl. (E. of Sumatra), v. d. Bossche. — d. 1. Amboyna, Hoedt. — e. 5. Badjowe (S. Celebes), Moens. — f. 1. Obi Isl., Bernstein. — g: 5. Boesak (N. Celebes), ? — h. 1. Nias Isl. (near Sumatra), E. E. W. G. Schröder. — i. 4. Tapa Toean, Atjeh (Sumatra), H. E. Wempe. — j. 8. Madura, from E. F. Jochim's collection. — k. 1. Painan (W. Sumatra), from E. F. Jochim's collection. — l. 1. Laboehan Deli (E. Sumatra), L. de Priester. — m. 4. Medan, Deli (Sumatra), J. C. B. Hüner. — n. 2. Pendawa (N. E. Sumatra), Technische Hoogeschool Delft. — o. 1. Aroe Is. (near New Guinea), J. Semmelink. — p. 2. Skroë (New Guinea), K. Schädler. — q. 14. Aden, H. Strengers & L. E. Nobel. — r. 1. Moluccas, from E. F. Jochim's collection. — 1237. 1. Japan, Burger, — 1691. 3. Padang (W. Sumatra),?

var. **coga** De Gregorio

F. ficus var. *coga* De Gregorio, Bull. soc. malac. italiana, vol. 11, p. 63; 1885.

var. **toga** De Gregorio

F. ficus var. *toga* De Gregorio, Bull. soc. malac. italiana, vol. 11, p. 63; 1885.

(?) monstr. **elipa** De Gregorio

F. ficus Fa. *elipa* De Gregorio, Bull. soc. malac. italiana, vol. 11, p. 64; 1885.

P. filosa (Sowerby)

Pyrula filosa Sowerby, Conchol., vol. 2, p. 74; 1892.

Pirula filosa, Smith, Journ. of Malac., vol. 3, p. 69 (5); 1894.

P. investigatoris Smith

Sycotypus, sp. Wood-Mason & Alcock, Ann. & Mag. of Nat. Hist., vol. 7, ser. 6, p. 15, fig. 2; 1891.

Pirula investigatoris Smith, Ann. & Mag. of Nat. Hist., vol. 14, ser. 6, p. 367; 1894. — Journ. of Malac., vol. 3, p. 69 (6); 1894.

Pyrula investigatoris, Prashad, Rec. Indian Mus., vol. 29, pl. 22, figs. 3, 5; 1927.

P. papyratia (Say)

Pyrula papyratia Say, Journ. Acad. Nat. Sci. Philadelphia, vol. 2, pars 2, p. 238 (81); 1822.

Pyrula reticulata (non Lamarck) Sowerby, Genera of Shells, vol. 2, N° 24, *Pyrula*, pl. 221, fig. 1; 1824.

Ficula gracilis Philippi, Zeitschr. f. Malakozool., vol. 5, p. 97; 1848.

Ficus gracilis, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 149; 1852.

- Ficula gracilis*, Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3B, Ficula, p. 12, N° 5 and p. 234, pl. 2, figs. 1, 2; 1881.
Pyrula papyratia, Tryon, Manual of Conch., vol. 7, p. 266, pl. 6, fig. 35; 1885.
Sycotypus papyraceus, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Pyrula papyracea, Sowerby, Conchol., vol. 2, p. 74; 1892.
Pirula papyracea, Smith (pars), Journ. of Malac., vol. 3, p. 66 (2); 1894.

Some authors (Adams, Dunker, Sowerby, Paetel, Smith) write the name of this species as "*papyracea*". If this orthography were correct this *Pirula* would be a homonym of *P. papyracea* Lm. (= *Rapa papyracea*), but fortunately Say has named his species "*papyratia*", so that both names can be conserved.

That this *Pirula* is related to *P. reticulata* (Lm.) is, beside in the other characters, visible in the nepionic shell. *P. papyratia* is however thin and translucent, and of a finer sculpture, so that we can better, in contradistinction to Smith's opinion, consider the two as a species and its variety. *Pyrula papyratia* Say is of June 1822 and *P. reticulata* Lamarck of August 1822, consequently *P. papyratia* must become the name of the species and *P. reticulata* that of the variety.

Ficula gracilis Philippi differs from *P. papyratia* only by its more slender form and by the spiral ribs being of about equal strength, not alternately thicker and thinner.

That this species, the area of distribution of which is the East coast of America between Georgia and Honduras, is found in Japan also, as stated by Adams (Ann. & Mag. of Nat. Hist., vol. 5, ser. 4, p. 430; 1870), in my opinion is a mistake.

a. 1. Florida, Sowerby & Fulton. — b. 1. Passa Grille (Florida), W. H. Eeshnaur.

var. **reticulata** (Lamarck)

- Pyrula reticulata* Lamarck, Anim. s. Vert., vol. 7, p. 141, N° 9; 1822.
Pyrula reticulata, Schubert & Wagner, Martini & Chemnitz, Neues syst. Conch. Cab., vol. 12, p. 96; 1829.
Pyrula reticulata, Kiener, Icon. coq. viv., *Pyrula*, p. 28, N° 19, pl. 12, fig. 1; 1840.
Pyrula reticulata, Deshayes, Anim. s. Vert., 2nd ed., vol. 9, p. 510, N° 9; 1843.
Ficus Ventricosa, var. Rousseau, Chenu, Illustr. conchyl., vol. 3, Ficus, pl. 2, fig. 2; 1846.
Ficula reticulata, Reeve (pars), Conch. Icon., *Ficula*, sp. 1; 1847.
Ficus reticulatus, Petit de la Saussaye (pars), Journ. de Conch., vol. 3, p. 149; 1852.
Pyrula fortior Mörch, Malakoz. Bl., vol. 24, p. 43; 1877.
Ficula reticulata, Kobelt (exclus. var.), Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3B, Ficula, p. 7, N° 1, pl. 1, figs. 4, 5; 1881.
Sycotypus fortior, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Sycotypus reticulatus, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Pyrula reticulata, Sowerby (pars), Conchol., vol. 2, p. 74; 1892.

The references to illustrations from other authors, given by Lamarck for more exact definition of his species, nearly all are well chosen and represent typical specimens. Two citations, however, in my opinion do not refer to *P. reticulata*, viz., Seba, Mus. 3. t. 68. f. 1. (tantum), and Martini, Conch. 3. t. 66. f. 733. Seba's fig. 1 shows a specimen with a lower number of ribs than commonly found in *P. reticulata*. These ribs, placed accordingly farther apart than in the last mentioned *Pirula*, has interspaces finely cancellated with striae, without the intervening lira which is characteristic for *P. reticulata*, as is shown in Seba's figures 3 and 4, quoted also by Lamarck for this species. It is not probable that Seba has represented here *P. reticulata*, as the illustration agrees more strongly with *P. ventricosa* (Sow.) (= *P. decussata* Wood), in which sometimes the intermediate rib is lacking or obscurely marked, and which has a lower number of ribs (14—18), corresponding with that of the specimen of Seba's fig. 1. By the plane-convex form of these spiral ribs, a feature apparent when comparing Seba's fig. 1 with his figs. 3 and 4, this shell resembles *P. ventricosa*. It differs, however, from the latter by the absence of spots on the ribs and by the fact that the longitudinal ridges cross the spiral ribs, these therefore being not smooth but striated. Fig. 2 of Seba in my opinion, better could have been chosen for *P. reticulata* than this illustration. The other figure mentioned, that of Martini, is a drawing of *P. ventricosa* (Sow.), as already remarked in a note by Deshayes (Anim. s. Vert., 2nd ed., vol. 9, p. 510; 1843).

Mörch (Malakoz. Bl., vol. 24, p. 43; 1877) and Tryon (Manual of Conch., vol. 7, p. 265 & 287; 1885) quote *Ficus clathrata* Rousseau (Chenu, Ill. Conch., 3, pl. 2, f. 3) as a synonym of *P. reticulata* (Lm.), and Smith (Journ. of Malac., vol. 3, p. 66 (2); 1894) also places *F. clathrata* into the synonymy of *P. papyratia* (Say), which he considers identical with *P. reticulata*. In my opinion these authors are wrong. The four adult or nearly full-grown specimens of *P. clathrata* figured by Rousseau (I leave the young specimens out of question), are shorter and more ventricose than *P. reticulata* and their canal at the end is less contracted. Still more perceptible is the difference when *P. clathrata* is compared to *P. papyratia*. Moreover, the number of ribs of *P. clathrata* is lower and they form a sharpened crest, instead of being flattened, and the intervals in consequence are rather subcanaliculated. Rousseau, moreover, was an able malacologist, who knew *P. reticulata* quite well, as appears from a good drawing of a typical specimen of the last-named species, given by him in the Illustrations Conchyliologiques under the name *Ficus ventricosa* var., on the same plate as that of *P. clathrata*.

Smith (Journ. of Malac., vol. 3, p. 67 (3); 1894) apparently is right in his statement: "The locality, Indian Ocean, quoted by Lamarck and repeated by subsequent authors, I regard as a mistake".

a. 10. American Ocean, from Dalen's & Old collection. — b. 3. ?, from Hooegeveen's collection. — c. monstr. 1. ?, from Hooegeveen's collection. — d. monstr. 1. American Ocean, from Dalen's & Old collection.

The specimen of *P. reticulata* from the collection Hooegeveen, bearing the letter c, shows an anomaly in sculpture, beginning at the labium internum with a zone of a breadth of about 15 mm and enlarging till ± 37 mm at the outer lip (fig. 1). This band bears a sculpture differing from the normal of *P. reticulata* on account of the lack of difference between the spiral ribs and the revolving threads situated between them. Moreover all lirae are of equal thickness, which is the average between the thickness of the ridges and the spiral threads of the normal part. Sacco (Moll. terreni terz. Piemonte e Liguria, part 8, p. 36, pl. 1, fig. 46; 1891) figures, under the name subvar. *anomala*, a similar deformation of *P. reticulata*, which as far as concerns the sculpture strongly resembles our specimen. He gives the following description: "In regione ventrali ultimi anfractus costae et costulae subaequales, perpropinquae". The shape of Sacco's specimen, however, is quite different, the last whorl being "in regione ventrali depressus", as he expresses it, whilst our *Pirula* is of entirely normal shape.

Another of our specimens, marked d, shows a similar deformity, but over a narrower zone of 10 mm breadth near the innerlip, enlarging till 25 mm at the outer lip. Here one can see how this aberration in sculpture is brought about. Near the inner lip namely there is a thickened line, which indicates a pause or cessation of growth. This previous labium externum, however, shows distinct traces of having been broken, as, in stead of being faintly and regularly curved, it is somewhat notched and forms, on a breadth of about 37 mm, a curve directed backward. In one point of this former lip

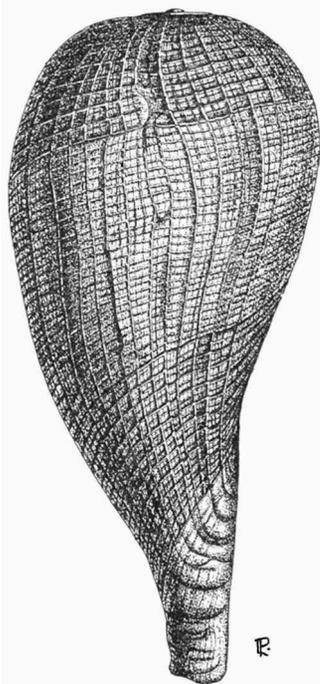


Fig. 1. *Pirula papyratia* (Say)
var. *reticulata* (Lm.)
deformatio. $\times 1$.

we remark a reentering angle, caused by the fact that the lip was broken there for a breadth of about 8 mm, till \pm 6 mm behind this normal border. In front of this place the aberrant sculpture commences. Possibly the cells of the mantle border were injured in consequence of a fracture and this may have caused the difference in sculpture. This would also confirm Sacco's supposition who remarks (p. 37): "La reticolazione specialissima di questa forma sembra doversi essenzialmente attribuire al fatto che la conchiglia ebbe a subire rotture e forse perdite parziali del guscio nella regione ventrale che venne sostituita dall'animale ma con profonde modificazioni del disegno primitivo." This author is right in adding: "la forma in esame entra in gran parte nel campo patologico; ho creduto tuttavia doverla accennare per mostrare la facile variabilità dell'ornamentazione del guscio di queste forme anche nello stesso individuo a seconda dello stato in cui esso si trova."

P. pellucida (Deshayes)

Ficus pellucidus Deshayes, Journ. de Conch., vol. 5, p. 184, pl. 6, figs. 1, 2; 1856.

Ficula ficus Linné Varietas Kobelt (exclus. fig.), Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, Ficula, p. 9, N° 2; 1881.

Pyrula ficus, Linn. Var. *pellucida*, Desh., Tryon, Manual of Conch., vol. 7, p. 266, pl. 6, fig. 37; 1885.

Sycotypus pellucidus, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.

Pirula pellucida, Smith, Journ. of Malac., vol. 3, p. 69 (5); 1894.

Kobelt and Tryon in my opinion are wrong when regarding this *Pirula* as a variety of *P. ficus* auct. The former even writes (p. 9): "*Ficus pellucidus* Deshayes kann ich nur für eine unbedeutende Abänderung unserer Art (*P. ficus*) halten" and, reproducing a figure (pl. 24, fig. 6) from the old edition of Martini (1777), adds: "entspricht ihr bis auf die Grundfarbe fast ganz". This illustration, however, is rather badly executed; moreover, it shows the shell from the dorsal side, so that the characteristic shape of this *Pirula*, as, emphasized by Deshayes, is not clearly visible. The last named author says, a.o.: "elle a toute l'apparence des autres espèces de *Ficus*. Cependant elle s'en distingue, au premier coup d'œil, par un canal proportionnellement plus court", and further states that the columella is "droite, étroite". The columella of *P. ficus*, on the contrary, is rather strongly curved, as Kobelt himself writes (p. 9): „Die Spindel ist stärker gebogen, als bei den anderen Arten". The pattern of the shell in this figure also differs from that in the illustration of Deshayes, as on a plain surface "couleur fauve cornée" the latter specimen shows "cinq rangées principales de points bruns, subquadrangulaires", whereas in the picture

of Kobelt we see five white bands with oblong dots, and between these zonae the maculations which form the ordinary pattern of *P. ficus*; therefore not a plain surface as in *P. pellucida*. Another character which apparently has been neglected by Kobelt, but which Deshayes regarded important enough to name the species after it, is indicated by the words of the text: "Testa... pellucida, tenui, fragili". Moreover the form in *P. pellucida* is "ovale, oblongue, pyriforme", whereas *P. ficus* is ventricose, abbreviately pyriform.

P. sewelli (Prashad)

Pyrula sewelli Prashad, Rec. Indian Mus., vol. 29, p. 230, pl. 22, figs. 1, 2, 4; 1927.

P. subintermedia (D'Orbigny)

- Pyrula ficoides* (non Brocchi) Lamarck, Anim. s. Vert., vol. 7, p. 142, N° 11; 1822.
Pyrula ficoides, Schubert & Wagner, Martini & Chemnitz, Neues syst. Conch. Cab., vol. 12, p. 95, pl. 226, figs. 4014, 4015; 1829.
Pyrula ficoides, Kiener, Icon. coq. viv., *Pyrula*, p. 29, N° 20, pl. 13, fig. 2; 1840.
Pyrula ficoides, Deshayes, Anim. s. Vert., 2nd ed., vol. 9, p. 511, N° 11; 1843.
Ficulina intermedia (non Melleville) Sismonda, Synopsis meth. anim. invert. Pedem., 2nd ed., p. 37; 1847.
Ficula reticulata, Reeve (pars altera), Conch. Icon., *Ficula*, sp. 1, pl. 1, fig. 1; 1847.
Pyrula subintermedia D'Orbigny, Prodrôme Paléontol., vol. 3, p. 173; 1852.
Ficus reticulatus, Petit de la Saussaye (pars altera), Journ. de Conch., vol. 3, p. 149; 1852.
Sycotypus ficoides, Adams, Genera rec. Moll., vol. 1, p. 199; 1858.
Ficus ficoides, Chenu, Manuel de Conchyl., vol. 1, p. 211, fig. 1150; 1859.
Sycotypus reticulatus (non Lamarck) Angas, Proc. Zool. Soc. London, p. 182; 1877.
Ficula decussata (non Wood) Sowerby (pars), Thesaurus Conchyl., vol. 4, p. 110, pl. 423, figs. 1, 3, (non 2); 1880.
Ficula reticulata Lamarck Varietas Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, *Ficula*, p. 7, N° 1, pl. 19, figs. 5, 6; 1881.
Ficula ficoides, Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, *Ficula*, p. 239; 1881.
Pyrula reticulata, Tryon (pars), Manual of Conch., vol. 7, p. 265, pl. 5, fig. 28; 1885.
Sycotypus ficoides, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
Pyrula reticulata Sowerby (pars altera), Conchol., vol. 2, p. 74; 1892.
Pirula ficoides, Smith, Journ. of Malac., vol. 3, p. 67 (3); 1894.
Pyrula reticulata Lamarck Var. *Ficoides* Lamarck, Hidalgo, Catalogo mol. test. Filipinas, p. 154; 1904—1905.
Ficus communis Hedley, Proc. Linn. Soc. New S. Wales, vol. 33, p. 461; 1908. — Journ. Roy. Soc. New S. Wales, vol. 51, suppl., p. 68; (1917), 1918.

The name *Pyrula ficoides* Lamarck 1822 is preoccupied by *P. ficoides* (Brocchi) 1814 (*Bulla ficoides* Brocchi, Conchiol. foss. subapenn., vol. 2, p. 280, pl. 1, fig. 5; 1814), a *Pirula* from the Pliocene of a quite different shape. Hedley (Proc. Linn. Soc. New S. Wales, vol. 33, p. 461; 1908)

used the name *Ficus communis* Bolten (Roeding, Mus. Boltenianum, p. 148; 1798), adding in a footnote: "Founded on Knorr, Verg. Pt. 3. Pl. 23. f. 1." This figure, however, does not represent a *P. ficoides* (Lm.), but is an excellent drawing of *P. reticulata* (Lm.) and is cited as thus by Lamarck for this *Pirula*. As it is not clear which species was meant by Bolten under the name *Ficus communis*, the latter name cannot be substituted for Lamarck's name. The next synonym of *P. ficoides* (Lm.), which has to be taken into consideration, is *Ficula intermedia* Sismonda (Synopsis meth. anim. invert. Pedem., 2nd ed., p. 37; 1847). The author quotes as synonym *P. ficoides* Lm., An. s. vert. 9. p. 511, and Kiener, Ic. t. 13. f. 2. Unfortunately this name was preoccupied by *P. intermedia* Melleville (Annales Sciences géol., vol. 2, p. 115, pl. 10, figs. 8, 9; 1843), a *Pirula* from the Tertiary (Suessonien), therefore d'Orbigny (Prodrome Paléontol., vol. 3, p. 173; 1852) named the *Pirula* dealt with here: *P. subintermedia*.

Lamarck and Deshayes regarded *P. ficoides* and *P. reticulata* as two good species, but afterwards many authors, a.o., Lischke, Kobelt, Dunker, Hidalgo, etc. mentioned *P. ficoides* as a variety of *P. reticulata*; whereas *P. ficoides* by Reeve, Petit de la Saussaye, Tryon, Sowerby (Conchol., vol. 2, p. 74; 1892), is placed among the synonyms of *P. reticulata*. In this connection Reeve (Conch. Icon., Ficula, pl. 1, sp. 1; 1847) writes: "after an examination of numerous specimens it is obvious that the *P. reticulata* and *ficoides*, of Lamarck, are merely different states of the same". Although already in 1880 Martin (Die Tertiärschichten auf Java, p. 56; 1879—80) protested against this procedure, stating "es ist gewiss nicht gerechtfertigt, wenn Reeve beide Formen zusammenbringt", two years later we still find the following statement by Dunker (Index moll. maris japon., p. 59; 1882): "*Pirula ficoides* Lamarckii ab hac specie (namely *P. reticulata* Lm.) certis limitibus separari nequit". On p. 8 of his Monograph Kobelt remarks: "Die Trennung von *reticulata* und *ficoides* lässt sich unmöglich aufrecht erhalten" and some lines previously: "Unter einer grossen Reihe von Exemplaren aus der Loebbecke'schen Sammlung finden sich viele, welche die Färbung der Stammform mit dem eingesenkten Gewinde der Varietät vereinigen und eine Trennung in zwei Arten unmöglich machen". This author, however, has laid too much stress on the "spira plano-retusa" of *P. ficoides*, for this kind of spire is found also among specimens of *P. reticulata*, whereas *P. ficoides* sometimes has a more raised spire. Except by the finer reticulation formed by the cutting of the spiral and vertical ridges and the "reichere Färbung", there is one other character by which it can easily be separated from *P. reticulata*, viz., the wholly different nepionic whorls, a point to which Smith already

called attention. The protoconch of *P. reticulata* Lm. (fig. 2) has $1\frac{1}{4}$, at the most $1\frac{1}{2}$, relatively large whorls, prominent above the following (mucronatus), whereas *P. ficoides* (fig. 3) has two whorls which are of a narrower and more flattened shape.

In the Animaux sans Vertèbres (vol. 7, p. 142, N° 11; 1822) Lamarck, after his diagnosis of *P. ficoides*, refers, besides to a moderate illustration



Fig. 2. Apex of *Pirula papyratia* (Say) var. *reticulata* (Lm.). $\times 6$.

of Lister (Conch. t. 750. f. 46), also to Knorr, Vergn. 6. t. 27. f. 7. By its somewhat ventricose shape the *Pirula* represented here bears a stronger resemblance



Fig. 3. Apex of *Pirula subintermedia* (Orb.). $\times 6$.

to *P. ficus* than to *P. ficoides*. The fine reticulation, which is so typical for the latter species, on this figure is not visible at all, whereas the pattern of spots and

whitish bands bearing maculations is to be found in some specimens of *P. ficus* too.

a. 13. Indian Ocean, Blume & from Dalen's collection. — b. 2. Amboyna, Hoedt. — c. 1. Badjowe (S. Celebes), Moens. — d. 3. Japan, P. F. von Siebold. — e. 1. Zanzibar, Derx. — f. 1. Nossi Bé (near Madagascar), Pollen & v. Dam. — g. 1. Tapa Toean, Atjeh (Sumatra), H. E. Wempe. — h. 2. Moluccas, J. L. Storm van 's Gravesande & from E. F. Jochim's collection. — i. 3. Aden, H. Strengers & L. E. Nobel. — j. 4. ?, ? — 1692. 1. Japan, P. F. von Siebold.

var. **margaretæ** (Iredale)

Ficula margaretæ Iredale, Rec. Austral. Mus. Sydney, vol. 18, p. 216, pl. 23, fig. 4; 1931.

var. **reevei** (De Gregorio)

Ficula fa *reevei* De Gregorio, Bull. soc. malac. italiana, vol. 11, p. 64; 1885.

P. tessellata (Kobelt)

Ficula decussata (non Wood) Sowerby (pars altera), Thesaurus Conchyl., vol. 4, p. 110, pl. 423, fig. 2 (tantum); 1880.

Ficula tessellata Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, Ficula, p. 12, N° 6, pl. 2, fig. 3; 1881.

Ficula tessellata Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, Ficula, p. 238; 1881.

Pyrula tessellata, Tryon, Manual of Conch., vol. 7, p. 267, pl. 5, fig. 31; 1885.

Sycotypus tessellatus, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.

Pirula tessellata, Smith, Journ. of Malac., vol. 3, p. 69 (6); 1894.

Ficula tessellatus, Hedley, Journ. Roy. Soc. W. Austral., vol. 1, p. 48; 1916. — Proc. Roy. Geogr. Soc. of Austral., Sess. 1916—1917, p. 15; 1918.

Pyrula eospila Iredale, Rec. Austral. Mus. Sydney, vol. 18, p. 216; 1931.

Concerning *P. tessellata* (Kobelt), Iredale (Rec. Austral. Mus. Sydney, vol. 18, p. 216; 1931) states that this shell "many years before Kobelt's time had been called *Pyrula eospila* by Peron (Voy. Terre Austral., 1, 1807, p. 132) from Ile Depuch, West Australia". On the cited page, however, Péron observes only in the account of the voyage: "Parmi les coquilles, il faut distinguer une charmante espèce de Pyrule (*Pyrula Eospila* N.), élégamment ornée de petites taches aurore". This indication, which can not be called a description, indeed is very brief, and, moreover, there is no figure to complete this meager "diagnosis." The colour of the spots of *P. tessellata* is brown, or chestnut, indicated by Kobelt in his diagnosis as "fuscus". Péron, on the contrary, describes a *Pirula* with maculae of an "aurore" colour, which he expresses also in the name (*eospila*). The word "aurore", morning red, however, indicates a pink, or light red, not a brown colour. To place *P. eospila* into the synonymy of *P. tessellata*, merely on account of this obscure and only partly correct indication of Péron, is not desirable, therefore I retain the name given by Kobelt.

a. 1. Australia, H. C. Fulton.

In shape, dimensions and sculpture our specimen corresponds almost completely with Kobelt's drawing, the spire only is a trifle less depressed. In its colour pattern our shell differs from Kobelt's by its lack of the two or three brownish bands, just as the three specimens in the British Museum mentioned by Smith (Journ. of Malac., vol. 3, p. 69 (6); 1894), and that of Dautzenberg's collection, which I could examine in the Musée Royal d'Histoire Naturelle at Brussels. The number of transverse series of quadratic spots also is lower, viz., 7 instead of 9, as in the type specimen.

P. ventricosa (Sowerby)

Ficus tenuis magna, cancellata Martini, Syst. Conch. Cab., vol. 3, p. 17 and p. 21, pl. 66, fig. 733; 1777.

Ficus cancellata Schröter, Namen-Register syst. Conch. Cab., p. 35; 1788.

Ficus tenuis Schröter, Namen-Register syst. Conch. Cab., p. 35; 1788.

Pyrula ventricosa Sowerby, Catal. shells collect. Tankerville, Append., p. 16; 1825.

Bulla decussata Wood, Index testac., suppl., p. 9, pl. 3, fig. 3b; 1828.

Pyrula ventricosa, Kiener, Icon. coq. viv., *Pyrula*, p. 27, N° 18, pl. 12, fig. 2; 1840.

Pyrula ventricosa, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 521, N° 29; 1843.

Ficus Ventricosa, Rousseau, Chenu, Illustr. conchyl., vol. 3, Ficus, pl. 2, figs. 1, 1a, 1b (non 2); 1846.

Ficula decussata Reeve, Conch. Icon., *Ficula*, sp. 3, pl. 1, fig. 3; 1847.

Ficus ventricosus, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 149; 1852.

Ficus decussatus, Chenu, Manuel de Conchyl., vol. 1, p. 211, fig. 1151; 1859.

- Ficula reticulata* (non Lamarck) Sowerby, Thesaurus Conchyl., vol. 4, p. 110, pl. 423, figs. 6, 7; 1880.
- Ficula decussata*, Kobelt, Martini & Chemnitz, Syst. Conch. Cab., vol. 3, part 3 B, Ficula, p. 10, N° 3, pl. 24, fig. 3; 1881.
- Pyrula decussata*, Tryon, Manual of Conch., vol. 7, p. 266, pl. 6, fig. 34; 1885.
- Sycotypus decussatus*, Paetel, Cat. Conch. Samml., vol. 1, p. 222; 1887.
- Pyrula decussata*, Sowerby, Conchol., vol. 2, p. 74; 1892.
- Pirula ventricosa*, Smith, Journ. of Malac., vol. 3, p. 68 (5); 1894.

a. 1. Panama, E. Deyrolle. — b. 1. China, Sowerby & Fulton.