

Supplementary data: Annotated list of Jurassic *Trochotoma* species

The best characterized Jurassic taxa referable to *Trochotoma* s. l. are discussed below in alphabetic order, and to facilitate comparisons some of the original figures are reproduced, grouped according to the morphology of their shells (Figure 5 in text and Supplementary Figures 1 to 6 here). Within each group, some names are regarded as potential synonyms. For each specific name a chresonymy (mostly limited to figured references) and a short description are provided, together with available data about material and types, while opinions about misidentifications and synonymy are recorded as remarks.

The following critical list of specific nominal taxa is mostly based on data from the literature, and it is offered as the necessary basis to attempt a systematic revision of the whole family, which is well beyond the aims of this paper.

***Trochotoma (T.) acuminata* Eudes-Deslongchamps, 1843 (Suppl. Fig. 1.B, 1.C-D?)**

1843 *Trochotoma acuminata* E.-D., Eudes-Deslongchamps, p. 108, pl. 8, figs. 11–15. (Suppl. Fig. 1.B)

1850a *Ditremaria acuminata* d'Orb.; d'Orbigny, p. 301, n° 90.

? 1851 *Trochotoma acuminata* Desl.; Morris & Lycett, p. 82, pl. 10, fig. 20 [fig. 18a–b ?] (Suppl. Fig. 1.D)

1853 *Ditremaria acuminata* d'Orb.; d'Orbigny, p. 384–385, pl. 341, figs. 8-13.

1877 *Trochotoma acuminata* Eudes Desl.; Hermite, p. 692.

? 1885 *Trochotoma acuminata* Deslongchamps; Cossmann, p. 312–313, pl. 13, fig. 14. (Suppl. Fig. 1.C)

1918 *Ditremaria acuminata* Eudes-Deslong.; Rollier, p. 56–57.

1934 *Ditremaria (Ditremaria) acuminata* Deslongchamps sen.; Haber, p. 324-326.

Type material. 7 or 8 specimens, Specimen figured in Eudes-Deslongchamps, 1843, pl. 8, fig. 12 was designated as lectotype by Haber, 1934, p. 324..

Type locality. Bathonian of Langrune (France).

Etymology. Epithet refers to the acute apex.

Description. Conical shell with acute apex, spire height variable; 7 or 8 whorls slightly convex in the middle, near the aperture the convexity becomes more pronounced and turns into a rounded angulation; surface smooth or faintly striated in some specimens; base wide, nearly flat and striated near the border and deeply umbilicated (freely translated from Eudes-Deslongchamps, 1843, p. 108).

Remarks. Eudes-Deslongchamps (1843) indicated that his material probably includes more than one species but the specimens are not well-preserved. Haber (1934) restricted the species to figures 11-13 in Eudes-Deslongchamps (1843, pl. 8), and did not include the specimens figured by d'Orbigny (1853). Cossmann (1885) pointed out that the illustrations in d'Orbigny (1853) are not accurate, and the very high shell Cossmann (1885, pl. 13, fig. 14) referred to this species was later thought to be misidentified and re-named *D. conica* by Rollier (1918; non *T. conica* in Eudes-Deslongchamps, 1843, p. 102 = error pro *conuloides*?). British specimens in Morris & Lycett (1851, p. 82, pl. 10, 20) were subsequently named *T. lycetti* by Hermite 1877 (non Moore, 1867) and *D. hamptonensis* by Haber, 1934, p. 344, and referred to *T. obtusa* by Cox & Arkell (1950) and Fischer (1964, 1969). Fischer and Weber (1997) included the specimens figured by d'Orbigny (1853) in the synonymy of *T. conuloides*.

***Trochotoma (T.) affinis* Eudes-Deslongchamps, 1843 (Fig. 5.E-F)**

1843 *Trochotoma affinis* E.-D., Eudes-Deslongchamps, p. 106, pl. 8, figs. 8–10. (Fig. 5.E)

1850 *T. affinis* Deslongchamps; Lycett, p. 411 (as synonym of *T. calix*).

1850a *Ditremaria affinis*, d'Orb., 1847 (*Trochotoma affinis* Deslongch.); d'Orbigny, p. 267 (# 120).

1853 *Ditremaria affinis*, d'Orb.; d'Orbigny, p. 381–383, pl. 341, figs. 1–3 (re-drawn from E.-Deslongchamps).

1855 *Trochotoma affinis* Deslongchamps; Pictet, p. 180, pl. 63, fig. 18.

1867 *Trochotoma affinis* Deslongchamps; Laube, p. 16

- 1868 *Trochotoma affinis* (Desl.); Eudes-Deslongchamps, p. 221, pl. 8, figs. 6a–b. (Fig. 5.F)
 1877 *Trochotoma affinis*, Eudes Desl.; Hermite, p. 690.
 1896 *Trochotoma affinis*, Deslongchamps; Hudleston, p. 447, pl. 41, fig. 4.
 1918 *Ditremaria affinis* Eudes-Desl.; Rollier, p. 55.
 1934 *Ditremaria (Ditremaria) affinis* (Deslongchamps sen.); Haber, p. 326-329.
 1997 *Trochotoma affinis* Eudes-Deslongchamps ; Fischer and Weber, p. 151, pl. 24, fig. 6.
 2012 *Valfinia* aff. *affinis* (Eudes-Deslongchamps) ; Gründel, p. 210, pl. 2, figs. 12-15, pl. 3, fig. 1.

Type material. Two specimens. Holotype MNHN-F-R09505.

Type locality. Moutiers (France), Oolites Ferrugineuses.

Etymology. «Trochotome apparenté», i.e. related by kinship.

Description. Conical shell with subacute apex; 7 to 8 quadrangular whorls, a bit higher than wide; apart from the open trema near the apertural margin, there are traces of a closed trema followed by a constriction near the first third of the last whorl (repos de bouche) (freely translated from Eudes-Deslongchamps 1843, p. 106).

Distribution. Bajocian-Bathonian, France and Great Britain. Eudes-Deslongchamps (1868) illustrated a specimen from Bayeux (level of *humphriesianum*). Hudleston (1896) figured specimens from Stoford, Great Britain.

Remarks. Already Eudes-Deslonchamps (1843, p. 107) regarded this species as a variety of *T. gradus*, but considered it as distinct due to its different stratigraphic provenance, and the following morphological differences: *T. affinis* has a more conical shell and presents «repos de bouche», i.e. traces of a previous aperture (although he also comments that this last feature can be accidental and probably is not a specific character). This species was listed by Lycett (1850, p. 411) as synonym of *T. calix*. Hudleston (1896, p. 448) proposed that «*T. calix*, *T. affinis* and *T. gradus* are varieties of one species, where *T. gradus* is a large tabulate form with about six whorls and an obtuse apex, *T. affinis* is a large subtabulate form with higher whorls and a sharper apex; whilst *T. calix* is a small subtabulate form with five whorls and a very obtuse apex.» Hudleston also included *T. carinata* Lycett in the synonymy of this species. Gründel (2012, p. 210) referred this species to the genus *Valfinia* Cox.

***Trochotoma (Placotoma) amata* (d'Orbigny, 1850b) (Suppl. Fig. 5.C)**

- 1850b *Ditremaria amata* d'Orb., p. 9 (n° 147).
 1853 *Ditremaria amata* d'Orb.; d'Orbigny, p. 389–390, pl. 343, figs. 3–8. (Suppl. fig. 5.C)
 1854 *Ditremaria amata* d'Orb.; Cotteau, p. 37.
 1855 *Trochotoma amata* d'Orbigny; Pictet, p. 180, pl. 63, fig. 17.
 1865 *Trochotoma amata* (d'Orbigny); Eudes-Deslongchamps, p. 424, pl. 3, figs. 3–6.
 1864 *Trochotoma amata* (d'Orbigny); Eudes-Deslongchamps, p. 38, 46, pl. 3, figs. 3–6.
 1884 *Trochotoma amata*; Quenstedt, p. 373–374, pl. 199, fig. 50.
 1890 *Trochotoma amata* d'Orbigny; de Loriol, p. 159–162, pl. 17, figs. 3–4.
 1893 *Trochotoma amata* d'Orbigny; de Loriol, p. 71–72.
 1918 *Ditremaria amata* d'Orb.; Rollier, p. 60.
 1934 *Ditremaria (Discotoma) amata* (d'Orbigny); Haber, p. 329, 368-371.
 1960 *Trochotoma (Discotoma) amata* (d'Orbigny); Knight et al., p. 220–221, figs. 135.2a-b (reproduced from d'Orbigny, 1853)
 1997 *Trochotoma (Discotoma) amata* (d'Orbigny); Fischer and Weber, p. 153-154, pl. 24, fig. 13-15.
 1998 *Trochotoma (Discotoma) amata* (d'Orbigny); Bertling & Insalaco, p. 154, fig. 10b.

Type material: Lectotype (MNHN-F-R05660) designated by Fischer and Weber (1997).

Type locality. Saulce-aux-Bois, Saint-Mihiel (France), Corallian (Oxfordian).

Etymology. Not given, probably meaning lovely, beautiful.

Description. Shell very depressed, much wider than high, with very large umbilicus. Spire forming a convex angle, made by depressed whorls, gradate, at the young stages only bearing spiral striae. Later these are crossed by large transverse undulations. The last whorl is bicarinated, slightly convex and with spiral threads extending to the periphery of the umbilicus, which is smooth. Aperture depressed, very oblique, extended into the umbilicus. Trema elongated and placed far enough from the margin. The selenizone is placed on a

protruding angle, and has a rib on each side and a central depression. The internal mould has transverse folds. (Free translation from d'Orbigny, 1853, p. 389).

Distribution. Corallian of several French localities in Meuse, Yonne and Ardennes. Knight et al. (1960) indicates Callovian as the age.

Remarks. This species is the type of *Discotoma* Haber 1934. D'Orbigny (1853, p. 389), de Loriol (1893, p. 72) and Rollier (1918, p. 69) included *T. discoidea* Buvignier (non Roemer) as a synonym. On the other hand Hermite (1877, p. 694) regarded *D. amata* as a junior synonym of *T. discoidea* Roemer (but see discussion under *T. discoidea* Roemer here). Hudleston (1881, p. 119–121) re-interpreted the species *Trochus tornatilis* Phillips, 1829 as a *Trochotoma*, and regarded all nominal species included here in the *T. amata* group as junior synonyms of *T. tornatilis*, of which he illustrated two specimens from Yorkshire, one of them lacking the transverse folds. The original material was revised and figured by Fischer and Weber (1997).

***Trochotoma auris* Zittel, 1873**

1873 *Trochotoma auris* Zitt.; Zittel, p. 347–348, pl. 51, figs. 3–5.

1877 *Trochotoma auris* Zittel; Hermite, p. 695.

1882 *Trochotoma* cfr. *auris* Zittel; Schlosser, p. 99 (= 55).

? 1887 *Trochotoma auris* Zittel; de Loriol, 1887, p. 212–214, pl. 23, figs. 8–9.

1918 *Ditremaria auris* Zitt.; Rollier, p. 62.

1934 *Ditremaria (Discotoma) auris* (Zittel); Haber, p. 329, 371–373.

Etymology. Noun in apposition, obviously evoking resemblance to an ear.

Description. Shell disc-shaped, very low, widely umbilicated. The 5 slightly curved whorls form a very rapidly growing, very short spire. The surface ornamentation has numerous, very thin spiral ribs which weaken towards first whorls. The selenizone is limited by two keel-like raised ribs. Base slightly convex and ending in very wide funnel-like umbilicus. The base is decorated with raised, simple, unnotched spiral lines which become thinner to the inside, until they disappear completely. Aperture low, oblique. (Freely translated from Zittel, 1873, p. 347–348).

Comparisons. Zittel (1873) compared this species with *T. discoidea*, *T. amata* and *T. mastoidea*.

Distribution. Several localities near Stramberg (Czech Republic), late Jurassic.

Remarks. Haber (1934, p. 386) proposed the new name *Ditremaria (Discotoma) zitteli* for part of the original material described by Zittel (his pl. 51, fig. 5 only), and also the new name *Ditremaria (Discotoma) valfinensis* for the specimens described by de Loriol, 1887.

***Trochotoma(T.) bicarinata* (d'Orbigny, [1843] 1853) (Fig. 5.G)**

1843 *Ditremaria bicarinata* d'Orbigny, p. 277.

1853 *Ditremaria bicarinata* d'Orbigny, 380–381, pl. 340, figs. 8–11. (Fig. 5.G)

1960 *Trochotoma bicarinata* (d'Orb.), Knight et al., figs. 135.1a-b (reproduced from d'Orbigny 1853).

Type locality. Fontaine-Étoupe-Four (Calvados, France), Early Jurassic.

Etymology. Epithet obviously referring to the whorls bearing two keels.

Description. Trochoid depressed shell, wider than high, with large and deep umbilicus. Spire carinated, with subquadrate whorls, ornamented by irregular spiral threads and striae. The last whorls and the base are also striated, but the umbilicus is smooth and without callus. Aperture oblique. Trema elongated placed on the carina far from the aperture (freely translated from d'Orbigny, 1853, p. 380–381).

Remarks. This species was the only mentioned by D'Orbigny, 1843 (p. 277) when he proposed the genus name *Ditremaria*, and should thus be considered as its type species. D'Orbigny only described and figured it later (1853). This species was regarded as a synonym of *T. gradus* by some authors (Tawney, 1874, pl. 54; Hermite, 1877; Rollier, 1918, p. 54; Haber, 1934, p. 329; d'Orbigny, 1853, p. 380, Fischer & Weber, 1997, p. 150).

***Trochotoma (T.) brocastellensis* Moore, 1867 (Suppl. Fig. 2.C)**

1867 *Trochotoma Brocastellensis* spec. nov. Moore, p. 552, pl. 15, fig. 29. (Suppl. fig. 2.C)

1934 *Ditremaria (Ditremaria) brocastellensis* (Moore); Haber, p. 329–330.

Type material. Not designated, Moore only mentioned two specimens, Bath Museum.

Type locality. Brocastle, South Wales (Great Britain), Early Jurassic.

Etymology. Epithet refers to the type locality.

Description. «Shell turbinated, concave; apex obtuse, whorls five, having on their surfaces depressed transverse striae; base of the whorls bounded by an encircling rib, on which are three close-set striae, immediately beneath which is a slight sinus. The whorls are angulated (the upper portion of the body-whorl most so), and are ornamented by curved or oblique, depressed costae.» (Moore, 1867, p. 552).

Remarks. Haber (1934, p. 330) included *T. lycetti* Moore (*non* Hermité) in the synonymy of this species. Monari et al. (2011, p. 372) regarded this species as a junior synonym of *T. vetusta* Terquem.

***Trochotoma (T.) calix* (Phillips, 1829) (Fig. 5.A-C)**

1829 *Solarium calix* (Bean, MS.) Phillips, p. 157, 174, 191, pl. 11, fig. 30. (Fig. 5.A)

1850 *Trochotoma calix* Phillips, Lycett, p. 411.

non 1850a *Pleurotomaria Calix* d'Orb.; d'Orbigny, p. 267, n° 123.

non 1853 *Pleurotomaria calix*, d'Orbigny, p. 476, pl. 383, figs. 6-7.

1875 *Trochotoma calix*, Phillips, p. 259 (as *calyx*), 330, pl. 11, fig. 30.

1885 *Trochotoma calix* Phillips; Hudleston, p. 156, pl. 4, figs. 6, 6a, 6b [specimen re-illustrated in 1896, pl. 41, figs. 6a–c]. (Fig. 5.B)

1891 *Trochotoma calix* (Phillips); Woods, p. 115.

1896 *Trochotoma calix* Phillips, Hudleston, p. 445, pl. 41, figs. 1a–b, 6a–c, 7. (Fig. 5.C)

1918 *Ditremaria calix* Phil.; Rollier, p. 54.

1934 *Ditremaria (Ditremaria) calix* (Bean 1829) Rollier 1918; Haber, p. 330-332.

Type material. Hudleston (1896, p. 445–446) stated that the type specimen was not then at York, and there is no report of its whereabouts; it may have been lost when Phillips was robbed (Edmonds, 1977).

Type locality. Blue wick [= Blea Wyke], Cold moor, eastern Yorkshire, GB (Phillips, 1829, p. 157), Inferior Oolite (Middle Jurassic, Aalenian).

Etymology. Not given, obviously meaning shaped like a chalice (noun in apposition).

Description. There is no original description in Phillips (1829), but one specimen was illustrated and the name is available under ICZN Art. 12.2.7. Hudleston (1896) described what he called the «more depressed variety» as follows: «Shell trochiform, tabulate, and profoundly excavated. Whorls (five) nearly rectangular, with a close suture. In some specimens the whorls of the spire show only one keel; but in others, where the spire is relatively higher, a lower keel is exposed. The upper keel is situated at the angle, and carries the obliterated fissure-band. Spiral ornament regular and in raised lines, which are somewhat wide apart ... and rosy, the sides of the whorls being somewhat concave. The body-whorl exhibits a well-defined lower keel which is thick and subangular at the periphery; hence the body-whorl is strongly bicarinate and subconcave. The base is widely excavated. The aperture is depressed and oblique, but the available specimens from the Dogger do not admit of any close description. The loop is long and narrow, and its presence is often indicated on the upper keel by a raised border. In other specimens the loop, having been a source of weakness, causes a deflection in the continuity of the keel».

Comparisons. Tawney (1874, p. 54) listed this species as a possible synonym of *T. gradus* (= *T. bicarinata*? = *T. carinata*), to which he referred 5 specimens from Dundry (Great Britain). Hudleston (1896) proposed that *T. gradus*, *T. affinis* and *T. calix* are «little more than varieties of one tabulate form» and that all tabulate trochotomas are very much alike. He restricted *T. calix* to the smaller variety from the Cotteswolds, whilst he considered that *T. gradus* and *T. affinis*, from the Anglo-Norman area, are larger and more markedly tabular.

Distribution. Aalenian, Great Britain. Abundant in the *opalinus* Zone of Yorkshire and Frocester Hill, also in the *murchisonae* Zone (Oolite Marl horizon). Lycett (1850) listed this species from the Inferior Oolite of Minchinhampton.

Remarks. This was the first material belonging to this family to be illustrated (Phillips, 1829), and although the species was adequately described only much later (Hudleston 1885), it is evident that it was easily recognized and was soon identified as a synonym of *T. affinis* E.-Deslongchamps (Lycett, 1850, p. 411). The references by d'Orbigny (1850a and 1853) were referred to *T. imbricata* by Cossmann, 1885; see also

Hudleston(1896, p. 445). Part of the material figured by Hudleston (1896, pl. 41, fig. 1, «a variety from the Cotteswolds approaching *T. affinis* Deslongchamps») was later named *D. hudlestoni* by Rollier (1918).

***Trochotoma (T.) carinata* Lycett, 1850 (Fig. 5.D), non *Ditremaria carinata* Zittel 1873**

1850 *Trochotoma carinata* Lycett, p. 417.

1855 *Trochotoma canaliculata* [sic] Lycett; Pictet, p. 180.

1857 *Trochotoma carinata*; Lycett, p. 159, 167, pl. 4, fig. 5. (Fig. 5.D)

1877 *Trochotoma carinata* Ziet.; Hermite, p. 695.

1918 *Trochotoma carinata* Lyc.; Rollier, p. 56.

Type material. Lycett (1850) did not mention how many specimens he had, only said that the species was rare. He later figured (1857) only one shell.

Type locality. Cotteswold Hills, (Great Britain), occurring chiefly in the Lower Oolite rocks.

Etymology. Epithet obviously referring to its keeled whorls.

Description. Lycett, 1850, p. 417: «Moderately elevated, acuminate; whorls narrow, numerous, angulated, rendered concave both above and below by an elevated and acute carina; the first three or four whorls have closely arranged encircling striae crossed by others longitudinal, but the larger whorls are perfectly smooth, or have only the oblique lines of growth; the carina is formed by two parallel lines; the base is widely and deeply excavated; height 5/6ths of the basal diameter».

Distribution: Bathonian, Great Britain.

Remarks. This species was diagnosed by Lycett in 1850, but only figured some years later by the same author (1857). Tawney, 1874 (p. 54) listed it as a possible synonym of *gradus*; Hudleston(1896, p. 447), Rollier (1918, p. 56), and Haber (1934, p. 326) included it in the synonymy of *affinis*. The potential homonym *Ditremaria carinata* Zittel (1873) is doubtfully referable to the genus *Valfinia*.

***Trochotoma? clypeus* Terquem, 1855**

1855 *Trochotoma clypeus* Tqm.; Terquem, p. 268, pl. 16, figs. 9–9a.

1865 *Trochotoma clypeus* Terq.; Terquem & Piette, p. 55.

1867 *Trochotoma clypeus* Terq.; Moore, p. 533

1877 *Trochotoma clypeus* Terq.; Hermite, p. 698.

1918 *Ditremaria clypeus* Terq.; Rollier, p. 52.

1934 *Ditremaria (Ditremaria) clypeus* (Terquem); Haber, p. 332–333.

2011 *Trochotoma clypeus* Terquem; Monari et al., p. 374, fig. 16A.

Type locality. Hettangian at Hettange (France).

Etymology. Noun in apposition, probably meaning shaped like a shield.

Description. Shell incomplete, nearly two times wider than long, discoid, spire depressed and button-like; 5 whorls, convex near the suture, ornamented by five obsolete longitudinal striae, the two posterior and three anterior limit a straight band placed on the angle; last whorl with a large expansion that forms an obtuse carina; subquadrangular aperture; base flat, ornamented by fine concentric striae up to the edge of the excavation, which is large. (Free translation from Terquem, 1855, p. 268).

Distribution. Late Hettangian of Hettange (France) and Brouch (Luxembourg) according to Monari *et al.* (2011); Moore (1867, p. 533) mentioned this species from the Early Jurassic of South Wales.

Remarks. Hermite (1877, p. 690) doubted about the placement of this species within *Trochotoma* as he did not see the diagnostic characters. This species was recently reviewed by Monari *et al.* (2011), who provided a good description but did not mention or figured the trema either; nevertheless, they referred the species to *Trochotoma*.

***Trochotoma (T.) conuloides* Eudes-Deslongchamps, 1843 (Suppl. Fig. 1.A, 1.E?)**

1843 *Trochotoma conuloides* E.-D., Eudes-Deslongchamps, p. 109, pl. 8, figs. 16–19. (Suppl. fig. 1.A)

? 1843 *Trochotoma conica* Eudes-Deslongchamps, p. 102, footnote 2 (error pro *conuloides*?)

1850a *Ditremaria conuloides* d'Orb.; d'Orbigny, p. 301, n° 91.

1851 *Trochotoma conuloides*; Woodward, p. 148, pl. 10, fig. 26.

? 1851 *Trochotoma conuloides* Desl.; Morris & Lycett, p. 82, pl. 10, fig. 16. (Suppl. fig. 1.E)

- 1853 *Ditremaria conuloides* d'Orb.; d'Orbigny, p. 385–386, pl. 341, figs. 14–17.
 1877 *Trochotoma conuloides* Eudes Desl.; Hermite, p. 692–693, pl. 14, figs. 4–5.
 1885 *Trochotoma conuloides* Deslongchamps; Cossmann, p. 311–312, pl. 10, figs. 38–39.
 1918 *Ditremaria conuloides* Eudes-Desl.; Rollier, p. 59–60.
 1934 *Ditremaria (Ditremaria) conuloides* (Deslongchamps sen.); Haber, p. 334–335.
 1997 *Trochotoma conuloides* Eudes-Deslongchamps; Fischer and Weber, p. 152, pl. 24, fig. 10.

Type material. 12 to 15 specimens, no types designated.

Type locality. Langrune (France), «pierre blanche», Bathonian, common.

Etymology. Epithet refers to its conical shape.

Description. Conical shell, with acute apex; 5 or 6 striated whorls, limited by a spiral line, last whorl somewhat enlarged near the aperture; striated base slightly convex near the periphery but with a deep umbilicus (freely translated from Eudes-Deslongchamps, 1843, p. 109).

Comparisons. According to d'Orbigny (1853) the species is very similar to *T. acuminata*, which occurs in the same beds, but they differ by the convexity of the whorls. See also remarks under *T. acuminata*.

Distribution. Bathonian of France and possibly also Great Britain.

Remarks. This species was designated type of the genus *Trochotoma* by Woodward (1851, p. 148). Cossmann (1885) discussed the previously figured material and concluded that d'Orbigny's (1853) figures do not accurately represent the species, and regarded Hermite's (1877) figure as the most exact. According to Eudes-Deslongchamps (1843) this species does not show variability. British specimens referred to *T. conuloides* described by Morris & Lycett (1851, p. 82) were later called *T. lycetti* by Hermitte (1877), and included in the synonymy of *T. obtusa* by Cox & Arkell (1950), and Fischer (1964, 1969).

***Trochotoma (Placotoma) cossmanni* (Rollier, 1918) (Suppl. Fig. 6.F)**

- 1918 *Ditremaria Cossmanni* sp. nov.; Rollier, p. 59.
 1934 *Ditremaria (Discotoma) cossmanni* (Rollier); Haber, p. 374–375.
 1964 *Trochotoma (Discotoma) cossmanni* (Rollier); Fischer, p. 50, pl. 2, figs. 10–11.
 1969 *Trochotoma (Discotoma) cossmanni* (Rollier); Fischer, p. 125.

Type locality. Saint Gaultier, Indre (France), upper Bathonian.

Etymology. Dedicated to the French palaeontologist M. Cossmann.

Description. «Shell discoidal, slightly convex, base concave, widely umbilicated; whorls (3) depressed, rather convex, transversely lineated, lines impressed by closely-arranged longitudinal and very fine oblique striae; lines upon de base acute; aperture depressed and excavated. We have never been able to discover an open fissure upon this small species, but the general figure agrees with this genus so well that we have not ventured to assign it to any other. Four lines are visible upon the lower and seven upon the upper face of the last volution, which is angular or step-like; the first two turns are smooth and rounded.» (Morris & Lycett 1851, p. 84).

Distribution. Bathonian of France and Great Britain.

Remarks. Rollier (1918, p. 59) proposed this species name for the Bathonian material from St. Gaultier (France) that Cossmann (1900, p. 581–582 [39–40], pl. 16, figs. 3–5; Fig. 11.F) referred to *T. imbricata*, together with the specimens referred by Morris & Lycett (1851, p. 84, pl. 10, figs. 10a-c; Fig. 11.D here) to *T. discoidea*, later re-named *D. chordulata* by Haber (1934). *T. (P.) cossmanni* is one of the few species which have been illustrated by good photographs (Cossmann 1900, Fischer 1964). Fischer (1969, p 125) included *T. petrariae* Bigot as a junior synonym of this species.

***Trochotoma (Placotoma) depressiuscula* Lycett, 1850 (Suppl. Fig. 6.C)**

- 1850 *Trochotoma depressiuscula*, Lycett, p. 411, 417.
 1853 *Trochotoma depressiuscula*, Lycett, p. 78.
 1855 *Trochotoma depressiuscula* Lycett; Pictet, p. 180.
 1896 *Trochotoma depressiuscula*, Lycett; Hudleston, p. 448, pl. 41, fig. 10. (Suppl. fig. 6.C)
 1918 *Ditremaria depressiuscula* (Lycett); Rollier, p. 56.
 1934 *Ditremaria (Ditremaria) depressiuscula* (Lycett); Haber, p. 337.

Type material. Type specimen in the Jermyn Street Museum (Hudleston 1896, p. 448).

Type locality. Midford (Great Britain), Bajocian.

Etymology. Epithet evidently referring to its rather low, depressed lateral profile.

Description. «Depressed; whorls five, narrow and angulated; ribs below the angle three, above more numerous. Upper surface of the whorls concave, lower flattened; base striated, excavation large not deep, height half the basal diameter» (Lycett, 1850, p. 417).

Comparisons. Hudleston (1896) thought this species to be related to *T. discoidea* Roemer.

Distribution. Middle Jurassic, Gloucestershire (Great Britain).

Remarks. Lycett (1850) only provided a diagnosis of this species, but did not illustrate it. His material was only figured many years later by Hudleston (1896).

***Trochotoma (T.) desoriana* (Cotteau, 1854)**

1854 *Ditremaria desoriana* Cotteau, p. 36–37 (description only).

1918 *Ditremaria Desoriana* Cotteau; Rollier, p. 57.

Type locality. Aisy, Yonne (France), Bathonian.

Etymology. Dedicated to the palaeontologist E. Desor, from Switzerland.

Description. With longitudinal (spiral) threads and a double carina bearing the selenizone, it is distinguished from *D. globulus* by a taller spire, and wider umbilicus. (Freely translated from Cotteau, 1854, p. 36).

Remarks. Cotteau (1854) did not figure this species, and compared it with *D. globulus*, which is now referable to *Valfinia*. On the other hand, Cossmann (1885, p. 307) saw the original specimens and included *D. desoriana* as a synonym of *T. tabulata* Morris & Lycett, while Fischer (1969) regarded it as a junior synonym of *T. extensa* Morris & Lycett.

***Trochotoma? discoidea* (Roemer 1836 non Buvignier, 1852) (Suppl. Fig. 4.E)**

1836 *Trochus discoideus* Nob.; Roemer, p. 150, pl. 11, fig. 12. (Suppl. fig. 4.E)

1850a *Trochus discoideus* Roemer; d'Orbigny, p. 354, n° 106.

non 1851 *Trochotoma discoidea* Roëmer; Morris & Lycett, p. 84, pl. 10, figs. 10, 10a–c.

1877 *Trochotoma discoidea* Roemer; Hermite, p. 694.

1918 *Ditremaria discoidea* Roemer; Rollier, p. 61.

1934 *Ditremaria (Discotoma) discoidea* (Roemer); Haber, p. 337, 375-378.

Type locality. Coral rag at Spitzhute near Hildesheim, Kimmeridgian?

Etymology. Epithet evidently referring to its discoidal shape.

Description. Discoidal plano-convex shell, with concave umbilicated base, 2-3 subconvex depressed whorls densely ornamented by spiral lines, depressed-ovate aperture. (Freely translated from Roemer's diagnosis, 1836, p. 150).

Remarks. Although no mention of trema is made in the original description (Roemer 1836), and the figure does not show this feature, this nominal species was related to *Trochotoma* by Morris & Lycett (1851) and later by Hermite (1877) and Rollier (1918). Morris & Lycett (1851) assigned to this species Bathonian carinated shells (quite different from Roemer's specimen), which were later referred to *T. funiculosa* by Cossmann (1885), to *T. cossmanni* by Rollier (1918), and re-named *D. chordulata* by Haber (1934). After Morris & Lycett's misidentification, other authors followed them and referred to Roemer's species Late Jurassic low carinated shells with radial folds (clearly different from the specimen illustrated by Roemer), which were soon known as *Trochotoma discoidea* Buvignier 1852 (*non* Roemer 1836), which is a *T. (Placotoma)*, closely related to, or even a junior synonym of, the type species of this subgenus, *T. amata* (d'Orbigny 1850b). To be adequately settled, this matter needs a revision of all material involved; pending this, we are treating *T. discoidea* (Roemer) and *T. discoidea* Buvignier as different species, the first one only doubtfully referred to *Trochotoma* and included in this group, the last one referable to *T. (Placotoma)*.

***Trochotoma (Placotoma) discoidea* Buvignier, 1852 non Roemer, 1836 (Suppl. Fig. 5.D)**

1852 *Trochotoma discoidea* Buv.; Buvignier, p. 39, pl. 25, figs. 10–11. (Suppl. fig. 5.D)

1861 *Dit. discoidea*, Et.; Thurmman & Étallon, p. 131, pl. 12, fig. 107.

1862a *Ditremaria discoidea* Et.; Étallon, p. 115.

1862b *Ditremaria discoidea* Et.; Étallon, p. 248.

1874 *Trochotoma discoidea* Römer; Brauns, p. 231–232.

1882 *Trochotoma discoidea* Buv.; Schlosser, p. 99, pl. 13, figs. 17–17a.

1918 *Trochotoma discoidea* Buv. (non Roem. sp.); Rollier, p. 60

Type locality. Coral rag, Verdun, Maxey, Douaumont (France).

Etymology. Epithet evidently referring to its discoidal shape.

Description. Orbicular depressed shell, sub-discoidal, ornamented by small ribs parallel to the suture, crossed by very fine growth-lines; spire whorls bicarinated, convex behind the posterior carina, over which the trema is placed; slightly concave between the two carinae; umbilicus very wide, aperture subtriangular. (Free translation from Buvignier, 1852, p. 39).

Remarks. D'Orbigny (1853) included this species as a junior synonym of *D. amata*, while Étallon (1862a) regarded it as the senior synonym. See discussion under *T. ? discoidea* (Roemer), which may be regarded as a senior secondary homonym of *T. discoidea* Buvignier. The specimens described by Schlosser (1882) were re-named *Ditremaria (Discotoma) schlosseri* Haber (1934, p. 383).

***Trochotoma? (Placotoma?) distefanoi* Fucini, 1913**

1903 *Trochotoma Di Stefanoi* Scalia, p. 37. (only listed)

1913 *Trochotoma Di Stefanoi* Sc.; Fucini, p. 2–3, pl. 1, figs. 1–2.

1934 *Ditremaria (Ditremaria) di stefanoi* (Scalia) ; Haber, p. 337, 361-362.

Type material. The specimen figured by Fucini (1913) is housed in the Pisa Museum.

Type locality. Montagne del Casale, Palermo, Sicily (Italy), Sinemurian.

Etymology. Dedicated to the Italian palaeontologist G. Di Stefano.

Description. Shell wider than high, with depressed, scalariform, conical spire. The whorls, separated by a channelled suture, are angular and have a carina at about the first third of their height, which divides the whorl into two parts, the lower one flat and the upper one slightly concave.

***Trochotoma (T.) extensa* Morris & Lycett, 1851(Suppl. Fig. 2.A)**

1851 *Trochotoma extensa* Morris & Lycett, p. 83, pl. 10, fig. 19a–19b. (Suppl. fig. 2.A)

1877 *Trochotoma extensa* Morr. et Lyc.; Hermite, p. 693.

1885 *Trochotoma extensa* Morris et Lycett; Cossmann, p. 313–314, pl. 11, fig. 26–27.

1918 *Ditremaria extensa* Morr. a. Lyc.); Rollier, p. 58.

1934 *Ditremaria (Ditremaria) extensa* (Morris and Lycett); Haber, p. 338-339.

1969 *Trochotoma extensa* Morris et Lycett; Fischer, p. 124, pl. 14, figs. 19a–b.

Type locality. Minchinhampton (Great Britain), Great Oolite (Bathonian).

Etymology. Epithet probably referring to its extremely wide base.

Description. «Shell conical; apex obtuse, depressed; whorls (4, 5) subangular, flattened, and smooth; base wide, rather convex; cavity large and deep. This is by far the largest and most rare of the Great Oolite species, the base is enormously wide, and the cavity very large. Height 16 lines, basal diameter 30 lines» (Morris & Lycett, 1851, p. 83).

Distribution. Bathonian of Great Britain and France.

Remarks. The specimens referred to this species by Cossmann (1885) were included in *T. imbricata* by some authors. Fischer (1969) provided some critical comments on the synonymy of this species, including as synonyms *Ditremaria desoriana* Cotteau, 1854, p. 220, *T. tabulata* in Cossmann, 1885, *T. imbricata* Cossmann, 1885, and *D. cotteuana* Haber, 1934, p. 335.

***Trochotoma (T.) funata* Lycett, 1850**

1850 *Trochotoma funata* Lycett, p. 411, 417 (description only)

1855 *Trochotoma funata* Lycett; Pictet, p. 180.

1896 *Trochotoma funata* Lycett ; Hudleston, p. 450, pl. 51, figs. 5a–b

1918 *Ditremaria funata* (Lycett); Rollier, p. 55.

1934 *Ditremaria (Ditremaria) funata* (Lycett); Haber, p. 339-340.

Type locality. Nailsworth, Cotteswold hills (Great Britain), Aalenian.

Etymology. Epithet probably referring to its ornamentation with (granulated) cords.

Description. «Elevated, acuminate, nearly smooth; whorls convex, their lower portions flattened, with numerous encircling granulated ribs, faintly traced, basal excavation contracted. Height about equal to the basal diameter» (Lycett, 1850, p. 417).

Remarks. This species was only described by Lycett (1850) but the original material was not available to Hudleston (1896), who figured a new specimen fitting Lycett's description.

***Trochotoma (Placotoma) funiculosa* Cossmann, 1885 (Suppl. Fig. 6.D-E)**

1885 *Trochotoma funiculosa* Cossmann, p. 209, pl. 10, figs. 36–37. (Suppl. fig. 6.E)

1918 *Ditremaria funiculosa* Cossmann; Rollier, p. 58.

1934 *Ditremaria (Discotoma) funiculosa* Cossmann; Haber, p. 379.

1950 *Trochotoma (Discotoma) funiculosa* Cossmann; Cox & Arkell, p. 51.

1969 *Trochotoma (Discotoma) funiculosa* Cossmann; Fischer, p. 124, pl. 14, figs. 22a–c.

Type material. Figured specimen from Eudes-Deslongchamps collection.

Type locality. Séz, Orne (France), middle Bathonian.

Etymology. Epithet probably referring to its ornamentation with (spiral) cords.

Description. This is a depressed shell, with numerous angular whorls, ornamented by 5 thick spiral cords, which are slightly granulose due to the intersection with growth-lines. The umbilicus is wide and reaches almost the base periphery in the last whorl. (Freely translated from Cossmann, 1885, p. 209).

Comparisons. According to Fischer (1969) this species differs from *T. cossmanni* by its two strong carinae separated by a vertical space, and details of the umbilical region.

Distribution. Bathonian of France and Great Britain.

Remarks. Cossmann (1885) included in his new species the material referred by Morris & Lycett (1851) to *T. discoidea* (see Fig. 11.D here), and this was confirmed by Cox & Arkell (1950). *Ditremaria chordulata* Haber, 1934 is regarded as a junior synonym of this species (see Fischer, 1969, p. 124).

***Trochotoma? gemmellaroi* (Haber, 1934)**

1879 *Ditremaria* sp. n. Gemmellaro, p. 198, pl. 6, figs. 18-19.

1882 *Ditremaria* sp. n. Gemmellaro, p. 370, pl. 28, figs. 18-19. (reprint from 1879)

1934 *Ditremaria (Ditremaria) gemmellaroi* nov. spec. Haber, p. 340.

Type material. Museo de la Università di Palermo.

Type locality. Montagne del Casale, Palermo, Sicily (Italy), Sinemurian.

Etymology. Dedicated to the Italian palaeontologist G. Gemmellaro.

Remarks. Gemmellaro (1879) did not describe this species, merely mentioned it in the discussion of *D. gradata*. This species was proposed by Haber for the material figured by Gemmellaro (1879) as *Ditremaria* sp.

***Trochotoma (T.) gigantea* Zittel, 1873**

1873 *Trochotoma gigantea* Zitt.; Zittel, p. 345-346, pl. 51, figs. 1a-d, 2.

1877 *Trochotoma gigantea* Zittel; Hermite, p. 695.

1882 *Trochotoma* cfr. *gigantea* Zitt. ; Schlosser, p. 100.

1918 *Ditremaria gigantea* Zitt.; Rollier, p. 62.

1934 *Ditremaria (Ditremaria) gigantea* (Zittel); Haber, p. 340-341

Type material. In Geologische Bundesanstalt in Wien. Haber (1934, p. 340) designated Zittel, 1873, pl. 51, fig. 1 as lectotype.

Type locality. Stramberg, Czeck Rep., Tithonian.

Etymology. Epithet obviously referring to its very large size.

Comparisons. Zittel (1873) compared it with *T. rathieriana* and *T. scalaris*.

Distribution. The species was reported as common in Stramberg and present also in other Czeck localities by Zittel (1873).

Remarks. Schlosser (1882) included *D. scalaris* d'Orbigny and *T. gigantea* Zitt. as synonyms.

***Trochotoma (T.) gradata* (Gemmellaro, 1879)**

1879 *Ditremaria gradata*, Gemm., Gemmellaro, p. 198–199, pl. 6, fig. 17.

1882 *Ditremaria gradata*, Gemm., Gemmellaro, p. 370, pl. 28, fig. 17 (reprint of 1879).

1934 *Ditremaria (Ditremaria) gradata* Gemmellaro; Haber, p. 341–342.

Type material. One specimen, Museo di Geologia e Mineralogia della R. Università di Palermo.

Type locality. Calcarea cristallina, Montagna del Casale, Palermo (Sicily, Italy), Early Jurassic (Sinemurian).

Etymology. Epithet refers to stepped profile.

Description. Trochoid shell, a bit wider than high, gradate, with a spiral carina dividing the surface of each whorl in a flat posterior part and a slightly concave anterior one, this last ornamented with a central sulcus and 5 spiral striae, 2 between the sulcus and the suture. The flanks are ornamented by 4 spiral striae. Last whorl almost bicarinated. Base convex and striated with a smooth deep umbilicus. Aperture with callosities on the columellar lip. Trema not well preserved, at about 5 mm from the aperture (freely translated from Gemmellaro, 1879, p. 198).

Comparisons. Very similar to *D. trochoides* Gemmellaro according to this author (1879). Comparisons are difficult since only a basal view was illustrated by Gemmellaro.

***Trochotoma (T.) gradus* Eudes-Deslongchamps, 1843 (Fig. 5.H-I)**

1843 *Trochotoma gradus* E.-D., Eudes-Deslongchamps, p. 106, pl. 8, figs. 4–7. (Fig. 5.H)

1855 *Trochotoma gradus* Desl.; Pictet, p. 180.

1868 *Trochotoma gradus* (Desl.); Eudes-Deslongchamps, p. 218, pl. 4, figs. 2a–b. (Fig. 5.I)

1874 *Trochotoma gradus*, Deslongchamps; Tawney, p. 53.

1877 *Trochotoma gradus*, Eudes Desl.; Hermite, p. 690.

1896 *Trochotoma gradus*, Deslongchamps; Hudleston, p. 447, pl. 41, figs. 2–3.

1918 *Ditremaria gradus* Eudes-Desl.; Rollier, p. 54.

1934 *Ditremaria (Ditremaria) gradus* (Deslongchamps sen.); Haber, p. 342–343.

1997 *Trochotoma gradus* Eudes-Deslongchamps ; Fischer and Weber, p. 150–151, pl. 24, fig. 5.

Type material. 8–10 specimens. Musée de Caen.

Type locality. Fontaine-Etoupe-four, Normandy (France); late Early Jurassic.

Etymology. «Trochotome escalier», i.e. stair-like (noun in apposition).

Description. Conical shell, somewhat depressed at the apex; spire with 6 to 7 subquadrate whorls, medially angulated with a prominent marginal keel, producing a stair-like profile; with few regular spiral striae; base excavated with a striated periphery, and umbilicus large and deep (freely translated from Eudes-Deslongchamps, 1843, p. 106).

Distribution. Toarcian, France and Great Britain. Tawney described 5 specimens from Dundry (GB) housed in the Bristol Museum.

Remarks. Eudes-Deslongchamps remarked that there is no morphological variation in shell shape. This species was generally regarded as a synonym of *T. bicarinata* (d'Orbigny) (Tawney, 1874; Hermite, 1877; Rollier, 1918; Haber, 1934). It is the type of *Ditremaria* according to Rollier (1918, p. 54), but see also Haber (1934, p. 321). Material in Hudleston (1896) was called *D. somertonensis* by Rollier (1918).

***Trochotoma (T.) haueri* Hörnes in Hauer, 1853**

1853 *Trochotoma Haueri* Hörn. in Hauer, p. 763 (description only).

Etymology. Dedicated to the Austrian palaeontologist F. von Hauer.

Description. Similar to *rathieriana* but smaller and more acute, apical angle 60°, with 6 to 7 whorls, height 20 mm, width 17 mm. (Translated from Hauer, 1853, p. 763).

Remarks. This species from the early Jurassic (Sinemurian-Pliensbachian?) of Germany was apparently never figured or mentioned again.

***Trochotoma hermitei* Gemmellaro, 1879 (Suppl. Fig. 3.D)**

1879 *Trochotoma Hermitei*, Gemm.; Gemmellaro, p. 196, pl. 5, figs. 65–68. (Suppl. fig. 3.D)

1882 *Trochotoma Hermitei*, Gemm.; Gemmellaro, p. 368, pl. 27, figs. 65–68 (reprint of 1879).

1934 *Ditremaria (Ditremaria) hermitei* (Gemmellaro); Haber, p. 345.

Type material. Several specimens, two illustrated. Museo di Geologia e Mineralogia della R. Università di Palermo.

Type locality. Calcare cristallino bianco, Montagna del Casale, Palermo, Sicily, Early Jurassic (Sinemurian).

Etymology. Dedicated to the French palaeontologist H. Hermite.

Description. Thick, almost trochiform shell, depressed with a low spire. Teleoconch consists of 5 regularly convex whorls ornamented by narrow sulci. Last whorl externally rounded, with a convex base, striated at the periphery but with a smooth and very deep umbilicus. Trema badly known, about 6 mm from aperture. (Freely translated from Gemmellaro, 1879, p. 196).

Remarks. The potential homonym *Ditremaria hermitei* de Loriol 1887 was apparently not referred to *Trochotoma* by any author, but it was nevertheless re-named *Trochotoma lorioli* Cossmann, 1902, and is now assigned to *Valfinia*.

***Trochotoma (T.) hudlestoni* (Rollier, 1918)**

1918 *Ditremaria Hudlestoni* sp. nov., Rollier, p. 55.

Type locality. Nailsworth Hill (Gloucester, Great Britain), late Aalenian.

Etymology. Dedicated to the British palaeontologist W.H. Hudleston.

Remarks. Rollier (1918, p. 55) proposed this name for the specimen figured by Hudleston (1885, pl. 4, fig. 1 only) as *Trochotoma calix*, which he distinguished for being higher than Phillips' species. This does not seem to justify a new name.

***Trochotoma (T.) imbricata* Cossmann, 1885 (Suppl. Fig. 2.D)**

1885 *Trochotoma imbricata* Cossmann, p. 308–309, pl. 8, fig. 18. (Suppl. fig. 2.D)

non 1900 *Trochotoma imbricata* Cossmann; Cossmann, p. 581, pl. 16, figs. 3–5.

1918 *Ditremaria imbricata* Cossmann; Rollier, p. 58–59.

1934 *Ditremaria (Ditremaria) imbricata* Cossmann; Haber, p. 346–347.

Type material. The figured specimens is from Cossmann's collection.

Type locality. Middle Bathonian beds at Éparcy (France).

Etymology. Epithet referring to the imbricated threads of its ornamentation.

Description. Shell with low spire, with 6 angular whorls, gradate, divided into two almost equal parts by a carina, accompanied by a canal. The shell is ornamented by low imbricated spiral threads and striae. The base is umbilicated and has a dozen imbricated striae, decreasing towards the umbilicus. The aperture is not preserved but it is referred to *Trochotoma* on the basis of the basal features. (Freely translated from Cossmann, 1885, p. 308).

Distribution. Bajocian and Bathonian of several localities in France.

Remarks. Cossmann (1885) included here the material identified as *D. calix* by d'Orbigny (1850a, 1853). The specimens from the Bathonian of St. Gaultier (France) he later (1900) referred to this species belong to a different taxon, named *D. cossmanni* by Rollier (1918, p. 59).

***Trochotoma (T.) infundibulum* (Étallon, 1862a)**

1862a *Ditremaria infundibulum* Et.; Étallon, p. 114–115 (description only).

1862b *Ditremaria infundibuliformis* Et ; Étallon, p. 12.

1934 *Ditremaria (Ditremaria) infundibulum* Étallon; Haber, p. 347.

Type locality. Valfin (France), Oxfordian.

Etymology. Noun in apposition apparently referring to the large umbilicus resembling a funnel.

Description. Shell much wider than high, ornamented by threads, umbilicus large, spire a bit concave, whorls carinated, rounded, gradate, last whorl much larger than previous ones, rounded ; aperture subquadrate, columellar lip irregular with teeth. (Freely translated from Étallon, 1862a, p. 114).

Remarks. This species was apparently never figured or mentioned again, and Étallon (1862a) described it as a depressed variety of *T. ratheriana*..

***Trochotoma? lycetti* Moore, 1867 (Suppl. Fig. 4.F)**

1867 *Trochotoma Lycetti* spec. nov. Moore, p. 552–553, pl. 15, figs. 27–28. (Suppl. fig. .F)

Type locality. Brocastle, South Wales (Great Britain), Early Jurassic.

Etymology. Dedicated to Dr. Lycett. «to whose researches we are indebted for the separation of this genus from the *Pleurotomaria*».

Description. «Shell discoidal, depressed; spire flattened; apex rather acute; whorls five, with numerous encircling striae, those in the centre and at the base of each volution being most elevated; the upper margin of the whorls flattened or angular, with irregular curved or almost obsolete lines of growth. The basal margin of the shell is surrounded by a raised rim composed of three or four slightly nodulated striae. Base of the shell and umbilicus deeply excavated and surrounded by very distinct encircling striae.» (Moore, 1867).

Remarks. The figure in Moore (1876) is poor; this species may be a junior synonym of *T. clypeus* Terquem or, as pointed out by Haber (1934), of *T. brocastellensis* Moore. It is a junior homonym of *Trochotoma lycetti* Hermite, 1877.

***Trochotoma (T.) magnifica* Cossmann, 1885 (Fig. 5.C)**

1885 *Trochotoma magnifica* Cossmann, p. 305–306, pl. 8, figs. 15–17. (Fig. 6.C)

1900 *Trochotoma magnifica* Cossmann; Cossmann, p. 581 [39], pl. 14, figs. 10–11.

1918 *Ditremaria magnifica* Cossmann; Rollier, p. 56.

1934 *Ditremaria (Ditremaria) magnifica* (Cossmann); Haber, p. 350.

Type material. Not designated, figured specimen from Rigaux collection.

Type locality. Hidrequent (France), Lower Bathonian.

Etymology. Epithet meaning splendid, magnificent.

Description. Nice shell with a *Trochus* or *Pleurotomaria* external form. Spire very high with 5 or 6 gradate whorls. The obtuse and rounded carina is placed on the apical third of each whorl, 3 fine threads between the carina and the suture. Last whorl about 2/5 of total height, bicarinated, with a concave space between carinae. Base with about 12 concentric striae near the border, which are smaller towards the umbilicus. Umbilicus deep with a small thickening on the columellar lip. Aperture subquadrangular, with a double tooth at the base. Trema elongated and with both extremes wider, placed on the shell angulation. (Freely translated from Cossmann, 1885, p. 305-306).

Distribution. Bathonian, several localities in France.

Remarks. Fischer (1969) treated this species as a junior synonym of *T. obtusa*.

***Trochotoma mastoidea* (Étallon in Thurmann & Étallon, 1861) (Suppl. Fig. 4.A-C)**

1861 *Dit. mastoidea* Et.; Thurmann & Étallon, p. 131–132, pl. 12, fig. 108. (Fig. 9.A)

1862a *Ditremaria mastoidea* Et.; Étallon, p. 116.

1862b *Ditremaria mastoidea* Et.; Étallon, p. 248.

1863 *Ditremaria mastoidea* Et.; Étallon, p. 455.

non 1870 *Ditremaria mastoidea* Et.; Greppin, p. 88.

1887 *Trochotoma mastoidea* Étallon; de Loriol, p. 214–215, pl. 23, figs. 10–11. (Fig. 9.B)

1913 *Trochotoma mastoidea* (Et.); Favre in Joukowsky & Favre, p. 426, pl. 26, fig. 1. (Fig. 9.C)

1918 *Ditremaria mastoidea* Et.; Rollier, p. 61.

1934 *Ditremaria (Discotoma) mastoidea* (Étallon); Haber, p. 350, 379-381.

1998 *Trochotoma (Discotoma) mastoidea* (Étallon); Bertling & Insalaco, p. 154.

Type locality. Caquerelle, Valfin (France), Corallian (Oxfordian).

Etymology. Epithet probably evoking a fancied resemblance of its lateral profile to a breast.

Description. Small and depressed shell, ornamented and with large umbilicus; much wider than high; spiral angle convex, with rounded whorls, separated by a well marked suture; selenizone between two cords; aperture depressed. Ornamented by 12 equal ribs, granulated when crossed by growth-lines; one granulated rib between the external carina and the selenizone. (Free translation from Étallon in Thurmann & Étallon, 1861, p. 131–132).

Remarks. Specimens assigned to this species by Greppin (1870) were later referred to *T. amata* by de Loriol (1890, p. 159). The specimens figured by de Loriol (1887) were named as a new variety by Haber (1884): *D. (Discotoma) mastoidea sequanica*.

***Trochotoma? (Placotoma?) maubertensis* Terquem & Piette, 1865**

1865 *Trochotoma maubertense* Terq. et Piette; Terquem & Piette, p. 55, pl. 4, figs. 17–18.

1877 *Trochotoma Maubertense* Terq. et Piette; Hermite, p. 689.

1918 *Ditremaria Maubertensis* Terq. et Piette; Rollier, p. 52.

1934 *Ditremaria (Ditremaria) maubertense* (Terquem et Piette); Haber, p. 351.

non 1988 *Trochotoma maubertense* Terquem and Piette; Meier & Meiers, p. 33, pl. 7, figs. 16a–b.

Type locality. Abundant at Maubert-Fontaine (northern France), Hettangian.

Etymology. The specific name refers to the type locality.

Description. Depressed moulds, more than twice wider than high, spire very short, with 5 graded whorls, ornamented by serrated transversal striae and fine longitudinal [spiral] ribs, granulated, angular carina with slongated granulations; sinus band depressed, placed at the middle of the whorl; aperture subquadrangular; base slightly convex ornamented by striae and ribs, umbilicus very large. (Freely translated from Terquem & Piette, 1865, p. 55).

Comparisons. The distinctive features are, according to Terquem & Piette (1865), the cancellate ornamentation and the subquadrangular aperture.

Remarks. This species is probably not a *Trochotoma*. Already Hermite (1877, p. 690) doubted about referring this species to *Trochotoma* as he did not see the diagnostic characters. The material referred to this species by Meier & Meiers (1988) was described as a new species of *Anodomaria* by Monari et al. (2011, p. 367).

***Trochotoma (T.) meneghinii* Gemmellaro, 1879 (Suppl. Fig. 1.F)**

1879 *Trochotoma Meneghinii* Gemmellaro, p. 195–196, pl. 6, figs. 11–12.

? 1879 *Trochotoma* n. sp.; Gemmellaro, p. 194–195, pl. 5, figs. 69–70.

1882 *Trochotoma Meneghinii* Gemmellaro, p. 367, pl. 28, figs. 11–12 (reprint of 1879). (Fig. 5.F)

? 1882 *Trochotoma* n. sp.; Gemmellaro, pl. 27, fig. 69–70 (reprint of 1879).

non 1966 *Trochotoma meneghinii* Gemm.; Bourrouilh, p. 43, fig. 17.

1934 *Ditremaria (Ditremaria) meneghinii* (Gemmellaro); Haber, p. 351–352.

? 1934 *Ditremaria (Ditremaria) bellampensis* Haber nov. spec.; Haber, p. 329.

Type material. Several specimens housed at Museo di Geologia e Mineralogia della R. Università di Palermo. No type designated.

Type locality. Montagna del Casale, Palermo, Sicily (Italy), Sinemurian, common.

Etymology. Dedicated to the Italian palaeontologist G. Meneghini.

Description. Conical-turbinated shell, a bit wider than high and slightly gradate. High and acute spire, apical angle regular. Nine slightly angular, longitudinally striated whorls. Base flat and concentrically striated with a deep infundibuliform and smooth umbilicus. Trema not well preserved, on internal moulds it is located very near the aperture. Aperture oblique, compressed, with a slight sinuosity on the columellar lip (freely translated from Gemmellaro, 1879, p. 195)

Comparisons. Gemmellaro (1879) compared it with *T. vetusta* Terq.

Remarks. Gemmellaro (1879, p. 194–195, pl. 5, figs. 69–70) described as a new species (not named) one large specimen from the same locality which could belong here. This specimen was later named as *D. bellampensis* by Haber (1934, p. 329). The material from the Early Jurassic of Morocco figured by Bourrouilh (1966) was regarded by Fischer et al. (2002, p. 444) and Monari et al. (2011) as synonym of *T. vetusta*, treated below in Group 3.

***Trochotoma? (Placotoma?) multicincta* (Schübler in Zieten, 1832) (Suppl. Fig. 6.H)**

1832 *Trochus multicinctus* Schübler; Zieten, p. 45, pl. 34, fig. 1. (Fig. 11.H)

1850a *Pleurotomaria multicinctus* d'Orb.; d'Orbigny, p. 250, n° 117.

non 1858 *Pleurotomaria multicincta*; Quenstedt, p. 157–158, 160, pl. 19, fig. 42.

? 1871 *Pleurotomaria multicincta*; Brauns, p. 280.

? 1884 *Pleurotomaria multicincta*; Quenstedt, p. 355.

non 1907 *Pleurotomaria multicincta* Zieten; Sieberer, p. 16, pl. 1, figs. 8a–b.

1918 *Ditremaria multicincta* (Schübler) v. Zieten; Rollier, p. 52–53.

Type locality. Near Boll (Wurttemberg, Germany), Early Jurassic marls.

Etymology. Epithet meaning “with many girdles or belts”

Distribution. Lias γ from Swabia and France, i.e. Pliensbachian.

Remarks. The records by Quenstedt (1858) and Sieberer (1907) clearly belong to a different species. This species was referred to *Ditremaria* by Rollier (1918, p. 52) and is thus included here, but it lacks the diagnostic characters of this group, such as the presence of a trema.

***Trochotoma? (Placotoma?) nucleus* (Terquem, 1855)**

1855 *Pleurotomaria nucleus* Tqm.; Terquem, p. 270, pl. 16, fig. 5.

1865 *Trochotoma nucleus* Terq.; Terquem & Piette, p. 55.

Type locality. Infralias at Hettange (France), i.e. Hettangian.

Etymology. Noun in apposition, meaning kernel.

Description. «Shell a lot wider than high, subglobose, more inflated dorsally, with a depressed spire, four whorls, not angulated, smooth, the last one with a rounded border, sinus band straight; rounded aperture; base inflated, rounded, smooth, with a linear umbilicus.» (Freely translated from Terquem, 1855, p. 270).

Remarks. First referred to *Pleurotomaria*, this species was later included in *Trochotoma* by Terquem & Piette (1865, p. 55).

***Trochotoma (T.) obtusa* Morris & Lycett, 1851 (Fig. 5.J)**

1851 *Trochotoma obtusa* Morris & Lycett, p. 83, pl. 10, figs. 15a–b (Fig. 6.J here) [+ ?fig. 18a–b in explanation of plates].

1877 *Trochotoma obtusa* Morr. et Lyc.; Hermite, p. 693.

? 1885 *Trochotoma obtusa* Morr. et Lyc.; Cossmann, p. 306-307, pl. 11, figs. 24–25.

1918 *Ditremaria obtusa* Morr. a. Lyc.); Rollier, p. 57.

1934 *Ditremaria (Ditremaria) obtusa* (Morris and Lycett); Haber, p. 352-353.

1950 *Trochotoma obtusa* Morris et Lycett; Cox & Arkell, p. 50.

1964 *Trochotoma obtusa* Morris et Lycett; Fischer, p. 50.

1969 *Trochotoma obtusa* Morris et Lycett; Fischer, p. 123–124, pl. 14, figs. 20, 21a–c.

1979 *Trochotoma obtusa* (Morris et Lycett); Palmer, p. 197.

Type locality. Minchinhampton (GB), Great Oolite (Bathonian), by far the most abundant species.

Etymology. Epithet refers to the obtuse apex.

Description. «Shell turbinated; apex obtuse; whorls (5) rather convex, striated, the lower surface dilated, its middle widely excavated, periphery striated. The encircling rib is large but depressed, and contributes to give a convex aspect to the whorls; the striae are large, the general figure being more turbinated, or less regularly conical, than is usual with the Trochotomae, each advance of growth was equal to two thirds of a revolution... Height 10 lines, basal diameter 13 lines» (Morris & Lycett, 1851, p. 83).

Distribution. Bathonian of Great Britain and France.

Remarks. Specimens from the Great Oolite referred by Morris & Lycett to several species are better referred to *T. obtusa*. The specimens from Ranville (France) figured by Cossmann (1885) were later re-named *Ditremaria ranvilliana* by Rollier (1918), who also regarded that the specimens described by d’Orbigny (1853, p. 386–387, pl. 342, figs. 1–5) as *D. globulus* belong to *T. obtusa* instead. A good synonymy of this species was proposed by Fischer (1964, 1969), which included *T. acuminata* in Morris & Lycett, 1851, *T. conuloides* in Morris & Lycett, 1851, *T. tabulata* Morris & Lycett, 1851, *T. globulus* in Piette, 1855, *Pleurotomaria recondita* Lycett, 1863, *T. lycetti* Hermite, 1877, *T. magnifica* Cossmann, 1885, and *D. hamptonensis* Haber, 1934.

***Trochotoma (T.) orientalis* (Kiparisova, 1952) (Fig. 5.N)**

1952 *Ditremaria orientalis* Kiparisova 1947, p. 22, pl. 6, figs. 1, 3, 4.

Type material. Holotype: pl. 6, fig. 1 in Kiparisova 1952. TsGM (= CNIGR, Central Scientific Geological Exploration Museum = Tchernyshev Museum, St. Petersburg, Russia).

Etymology. Evidently meant to stress easternmost record.

Description. Trochiform, low-spired and gradate shell, last whorl more expanded than spire whorls; teleoconch comprising about 5 whorls; sutural ramp concave; smooth or slightly ornamented surface; flat base and oblique aperture.

Comparisons. Kiparisova (1952, p. 22–23) compared this species with *T. imbricata* (Cossmann) and also with *T. affinis* E.Deslong. and its possible synonym *T. gradus* E.–Deslong.

Remarks. This species belongs to the so-called Kiselevka Assemblage from the lower Amur river region (Priamur), which is confined to a large limestone lens within the Kiselevka Formation (a thick succession of jasper, siliceous-clayey rocks and volcanics), thus possibly allochthonous in origin (Sey et al., 1992, p. 227), Early Jurassic (late Sinemurian) in age.

***Trochotoma (T.) pachyspira* Eudes-Deslongchamps, 1868 (Suppl. Fig. 2.E)**

? 1864 *Trochotoma Morieri* Eudes-Deslongchamps, p. 177. (*nomen nudum*)

1868 *Trochotoma pachyspira* (Eud. Desl.); Eudes-Deslongchamps, p. 216–218, pl. 4, figs. 1a–c. (Fig. 7.E)

1869b *Trochotoma pachyspira* (Eud. Desl.); Eudes-Deslongchamps, p. 61–63, pl. 4, figs. 1a–c.

1877 *Trochotoma pachyspira*, Eug. Desl.; Hermite, p. 690.

? 1879 *Trochotoma* confr. *pachyspira*, Eug. Desl.; Gemmellaro, p. 194, pl. 5, figs. 71–72.

? 1882 *Trochotoma* confr. *pachyspira*, Eug. Desl.; Gemmellaro, pl. 27, figs. 71–72 (reprint of 1879).

1918 *Ditremaria pachyspira* Eudes-Desl.; Rollier, p. 54.

1948 *Ditremaria pachyspira* ? E. E. Desl.; Dubar, p. 138, pl. 11, fig. 13.

Type material. Not designated, 4 specimens.

Type locality. May (Calvados, France), middle Lias.

Etymology. Specific name refers to the thick-spired shell.

Description. Helicoidal shell, thick, with rounded obtuse apex. Teleoconch comprises 5 rounded whorls divided in two equal parts by a straight selenizone which becomes more pronounced towards the last whorl. Weak spiral striae on the whole shell. The last whorl is shaped as the others, but towards the aperture it thickens. Trema long, oval in shape. Base wide with a large smooth umbilicus. Inner lip simple, with a sinuosity near the centre of the base, outer lip forming a continuous curve. (Freely translated from Eudes-Deslongchamps, 1868, p. 216–217).

Comparisons. This species appears at the same localities and levels as *T. gradus*, but Eudes-Deslongchamps (1868) distinguished it for its large size and rounded whorl sections, with almost no carina.

Distribution. Gemmellaro (1879, 1882) compared with this species material from the early Jurassic of Bellampo and Casale, Palermo, Sicily, and Dubar (1948) doubtfully referred material from the late Early Jurassic of Morocco.

Remarks. In his thesis Eudes-Deslongchamps jun. (1864) mentioned a new species, *T. morieri*, which he did neither describe nor figure. Haber (1934, p. 354–355) interpreted that this is the same later named *T. pachyspira* by Eudes-Deslongchamps (1868) and so included it as a synonym of *T. pachyspira*. The material compared with this species and figured by Gemmellaro (1879, 1882) was later named *D. siciliana* by Haber (1934, p. 360).

***Trochotoma (Placotoma) petrariae* Bigot, 1935 (Suppl. Fig. 6.G)**

1935 *Trochotoma Petrariae* n. sp. Bigot, p. 719, pl. 39, figs. 4, 4a. (Fig. 11.G)

1953 *Trochotoma (Discotoma) Petrariae* Bigot; Fischer, p. 7, pl. 1, figs. 1–2.

Type material. Not designated, 4 specimens were described by Bigot (1935).

Type locality. Breuil, Normandie (France), Bathonian.

Etymology. Specific name probably meaning “of the stones”

Description. Shell very depressed, with 4 gradate whorls, bi-angular, with the anterior corner forming a strong rounded carina. The whorls have 9 flat spiral cords separated by faint lines; the growth lines are strongly curved backwards. The spire apex is somewhat protruding. The base is widely umbilicated, its ornamentation is unknown. Aperture broken. (Freely translated from Bigot, 1935, p. 719).

Remarks. This species was included by Fischer (1969) as a junior synonym of *T. cossmanni*.

Trochotoma(T.) putealis Cossmann, 1885 (Suppl. Fig. 1.G)

1885 *Trochotoma putealis* Cossmann, p. 310–311, pl. 15, figs. 25–26. (Fig. 5.G)

1918 *Ditremaria putealis* Cossmann; Rollier, p. 58.

1934 *Ditremaria (Ditremaria) putealis* (Cossmann); Haber, p. 355-356.

Type material. One specimen, collected by Legay.

Type locality. Carrière Lunel, near Marquise (France), Lower Bathonian.

Etymology. Epithet refers to a pit or hole (i.e. the trema).

Description. Shell convex and conical, the apical angle decreases with growth. The first whorls are convex and the next gradate, slightly angulated at the middle. Shell surface ornamented by 5 spiral threads to each side of the angulation, crossed by very oblique growth lines. The last whorl is obtusely angular at the base, which bears 10 to 12 concentric threads. Umbilicus very large, smooth, reaching two thirds of total height. Aperture long, with an oblique external lip (freely translated from Cossmann, 1885, p. 311).

Remarks. This species is slightly gradate and is intermediate between this group of conical shells and the next, characterized by gradate shells.

Trochotoma (T.) quenstedti (Rollier, 1918) (Suppl. Fig. 1.H)

1918 *Ditremaria Quenstedti* sp. nov. pour *Ditremaria* (?) in Quenstedt; Rollier, p. 56. (Fig. 5.H)

Type locality. Eschingen, Wurttemberg (Germany), Brauner Jura δ , middle to upper Bajocian.

Etymology. Dedicated to the German palaeontologist F.A. Quenstedt.

Description. Medium-sized species, very high, trochoid, with an apical angle of 37° in the last whorls. It only has one low carina. The selenizone is conspicuous and the trema is short and simple, thought by Quenstedt to be a pathological character in a *Pleurotomaria*. (Freely translated from Rollier, 1918, p. 57).

Remarks. This species was named for the specimen figured by Quenstedt (1858, p. 415, pl. 57, fig. 20) as *Ditremaria?* sp. indet. According to Rollier (1918) this is the only species known from the Swabian Middle Jurassic. Haber (1934, p. 356) refers it to *Pleurotomaria*.

Trochotoma (T.) ranvilliana (Rollier, 1918)

1918 *Ditremaria Ranvilliana* sp. nov. pour *Trochot. obtusa* (non Morr. a. Lyc.) Cossmann; Rollier, p. 60.

1934 *Ditremaria ranvilliana* Roll. vide *Ditremaria (Ditremaria) tabulata* Morr. and Lyc.; Haber, p. 356.

Type material. Not designated, figured specimen (in Cossmann 1885) is from Eudes-Deslongchamps collection.

Type locality. Ranville (France), late Bathonian.

Etymology. Epithet refers to the type locality.

Description. Turbinated and strongly angular shell, whorls strongly angular, with gradate whorls, and ornamented by 8 or 9 deep lines. Last whorl with flanks slightly concave. The base forms a conical surface near the margin and limits the wide umbilicus with an obtuse carina. The base is more finely striated than the rest of the surface, and the striae decrease into the umbilicus. (Freely translated from Cossmann, 1885, p. 306–307).

Remarks. Probably a synonym of *T. obtusa* (see above), regarded as synonym of *T. tabulata* by Haber (1934).

Trochotoma (T.) rathieriana (d'Orbigny, 1850b) (Fig. 5.K)

1850b *Ditremaria Rathieriana* d'Orbigny, p. 9, n° 145 (short description only).

1853 *Ditremaria Rathieriana* d'Orb.; d'Orbigny, p. 387–388, pl. 342, figs. 6–8, pl. 343, figs. 1–2 (as *D. Rathieri* on p. 394). (Fig. 6.K)

1854 *Ditremaria Rathieriana* d'Orb.; Cotteau, p. 37.

1862a *Ditremaria Rathieriana* d'Orb.; Étallon, p. 114.

1877 *Trochotoma rathieriana* d'Orb.; Hermite, p. 694.

1893 *Trochotoma rathieriana* d'Orbigny; de Loriol, p. 72–73.

1934 *Ditremaria (Ditremaria) rathieriana* D'Orbigny; Haber, p. 356-358.

Type material. Not designated, the figured specimens are from d'Orbigny's collection, now at the Natural History Museum in Paris.

Etymology. Epithet refers to the collector, M. Rathier.

Description. Large species, 70 mm wide, spiral angle 85°, gradate whorls with longitudinal striae (freely translated from d'Orbigny, 1850a, p. 9). In 1853 (p. 388) d'Orbigny provided a more complete description.

Distribution. Callovian-Oxfordian, France. D'Orbigny (1853) reported it from the Corallian at several localities north and east of the Paris basin and in the Pyrenean basin.

Remarks. This species was first only described by d'Orbigny (1850) and figured by him later (1853).

***Trochotoma (Placotoma) rota* Eudes-Deslongchamps, 1843 (Suppl. Fig. 5.A-B)**

1843 *Trochotoma rota* E.-D., Eudes-Deslongchamps, p. 105, pl. 8, figs. 1–3. (Suppl. Fig. 5.A)

1850a *Ditremaria rota* d'Orb.; d'Orbigny, p. 301, n° 89.

1853 *Ditremaria rota* d'Orb.; d'Orbigny, p. 383–384, pl. 341, figs. 4–7. (Suppl. Fig. 5.B)

1855 *Trochotoma rota* Deslongchamps; Pictet, p. 180.

1877 *Trochotoma rota* Eudes Desl.; Hermite, p. 692.

1885 *Trochotoma rota* Deslongchamps; Cossmann, p. 309–310.

1918 *Ditremaria rota* Eudes-Desl.; Rollier, p. 59.

1934 *Ditremaria (Discotoma) rota* (Deslongchamps sen.); Haber, p. 358, 382–383.

Type material. Two specimens.

Type locality. Langrune (France), Bathonian.

Etymology. «Trochotoma roulette», i.e. shaped like a wheel (noun in apposition).

Description. Shell conoid and depressed, with a low spire and a subacute apex, 4 of 5 whorls, the last one very large; whorls with subquadrangular section, wider than high, ornamented by large irregular folds which end and the upper external angle of the whorls, which is nodose; the lower external angle is also nodose.

The external wall of the whorls, limited by these two angles, is slightly concave and has large irregular folds, perpendicular to the carinae; base large, with a deep wide umbilicus. (Free translation from Eudes-Deslongchamps, 1843, p. 105).

***Trochotoma (T.) scalaris* (d'Orbigny, 1850b)**

1850b *Ditremaria scalaris* d'Orbigny, p. 9, n° 146. (short description only)

1853 *Ditremaria scalaris* d'Orb.; d'Orbigny, p. 390–391, pl. 344.

1874 *Trochotoma scalaris* d'Orbigny; Brauns, p. 232–233.

1877 *Trochotoma scalaris* d'Orb., Hermite, p. 694.

1918 *Ditremaria scalaris* d'Orb.; Rollier, p. 60.

1934 *Ditremaria (Ditremaria) scalaris* D'Orbigny; Haber, p. 358.

Type locality. Saulce-aux-Bois, Ardennes, France, Corallian (Oxfordian).

Etymology. Epithet refers to stair-like profile.

Description. Conical shell, higher than wide, with a deep umbilicus. Spire forms a regular angle, whorls regularly gradate, ornamented by small spiral threads. Base also striated except within the umbilicus, which is smooth. Aperture oblique, extended into the umbilicus by a deep sinus, with a strong transverse fold at the aperture base. Trema elongated. (Freely translated from d'Orbigny, 1853, p. 390–391).

Comparisons. D'Orbigny (1853) regarded it as similar to *T. rathieriana*.

Remarks. Included as a synonym of *T. gigantea* Zitt. by Schlosser, 1882, p. 100.

***Trochotoma (T.) schlumbergeri* Eudes-Deslongchamps, 1868 (Fig. 5.M)**

1868 *Trochotoma Schlumbergeri* (Eug. Desl.); Eudes-Deslongchamps, p. 219–220, pl. 8, figs. 5a-b. (Fig. 6.M)

1869b *Trochotoma Schlumbergeri* (Eug. Desl.); Eudes-Deslongchamps, p. 63–65, pl. 8, figs. 5a–b.

1871 *Pleurotomaria (Trochotoma) Schlumbergeri*, Mayer, p. 239, pl. 8, fig. 5 (text is a copy from Eudes-Deslongchamps 1868).

1877 *Trochotoma schlumbergeri*, Eug. Desl.; Hermite, p. 690–691, pl. 14, figs. 1–3.

1918 *Ditremaria Schlumbergeri* Eudes-Deslongchamps; Rollier, p. 55.

1934 *Ditremaria (Ditremaria) schlumbergeri* (Deslongchamps); Haber, p. 359-360.

Type locality. Bayeux (France), Aalenian oolithe.

Etymology. Dedicated to M. Schlumberger, from Nancy, collector.

Description. Helicoidal shell, acuminate, with pronounced spire. 7 or 8 whorls, with two strong carinae, space between carinae concave, ornamented by 3 spiral threads crossed by growth-lines. Periphery of base with 5 spiral lines. Space between upper carina and suture bears only growth lines, without spiral ornamentation. Umbilicus very large. Aperture subquadrate with a rudimentary tooth on the columellar lip. (Freely translated from Éudes-Deslongchamps, 1868, p. 219).

Comparisons. Eudes-Deslongchamps (1868) compared his new species with *T. affinis*, and distinguished it by a more prominent carina and minor differences in ornamentation. Hermite (1877) compared it with *T. calix*.

***Trochotoma (T.) secans* (Dubar, 1948) (Suppl. Fig. 2.F)**

1948 *Ditremaria secans* n. sp., Dubar, p. 137, pl. 11, figs. 12a–c. (Fig. 7.F)

Type locality. Djebel Bou-Dahar, Morocco, Pliensbachian ?

Etymology. Epithet possibly referring to the trema (since cutting or cleaving is meant).

Description. Similar to *T. gradus*, but with the spire has a wide apical angle, and the shell is much wider than high. The carinae are angular, especially the carina that surrounds the base. Selenizone within two spiral cords. In front of the trema there is a clear arched fissure. (Freely translated from Dubar, 1948, p. 137).

Remarks. Dubar (1948) indicated that this species is similar to *T. gradus* and *T. bicarinata*. He also pointed out that, in the Early Jurassic of Morocco as in the French Upper Jurassic, *Trochotoma* species replace *Pleurotomaria* in the reefal facies.

?*Trochotoma (Placotoma) solarium* (Koch, 1848)

1848 *Pleurotomaria Solarium* Koch, p. 174-175, pl. 25, figs. 17–19.

1918 *Ditremaria solarium* Koch; Rollier, p. 52.

1934 *Ditremaria solarium* Koch vide *Pleurotomaria solarium* Koch ; Haber, p. 361.

Type locality. Liassic Belemniten-schichten (lower Pliensbachian), Kahlefeld, Nordheim (Germany).

Etymology. Noun in apposition, apparently evoking a fancied resemblance to a sundial.

Description. Shell depressed-conic, umbilicated, transversely striated; whorls with flat upper surface and oblique lateral surface, separated by a sub-angular area bearing nodose costae which vanish towards the suture; angulated periphery; flat base with concentric striae and radial threads becoming nodose at the edge. (Free translation from Koch, 1848, p. 174).

Remarks. This species was described as a *Pleurotomaria* by Koch (1848) and regarded as such by Haber (1934), but it was referred to *Ditremaria* by Rollier (1918). The diagnostic presence of a trema was not mentioned or figured by Koch.

***Trochotoma (T.) somertonensis* (Rollier, 1918)**

1918 *Ditremaria Somertonensis* sp. nov. pour *Trochotoma gradus* (non E.-D.) Hudleston, Rollier, p. 55.

Type material and locality. Types not designated, Hudleston's specimens were found at Coker in beds of the *murchisonae* Zone (Aalenian).

Etymology. Epithet apparently referring to a locality in Somerset.

Description. Hudleston, 1896 (p. 447, pl. 41, figs 2–3, under *T. gradus*): "Shell trochiform and broadly tabulate, with a somewhat obtuse apex; whorls of the spire almost rectangular and increasing by wide steps, being strongly angulated towards the middle. The ornaments consist of regular spiral lines, which pervade the entire shell and are somewhat wide apart; the lines are decussated obliquely. Sutures close. The body-whorl is strongly bicarinate, the anterior carina forming a blunt angle at the periphery, whilst the space between the carinae is considerably excavated. The base is infundibuliform and rounded towards the periphery, which is striated like the spire. Aperture for the most part concealed in all specimens available to me."

***Trochotoma striata* Hörnes in Hauer, 1853 (Suppl. Fig. 3.A)**

- 1853 *Trochotoma striata* Hörn. in Hauer, p. 762–763 (description only).
1861 *Trochotoma striatum* Hörn.; Stoliczka, p. 193, pl. 5, figs. 2a–b. (Fig. 8.A)
1980 *Trochotoma striatum* Hörnes; Szabó, p. 65, pl. 4, fig. 5.
? 1991 ?*Trochotoma striatum* Hörnes; Conti & Monari, p. 264–265, pl. 5, fig. 13.

Type material. Hörnes only mentioned one specimen.

Type locality. Hierlatz.

Etymology. Epithet referring to the striated shell ornamentation.

Description. Shell with a somewhat acute apex (around 70°), 40 mm high and equally wide, 6–7 convex whorls; wide selenizone situated medially. Whole shell ornamented by spiral threads; with a deep but not very wide umbilicus. (Freely translated from Hauer, 1853, p. 763).

Distribution. Hierlatz Limestone in the Alps, also in Hungary at the Bakony Mt. (Szabó, 1980), and probably the western Pontides, Turkey (Conti & Monari, 1991), Early Jurassic (Pliensbachian ?).

Remarks. This species was described but not figured by Hörnes in Hauer (1853), who only had one specimen. Stoliczka (1861) provided a good illustration and description. *Ditremaria striata* Zittel (1873, p. 344), from the Late Jurassic of Czech Republic, is a different species and, if referable to *Trochotoma* as Hermite (1877, p. 696) did, it becomes a secondary junior homonym of *T. striata* Hörnes.

***Trochotoma suevica* (Quenstedt, 1884) (Suppl. Fig. 4.D)**

- 1884 *Ditremaria Suevica* Quenstedt, p. 373, pl. 199, figs. 48–49. (Fig. 9.D)
1907 *Ditremaria suevica* Quenstedt; Sieberer, p. 63, pl. 5, fig. 12.
1918 *Ditremaria Suevica* Quenst.; Rollier, p. 61.
1934 *Ditremaria (Discotoma) suevica* (Quenstedt); Haber, p. 362, 383–384.

Type locality. Weisser Jura ε, (Kimmeridgian) Natheim, Germany.

Etymology. Epithet evidently referring to its provenance from Swabia.

Description. The long hole at the end of a thick rib is only separated by a narrow strip from the aperture edge. The next rib, where the basal region starts, is somewhat thicker. The spire whorls are convex, *Natica*-like. The finer ribs are granulate, showing particularly strong granules along the marginal suture, whereas the juvenile whorl appears almost smooth to the naked eye. On the selenizone there are three lines, covered by lunules, as in *Pleurotomaria*. (Freely translated from Quenstedt, 1884, p. 373). Apical angle 110°, shell wider than high (Sieberer, 1907, p. 63).

***Trochotoma (T.) tabulata* Morris & Lycett, 1851 (Fig. 5.L)**

- 1851 *Trochotoma tabulata* Morris & Lycett, p. 83, pl. 10, figs. 17, 17a. (Fig. 6.L)
1877 *Trochotoma tabulata* Morr. et Lyc.; Hermite, p. 693.
non 1885 *Trochotoma tabulata* Morr. et Lyc.; Cossmann, p. 307–308, pl. 8, figs. 13–14.
1918 *Ditremaria tabulata* Morr. a. Lyc; Rollier, p. 57.
1934 *Ditremaria (Ditremaria) tabulata* (Morris and Lycett); Haber, p. 362–364.
1935 *Trochotoma tabulata* Morr. et Lyc.; Bigot, p. 718.

Type locality. Minchinhampton (Great Britain), Great Oolite (Bathonian).

Etymology. Epithet apparently referring to the stepped profile with flat volutions.

Description. «Shell conical, apex acute; whorls 5, very finely striated, step-like, and angulated in their middle portion; the last whorl is angulated, the base flattened and deeply excavated. The sides of the volutions are nearly flat, both above and beneath the angle» (Morris & Lycett, 1851, p. 83).

Comparisons. Morris & Lycett (1851) compared this species with *T. calix* and *T. affinis*, and distinguished it by its flat sides, ribs less prominent, finer striae and more acute apex.

Remarks. Cox & Arkell (1950, p. 50) and Fischer (1964, p. 50; 1969, p. 123–124) regarded this species as a synonym of *T. obtusa* Morris & Lycett. Specimens referred to this species by Cossmann (1885) were named *D. cotteauana* by Haber (1934, p. 335) and included into *T. extensa* by Fischer (1969). Haber (1934, p. 362) regarded *D. ranvilliana* Rolloer as a junior synonym.

***Trochotoma (Placotoma) tornatilis* (Phillips, 1829) (Suppl. Fig. 6.A-B)**

- 1829 *Trochus tornatilis* Phillips, p. 188, pl. 4, fig. 16. (listed as *T. ? tornatus* in page 130). (Fig. 11.A)

non 1853 *Pleurotomaria tornata* (Phillips); d'Orbigny, p. 564, pl. 422, figs. 6-8.

1875 *Trochotoma tornatilis* Phillips, p. 325, pl. 4, fig. 16 (listed as *Trochotoma tornata* Phil. in page 259)

1881 *Trochotoma tornatilis* Phillips; Hudleston, p. 119–121, pl. 4, fig. 1b. (only?) (Fig. 11.B)

? 1881 *Trochotoma tornatilis* Phillips; Hudleston, p. 119–121, pl. 4, fig. 1a.

1892 *Trochotoma tornatilis* Phil.; Fox-Strangways, p. 234.

1934 *Ditremaria (Discotoma) tornata* (Phillips); Haber, p. 384-385.

Type locality. The specimen illustrated by Phillips (1829) is from the Coralline Oolite (Oxfordian) at Scarborough, Yorkshire, Great Britain.

Etymology. Epithet probably referring to its winding or spinning whorls.

Description. «Fig. 1b specimen... Shell very depressed, more than twice as wide as high, largely excavated. Spire composed of about four whorls, which are wide apart, subdepressed in the early stages, and very much so in the body-whorl, which is large in proportion to the rest of the spire. The ornament consists of regular raised lines parallel to the suture (i.e. transverse), and these lines are cut across from left to right by a system of fine striations, producing a delicate pattern. The whorls are bicarinated (a feature not observed in the earlier stage): the posterior keel, which forms the salient angle, contains the fissure. This is elongate, and terminates three millimètres from the present margin of the outer lip, which has been slightly reduced by fracture. The space between the keels is rather excavated, and the anterior keel is rounded off. The same ornamentation is continued in the base of the shell, but the state of preservation does not admit of an accurate description of the aperture.Fig. 1a. Smaller specimen ... This shell has the general character and ornamentation of the previously described, but is less depressed. Moreover, the body-whorl develops wide undulations across its surface, which yield an additional ornament.» (Hudleston, 1881, p. 120).

Remarks- This species was illustrated but not described by Phillips (1829), and the figure was regarded as «most inadequate» by Hudleston (1881), who re-interpreted and described it on the basis of new specimens, concluding that *T. discoidea* and *T. amata* should be regarded as junior synonyms. Phillips (1829 and following editions) spelled this species name both as *tornata* and *tornatilis*, and we follow Hudleston (1881) in using *tornatilis*. He also discussed the variability he observed concerning the ornamentation, illustrating two varieties, with and without transverse folds. De Loriol (1890, p. 159; 1893, p. 72) regarded the first specimen (Hudleston (1881, pl. 4, fig. 1a) as belonging to *T. amata*.

Trochotoma? trocheata (Terquem, 1855) (Suppl. Fig. 3.B)

1855 *Pleurotomaria trocheata* Tqm.; Terquem, p. 271, pl. 16, fig. 15, 15a. (Fig. 8.B)

1865 *Trochotoma trocheata* Terq.; Terquem & Piette, p. 55.

Type locality. Infralias at Hettange (France), i.e. Hettangian.

Etymology. Epithet evidently meaning wheel-shaped

Description. Shell a bit wider than high, trochiform, conical, short spire with acute apex, 6 whorls, inflated in the middle and depressed near the suture, ornamented by longitudinal [spiral] striae and transverse folds, nodular near the sutures, last whorl with an angular edge; sinus large and deep, sinus band large, placed on the anterior third; subquadrangular aperture; base nearly flat, with a large sinus without umbilicus. (Freely translated from Terquem, 1855, p. 271).

Remarks. First referred to *Pleurotomaria*, this species was later included in *Trochotoma* by Terquem & Piette (1865, p. 55).

Trochotoma trochoides (Gemmellaro, 1879) (Suppl. Fig. 3.C)

1879 *Ditremaria trochoides*, Gemm.; Gemmellaro, p. 197, pl. 6, figs. 13–16. (Fig. 8.C)

1882 *Ditremaria trochoides*, Gemm.; Gemmellaro, pl. 28, figs. 13–16 (reprint of 1879).

Type material. Two specimens figured. Museo di Geologia e Mineralogia della R. Università di Palermo.

Type locality. Calcare cristallino bianco, Montagna del Casale, Palermo, Sicily, Early Jurassic.

Etymology. Epithet evidently meaning shaped like a wheel.

Description. Thick trochoid shell, a bit wider than high, with rounded whorls bearing spiral threads. Base excavated and smooth with peripheral spiral cords. Trema about 4 mm from aperture. Thick callous lips. (Freely translated from Gemmellaro, 1879, p. 197).

***Trochotoma (T.) vetusta* Terquem, 1855 (Suppl. Fig. 2.B)**

1855 *Trochotoma vetusta* Tqm.; Terquem, p. 267–268, pl. 16, figs. 10, 10a. (Fig. 7.B)

1865 *Trochotoma vetusta* Terq.; Terquem & Piette, p. 55.

1877 *Trochotoma vetusta* Terq.; Hermite, p. 689.

1918 *Ditremaria vetusta* Terq.; Rollier, p. 52.

1934 *Ditremaria (Ditremaria) vetusta* (Terquem); Haber, p. 366.

? 1967 *Trochotoma* cf. *vetusta* Terquem; Zapfe, p. 442–443, pl. 4, fig. 4a.c.

1988 *Trochotoma vetusta* Terquem; Meier & Meiers, p. 34, pl. 8, figs. 17a–c.

2002 *Trochotoma (Trochotoma) vetusta* Terquem; Fischer et al., p. 444, figs. 3–1a, b.

2011 *Trochotoma vetusta* Terquem; Monari et al., p. 372, fig. 15.

Type locality. Grès infra-liasique, Hettange (France), i.e. Hettangian.

Etymology. Epithet apparently referring to the old age.

Description. Shell incomplete, a lot more wider than high, turbinated, depressed, spire gradate with an obtuse apex; 5 angulated whorls, carinated at the angle and ornamented by five longitudinal striae; band large, placed on the angulation, subpentagonal aperture; base ornamented by numerous and regular striae, umbilicus large and deep, occupying all the basal surface. (Free translation from Terquem, 1855, p. 267–268). A more complete description was provided by Monari *et al.*, 2011.

Distribution. Hettangian to Sinemurian, France, Luxembourg, Wales, Italy and Morocco (see Monari *et al.*, 2011).

Remarks. Hermite (1877, p. 690) doubted about the placement of this species within *Trochotoma* as he did not see the diagnostic characters. Monari *et al.* (2011) included *T. brocastellensis* Moore as a synonym of this species, and also the material from Morocco figured by Bourrouilh (1966) as *T. meneghini*. Monari *et al.* (2011) provided good photographs, including details of the trema and shell shape variability.

***Trochotoma?* sp. indet. (Kiparisova, 1952) (Suppl. Fig. 4.G)**

1952 *Ditremaria* sp. indet.; Kiparisova, p. 23, pl. 5, figs. 3a–b. (Fig. 9.G)

Description. Discoidal, depressed and low-spined shell; 3–4 teleoconch whorls convex, ornamented by regularly spaced spiral cords; flat base and aperture unknown.

Comparisons. Kiparisova described but did not name this species, which she compared to *T. suevica* Quenstedt.

Distribution. Lower Jurassic of the Amur river region, NE Russia.

Remarks. See note to *T. orientalis* above.

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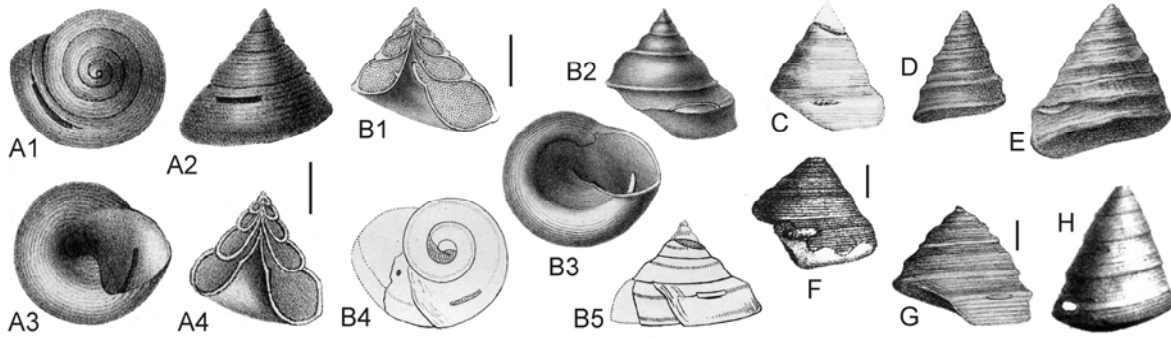
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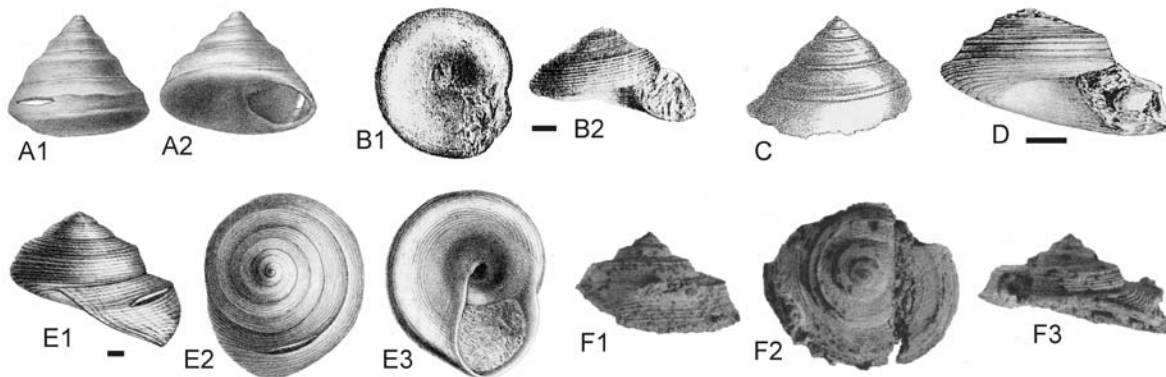
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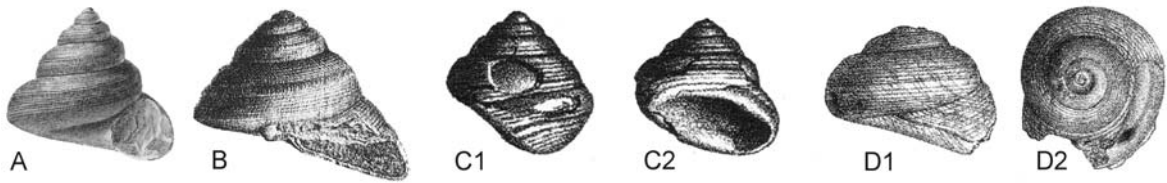
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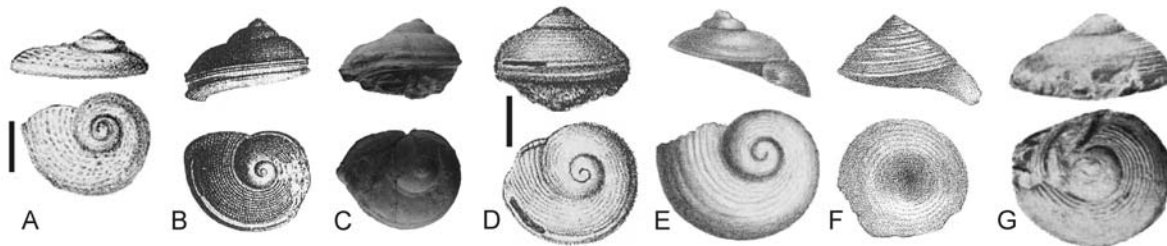
Supplementary Figure 1. Conical not gradate shells, with the spire higher than last whorl and acute apical angle. With wide and deep umbilicus; trema usually long and narrow. Ornamented by spiral threads, carinae absent or weak. Reproduction of original illustrations of some species of this group. **A.** *Trochotoma (T.) conuloides* Eudes-Deslongchamps, from Eudes-Deslongchamps, 1843, pl. 8, fig. 16-19. **B.** *Trochotoma (T.) acuminata* Eudes-Deslongchamps, from Eudes-Deslongchamps, 1843, pl. 8, figs. 11-15. **C-D.** *Trochotoma (T.) acuminata?*, **C**, from Cossmann, 1918, pl. 13, fig. 14, re-named *Ditremaria conica* Rollier, 1918; **D**, from Morris & Lycett, 1851, pl. 10, fig. 20, re-named *Trochotoma lycetti* Hermite, 1877 and *D. hamptonensis* Haber, 1934. **E.** *Trochotoma conuloides?*, from Morris & Lycett, 1851, pl. 10, fig. 16, re-named *T. lycetti* Hermite, 1877. **F.** *Trochotoma (T.) meneghinii* Gemmellaro, from Gemmellaro, 1879, pl. 6, figs. 11. **G.** *Trochotoma (T.) putealis* Cossmann, from Cossmann, 1885, pl. 15, figs. 25. **H.** *Trochotoma (T.) quenstedti* (Rollier), from Quenstedt, 1858, pl. 57, fig. 20 (as *Ditremaria?* sp. ind.). Graphic scale bars: 5 mm.



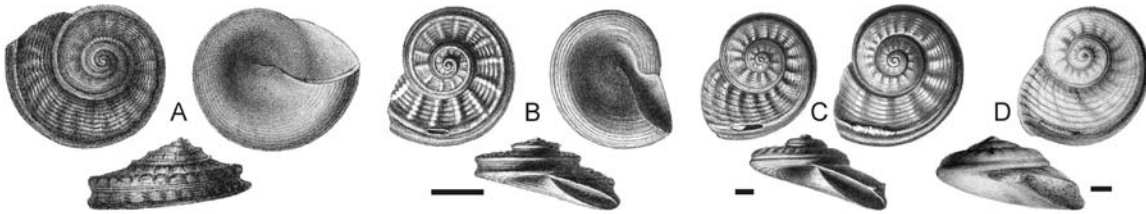
Supplementary Figure 2. Spire of approximately same height as the last whorl; outer face oblique; shell surface ornamented by spiral threads; narrow and elongated trema; flat to slightly convex base, with an open and wide umbilicus. Reproduction of original illustrations of some species of this group. **A.** *Trochotoma (T.) extensa* Morris & Lycett, from Morris & Lycett, 1851, pl. 10, figs. 19a-b. **B.** *Trochotoma (T.) vetusta* Terquem, from Terquem, 1855, pl. 16, figs. 10-10a. **C.** *Trochotoma (T.) brocastellensis* Moore, from Moore, 1867, pl. 15, fig. 29. **D.** *Trochotoma (T.) imbricata* Cossmann, from Cossmann, 1885, pl. 8, fig. 18. **E.** *Trochotoma (T.) pachyspira* Eudes-Deslongchamps, from Eudes-Deslongchamps, 1868, pl. 4, figs. 1a-c. **F.** *Trochotoma (T.) secans* (Dubar), from Dubar, 1948, pl. 11, figs. 12a-c. Graphic scale bars: 5 mm.



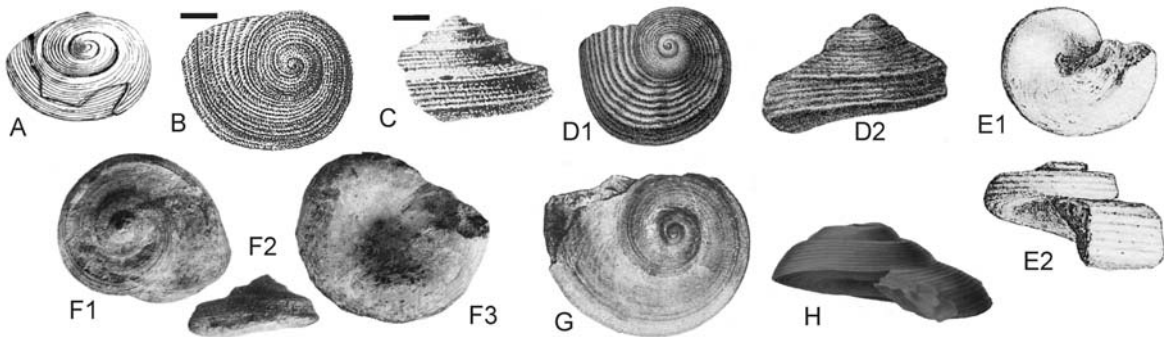
Supplementary Figure 3. Conical shells with wide apical angle; no marginal carinae and convex whorls surface; sutures deep; broad selenizone placed at about mid-height of whorl; shell ornamented by spiral threads and umbilicus deep but not broad. Reproduction of original illustrations of some species of this group. **A.** *Trochotoma striata* Hörnes, from Stoliczka, 1861, pl. 5, fig. 2. **B.** *Trochotoma trocheata* (Terquem), from Terquem, 1855, pl. 16, figs. 15-15a. **C.** *Trochotoma trochoides* (Gemmellaro), from Gemmellaro, 1879, pl. 6, figs. 13-14. **D.** *Trochotoma hermitei* Gemmellaro, from Gemmellaro, 1879, pl. 5, figs. 65-66. Graphic scale bars: 5 mm.



Supplementary Figure 4. Low conical shells with the last whorl higher than spire and the apical angle obtuse. Whorls with convex surface; conspicuous marginal carina, wide umbilicus; and ornamented by spiral threads. Reproduction of original illustrations of some species of this group. **A-C.** *Trochotoma mastoidea* (Étallon), **A**, from Thurmann & Étallon, 1861, pl.12, fig. 108; **B**, from de Loriol, 1887, pl. 23, figs.10-11 (= *Ditremaria mastoidea sequanica* Haber); **C**, from Favre in Joukowsky & Favre, 1913, pl. 26, fig. 1. **D.** *Trochotoma suevica* (Quenstedt), from Quenstedt, 1884, pl. 199, figs. 48-49. **E.** *Trochotoma? discoidea* (Roemer), from Roemer, 1836, pl. 11, fig. 12. **F.** *Trochotoma? lycetti* Moore, from Moore, 1867, pl. 15, figs. 27-28. **G.** *Trochotoma?* sp. indet., from Kiparisova, 1952, pl. 5, figs. 3a.b. Graphic scale bars: 5 mm.



Supplementary Figure 5. Conical, gradate, very depressed and low-spired shells, whorls increasing rapidly in diameter; ornamented by spiral cords; prosocline axial ribs may be present on the ramp of whorls; flat base and a widely open umbilicus; and an oblique aperture. Reproduction of original illustrations of some species of this group. **A-B.** *Trochotoma (Placotoma) rota* Eudes-Deslongchamps, **A**, from Eudes-Deslongchamps, 1843, pl. 8, figs. 1-3; **B**, from d'Orbigny, 1853, pl. 341, figs. 5-7. **C.** *Trochotoma (Placotoma) amata* (d'Orbigny), from d'Orbigny, 1843, pl. 343, figs. 3-5. **D.** *Trochotoma (Placotoma) discoidea* Buvignier, from Buvignier, 1852, pl. 25, figs. 10-11. Graphic scale bars: 5 mm.



Supplementary Figure 6. Conical, gradate, very depressed and low-spired shells, with rather convex whorls increasing rapidly in diameter; shell surface ornament dominated by spiral threads sometimes crossed by fine prosocline growth lines; base concave with wide umbilicus. Reproduction of original illustrations of some species of this group. **A-B.** *Trochotoma (Placotoma) tornatilis* (Phillips); **A**, from Phillips, 1829, pl. 4, fig. 16; **B**, from Hudleston, 1881, pl. 4, fig. 1b. **C.** *Trochotoma (Placotoma) depressiuscula* Lycett, from Hudleston, 1896, pl. 41, fig. 10. **D-E.** *Trochotoma (Placotoma) funiculosa* Cossmann; **D**, from Morris & Lycett, 1851, pl. 10, figs. 10a-b, as *T. discoidea*, re-named *D. chordulata* Haber, 1934); **E**, from Cossmann, 1885, pl. 10, figs. 36-37. **F.** *Trochotoma (Placotoma) cossmanni* (Rollier), from Cossmann, 1900, pl. 16, figs. 3-5. **G.** *Trochotoma (Placotoma) petrariae* Bigot, from Bigot, 1935, pl. 39, fig. 4. **H.** *Trochotoma (Placotoma)? multincincta* (Schübler in Zieten), from Zieten, 1832, pl. 34, fig. 1. Graphic scale bars: 5 mm.