CATALOGUE OF THE SOLARIIDAE IN THE RIJKSMUSEUM VAN NATUURLIJKE HISTORIE. III. TORINIA

by

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Opinions are divided in relation to what generical name has priority, *Heliacus* or *Torinia*. In proof of this I will quote, leaving aside those of many others, the opinions of two authorities.

Thiele [1918, p. 80 (114)] writes: "Bezüglich des Namens *Torinia* bemerkt Iredale, dass ihm *Heliacus* Orbigny, weil älter, vorzuziehen sei; es mag sein, dass dieser Name ein wenig älter ist — nach Hermannsen von 1841, nach Iredale 1842, es scheint also die Zeit des Erscheinens nicht ganz festzustehen —, während *Torinia* von Gray 1842 auf die Beschaffenheit des Deckels hin begründet worden ist".

The opinion of Tomlin (1928, p. 333), however, is quite different: "Gray in Proc. Zool. Soc., 1847, p. 151, gives his own genus *Torinia* precedence, quoting it as of 1840 and 1842. These two references are to different editions of the 'Synopsis of the Contents of the British Museum', and are fully explained by Iredale in Proc. Malac. Soc. (London), X, pp. 294-309. The 1840 usage of *Torinia* is a *nomen nudum*; the 1842 edition gives a short comparative account of operculum only, quoted on p. 308. It hardly seems a sufficient diagnosis on which to found a genus, and the reasons for rejection given by Iredale on p. 301 may well be applied to this case at any rate".

As I mentioned already in a previous paper (1940, p. 223), I follow in this catalogue Thiele's "Handbuch der systematischen Weichtierkunde", in relation to the generic names and also as far as concerns the classification, but it is not my intention to state thereby hat I always completely agree with the opinions of his author.

I wish to express here my heartiest thanks to the gentlemen who helped me in the gathering of the very scattered literature, often difficult to obtain, referring to the genus *Torinia*, or who copied diagnoses and descrip-

tions. Especially I am indebted to Prof. V. van Straelen, Dr. W. Adam, Mr. R. Winckworth, Mr. William J. Clench, Mr. Harald A. Rehder, Dr. C. O. van Regteren Altena.

Genus **Torinia** Gray, 1842
Heliacus d'Orbigny, 1842

T. admiranda (Melvill & Standen)

Solarium (*Torinia*) *admirandum* Melvill & Standen, Ann. & Mag. of Nat. Hist., ser. 7, vol. 12, p. 322; 1903.
Solarium admirandum, Melvill, Journ. of Malac., vol. 11, p. 84, pl. 8, figs. 6, 6A; 1904.

Type locality: "Gulf of Oman, lat. 24° 58′ N., long. 56° 54′ E., 156 fathoms".

T. aequatorialis Thiele

Torinia aequatorialis Thiele, Wiss. Ergebn. "Valdivia", vol. 17, Gastropoda der Tiefsee-Exp., II, p. 268 (302), pl. 9 (21), figs. 8, 9; (1918) 1925.

Type locality: "Schalen von Padang und von Ost-Borneo".

"Nach der Beschaffenheit der Unterseite hat sie Aehnlichkeit mit *T. gemmulata* und mit *T. cerdalea* Melvill u. Standen" (Thiele, l.c.).

T. aethiops (Menke)

Solarium aethiops Menke, Synopsis meth. Moll., ed. 2, p. 142 & p. 53; 1830.
Solarium aethiops, Philippi, Zeitschr. f. Malakozool., vol. 5, p. 167; 1848 (1849).
Solarium aethiops, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 24, No. 25, pl. 4, fig. 1; 1853.
(non) *Solarium (Torinia) Aethiops,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 240, pl. 5, figs. 68, 69, 70; 1863 (1866).
Torinia aethiops, Marshall, Tryon, Manual of Conch., vol. 9, p. 18, pl. 5, figs. 85, 86; 1887.
Solarium (*Torinia*) *aethiops,* Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.

Type locality: "Hab. ad Porto-rico".

This *Torinia* is related to *T. cyclostomum* Mke., but the latter is, amongst others, larger and conically elevated with somewhat rounded whorls, whereas *T. aethiops* is globose-conic with flattened whorls. *T. cyclostomum* has 4 cingula of about equal breadth, whereas the 5 cingula of *T. aethiops* fairly differ among each other in breadth.

Menke's diagnosis of *T. aethiops* is not very clear and badly framed, he writes, for instance, "sulci" where he means "cingula". Fortunately Philippi, who was well acquainted with Menke, gives a good description and two distinct figures.

The description by Hanley (1863, p. 240) of *T. aethiops* contains the characteristics of this *Torinia* ["spirae anfractus... cingulis 5 moniliformi-crenatis (quorum 3 superiora multo sunt minora...) ornati] with those of *T. cyclostomum* [spirae anfractus supernè declives, infernè rotundati]. In his figure (1863, pl. 5, fig. 69) I can but recognize *T. cyclostomum* (not *T. aethiops*) in relation to the form, the dimensions and the number of the cingula, as did Marshall (1887, p. 18) and Paetel (1887, p. 285).

T. africana (Bartsch) vide *T. dorsuosa* (Hinds) var.
T. alfredensis (Turton) vide *T. dorsuosa* (Hinds) var.

T. amoena (Murdoch & Suter)

Omalaxis amoena Murdoch & Suter, Trans. & Proc. N. Zealand Inst., vol. 38, p. 293, pl. 24, figs. 30, 31, 32; 1905 (1906).
Omalaxis amoenus, Finlay, Trans. & Proc. N. Zealand Inst., vol. 57, p. 401; (1926) 1927.
Awarua amoena, Mestayer, Trans. & Proc. N. Zealand Inst., vol. 61, p. 145; 1930.
Awarua amoena, Powell, Shellfish of New Zealand, p. 75; 1937.

Type locality: "In the vicinity of Cuvier Island, east of Great Barrier Island, in S. lat. 36° 8′, E. long. 175° 55′; depth, 110 fathoms". (Continental shelf of New Zealand).

Murdoch & Suter (1905, p. 294) placed this Solariid in the genus *Omalaxis* with the remark that it is almost identical with *Discohelix retifera* Dall, from the Pliocene of Florida; but according to Iredale (1911, p. 256) *Omalaxis amoena* is "certainly a species of *Heliacus*". This opinion is confirmed by Finlay (1926, p. 401): "*Omalaxis amoenus* Murdoch and Suter, 1906 should, as Iredale has contended, be referred... to *Heliacus,* larger shells than the type showing the characteristic rounding and descending of the whorls".

Mestayer (1930, p. 145) created the new genus *Awarua* for this species, of which Thiele (1932, p. 737), however, says that it belongs to the genus *Torinia.*

T. architae (O. Costa)

Solarium Architae O. Costa, Atti della R. Accad. Scienze, vol. 3, p. 40, No. 15; 1830.
Solarium Architae, O. Costa, Fauna del Regno di Napoli, Pettinibranchi, p. 5, pl. 1, fig. 1a, A, B, C; 1841.
Solarium Architae, O. Costa, Atti della R. Accad. Scienze, vol. 5, pars 2, p. 48; 1844.
Solarium Architae, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866).
Solarium Architae, Jeffreys, Ann. & Mag. of Nat. Hist., vol. 6, ser. 4, p. 80 & p. 458; 1870.
Solarium Architae, Monterosato, Notizie Solarii del Medit., p. 10, figs. 21, 22, 23; 1873.

Solarium Archytae, Monterosato, Journ. de Conch., vol. 22, p. 271; 1874.
Solarium Archytae, Monterosato, Giorn. Sci. Naturali Palermo, vol. 13, p. 97; 1878.
Solarium architae, Jeffreys, Proc. Zool. Soc. London, p. 39; 1885.
Solarium Archytae, Locard, Catal. gén. Moll. de France, p. 303; 1888.
Torinia Architae, Marshall, Tryon, Manual of Conch., vol. 9, p. 21, pl. 6, figs. 9, 10, 11; 1887.
Solarium architae, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium Archytae, Kobelt, Prodromus faunae Moll., p. 216; 1888.
Solarium architae, Smith, Proc. Zool. Soc. London, p. 282; 1890.
Architectonica architae, Tomlin & Shackleford, Journ. of Conch., vol. 14, p. 252; 1914.
Solarium Architae, Nobre, Mol. Marinhos Portugal, p. 152; 1932.

Type locality: "Trovasi nel golfo di Taranto".

It is not impossible that this species is a juvenile form of *T. sicula* (Cantr.) (= *T. fallaciosa* Tib.). "According to Weinkauff", Jeffreys (1870, p. 80) writes in relation to *T. architae,* "this species is the *S. siculum* of Cantraine". Petit de la Saussaye (1869, p. 120) also, considers *T. architae* as a young specimen of *T. fallaciosa,* whereas Sacco (1892, p. 69) in the description of a *Torinia* of the Helvetien observes: "per la base depresso-imbutiforme ricordano la *T. Architae* Costa, che d'altronde potrebbe anche esser solo una forma giovanile[1])".

a. 2. St. Helena, H. C. Fulton.

var. **soverbii** (Hanley)

Solarium soverbii Hanley, Proc. Zool. Soc. London, p. 206; 1862.
Solarium (Torinia) Soverbii, Hanley, Thesaurus Conchyl., vol. 3, p. 243, pl. 5, figs. 81, 82; 1863 (1866).
Torinia Sowerbyi, Marshall, Tryon, Manual of Conch., vol. 9, p. 21, pl. 6, figs. 12, 13; 1887.
Torinia Sowerbii, Marshall, Tryon, Manual of Conch., vol. 9, p. 32; 1887.
Solarium (Torinia) Sowerbyi, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "Littora Tunetana".

Some authors (Jeffreys, Monterosato) regard this variety as a synonym of *T. architae.*

T. areola (Gmelin) vide *T. gyrus* (Meuschen).

T. aspera (Hinds)

Solarium asperum Hinds, Proc. Zool. Soc. London, 23; 1844.
Solarium asperum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 438; 1844.
Solarium asperum, Hinds, Zool. voyage Sulphur, p. 50, pl. 14, figs. 9, 10; 1844.
Solarium asperum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 22, No. 22, pl. 3, fig. 12; 1853.

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1) Spacing by me.

Solarium (Torinia) asperum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 241, pl. 5, figs. 77, 78; 1863 (1866).
Torinia aspera, Marshall, Tryon, Manual of Conch., vol. 9, p. 21, pl. 6, figs. 7, 8; 1887.
Solarium asperum, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Torinia aspera, Thiele, Wiss. Ergebn. „Valdivia", vol. 17, Gastropoda der Tiefsee-Exp., II, p. 268 (302), pl. 9 (21), figs. 6, 7; (1918) 1925.
Heliacus asper, Tomlin, Ann. S. African Mus., vol. 25, p. 333; 1928.
Heliacus asper, Tomlin, Ann. Natal Mus., vol. 6, p. 432; 1931.

Type locality: "Straits of Macassar".

"*Solarium dilectum* Deshayes von Mauritius ist sehr ähnlich, vielleicht sogar dieselbe Art, *T. admiranda* Melvill u. Standen aus dem Golf von Oman ist gleichfalls recht ähnlich" (Thiele, l.c.).

T. bicanaliculata (Valenciennes)

Solarium bicanaliculatum Valenciennes, Humboldt & Bonpland, Recueil observations Zool., vol. 2, p. 270; 1833.
Solarium (Torinia) bicanaliculatum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 237; 1863 (1866).

Type locality: "Habitat cum praecedente" (sc. Acapulco Mexicanorum).

This species is related to *T. cylindrica,* but the latter on the umbilical wall has 3 sulci, whereas this *Torinia* has only 2 sulci; the sculpture of *T. cylindrica,* moreover, is more pronounced, whereas *T. bicanaliculata* is "subgranulosa". The latter is slightly smaller in dimensions and also in the habitat there is a difference, as *T. cylindrica* lives in the West Indies, whereas *T. bicanaliculata* inhabits the Pacific Ocean off the Mexican coast.

Hanley, l.c., writes in relation to this species: "A shell which, if not identical, must be nearly allied" [to *perspectiviunculus* = *T. gyrus* (Meusch.) subsp. *variegata* (Gm.)].

T. bisulcata (d'Orbigny)

Solarium bisulcatum d'Orbigny, Ramon de la Sagra, Descr. Moll. de Cuba, vol. 2, p. 66, pl. 19, figs. 17, 18, 19, 20; 1853.
Solarium bisulcatum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 34, No. 39; 1853.
Solarium bisulcatum, Gray, List of shells Cuba, p. 22; 1854.
Solarium (Torinia) bisulcatum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 238, pl. 5, figs. 71, 72; 1863 (1866).
Torinia? bisulcata, Mörch, Malakoz. Bl., vol. 22, p. 157; 1875.
Torinia bisulcata, Marshall, Tryon, Manual of Conch., vol. 9, p. 22, pl. 6, figs. 14, 15, 16; 1887.
Solarium (Torinia) bisulcatum, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium bisulcatum, Dall, Bull. U. S. Nat. Mus., No. 37, p. 148; 1889.
Solarium bisulcatum, McGinty, Nautilus, vol. 54, p. 103; 1941.

Type locality: "Jamaica, Martinique".

This species reminds more or less of *T. gyrus* (Meusch.) subsp. *depressiuscula* mihi, but differs from the latter by its smaller size, its colour and its much lesser height. The umbilicus of both species is, in proportion to their dimensions, about the same.

Under the heading: "*Solarium bisulcatum* Orbigny, 1845. — A Change of Genus", McGinty (1941, p. 106) suggests that this mollusc should be placed in the genus *Torinia,* adding "the rather depressed shape probably accounts for its having been classified as *Solarium*". It appears, however, from the literature that this was already done by most authors since 1863.

T. bollonsi (Mestayer)

Discohelix meridionalis Mestayer, Trans. & Proc. N. Zealand Inst., vol. 48, p. 125; (1915) 1916.
Mangonuia Bollonsi Mestayer, Trans. & Proc. N. Zealand Inst., vol. 61, p. 145, pl. 26, figs. 1, 2, 3; 1930.
Mangonuia bollonsi, Powell, Shellfish of New Zealand, p. 75; 1937.

Type locality: "Off North Cape, New Zealand. Depth, about 75 fms.".

Thiele (1931, p. 737) states concerning this species: "dürfte zur Gattung *Torinia* gehören, vielleicht als Sektion".

T. borealis (Verrill & Smith)

Solarium boreale Verrill & Smith, Proc. U. S. Nat. Mus., vol. 3, p. 376; 1880 (1881).
Solarium boreale, Verrill, Proc. U. S. Nat. Mus., vol. 3, p. 406; 1881.
Solarium boreale, Verrill, Cat. Mar. Moll. in Trans. Connecticut Acad., vol. 5, p. 529, pl. 57, figs. 29, 30; 1882.
Torinia borealis, Marshall, Tryon, Manual of Conch., vol. 9, p. 22, pl. 6, figs. 24, 25; 1887.
Solarium (Torinia) borealis, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium bisulcatum Orbigny var. *boreale,* Dall, Bull. U. S. Nat. Mus., No. 37, p. 148, pl. 62 (errore pro 63), figs. 95, 95a; 1889.
Solarium boreale, Dautzenberg & Fischer, Mém. Soc. Zool. France, vol. 10, p. 159; 1897.
Solarium (Torinia) boreale, Dautzenberg, Rés. Camp. Sci. Prince de Monaco, fasc. 72, p. 123; 1927.

Type locality: "Station 871, (40° 02′ 54″ N. latitude, 70° 23′ 40″ W. longitude) 115 fathoms". Southward of Nantucket Isl. (N.E. coast of U.S.A.).

T. caelata (Hinds)

Solarium caelatum Hinds, Proc. Zool. Soc. London, p. 25; 1844.
Solarium caelatum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 440; 1844.
Solarium caelatum, Hinds, Zool. voyage Sulphur, p. 51, pl. 14, figs. 11, 12; 1844.
Solarium caelatum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 19, No. 18, pl. 3, fig. 8; 1853.

Solarium (Torinia) caelatum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 240, No. 33, pl. 5, figs. 75, 76; 1863 (1866).
Torinia caelata, Marshall, Tryon, Manual of Conch., vol. 9, p. 20, pl. 6, figs. 4, 5; 1887.
Solarium (Torinia) caelatum, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Torinia caelata, Hedley, Australas. assoc. advancement science, p. 360; 1909.

Type locality: "Straits of Macassar".

T. cantrainei nom. nov.

(non) *Solarium affine* J. de C. Sowerby, Trans. Geol. Soc. London, 2nd. ser., vol. 5, part 1, p. 328, pl. 26, fig. 5; 1837.
Solarium affine Cantraine, Bull. Acad. Roy. Sci. Bruxelles, vol. 9, part 2, p. 342; 1842.

Type locality: "Environs de Messine".

Nobre (1932, p. 152) considers *S. affine* Cantr. as a synonym of *S. moniliferum,* which he identifies with *S. carocollatum* Lm. According to Jeffreys (1885, p. 39) also, *S. affine* is a synonym of *S. carocollatum.* There is indeed some affinity between *S. affine* and *S. carocollatum,* principally when one takes into consideration the great variability of the latter, of which Sacco (1892, p. 40) already describes 10 varieties. An important difference, however, between these two species, consists in the strong development of the sulcus internus in *S. carocollatum*; Lamarck does not mention it in his description, but Deshayes (1830, p. 160) writes: "ombilico pervio, crenis crassis, s u l c o p r o f u n d o [1]) separatis, obvallato". In *S. affine,* on the contrary, this sulcus is absent, as we learn from the diagnosis of Cantraine (1842, p. 342): "s u l c o [1]) umbilicum magnum circumdante n u l l o [1])".

Sowerby (1837, p. 328, pl. 26, fig. 5), however, in 1837 has already given the name *S. affine* to a fossil of the tertiary of Cutch (W. Hindustan), the name *S. affine* Cantraine 1842 therefore must be suppressed and I propose to name now this Solariid *T. cantrainei.*

T. carocollata (Lamarck)

Solarium carocollatum Lamarck, Anim. s. Vert., vol. 7, 1. 6, No. 7; 1822.
Solarium carocollatum, Deshayes, Encycl. méth., Vers, vol. 2, p. 160, No. 9; 1830
Solarium carocollatum, Deshayes, Lamarck, Anim. s. Vert., 2nd. ed., vol. 9, p. 108, No. 7; 1843.
Solarium moniliferum (non Bronn) Monterosato, Notizie Solarii Mediterraneo, p. 5, figs. 5, 6, 7; 1873.
Solarium Alleryi Monterosato, Giorn. Sci. Naturali, Palermo, vol. 13, p. 97; 1878.
Solarium carocollatum, Jeffreys, Proc. Zool. Soc. London, p. 39; 1885.

1) Spacing by me.

Solarium (Solarium) carocollatum, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium moniliferum (non Bronn), Kobelt, Prodromus faunae Moll., p. 217; 1888
Solarium Alleryi, Locard, Expéd. sci. "Travailleur" & "Talisman", Moll. testac., vol. 2, p. 14; 1898.
Solarium moniliferum (non Bronn), Nobre, Mol. Marinhos Portugal, p. 152; 1932.

Type locality: ?; ? (Deshayes); "Both sides of the Mediterranean, and off the Azores" (Jeffreys).

T. catenulata (O. Costa)

Architea catenulata O. Costa, Annuario Mus. Zool. Napoli, vol. 5, p. 53, pl. 1, fig. 4; 1869.
Archytea catenulata, Monterosato, Giorn. Sci. Naturali, Palermo, vol. 13, p. 97; 1878.
Archytea catenulata, Kobelt, Prodromus faunae Moll., p. 217; 1888.

Type locality: "Mare mediterraneum. Spec. unicum ad insulam Capri inventum" (Kobelt).

T. cerdalea (Melvill & Standen)

Solarium (Torinia) cerdaleum Melvill & Standen, Ann. & Mag. of Nat. Hist., ser. 7, vol. 12, p. 297, pl. 20, fig. 16; 1903.

Type locality: "Persian Gulf, Fao, on telegraph-cable".

T. chemnitzii (Kiener) vide *T. crenellus* (Linné).

T. chiquita (Pilsbry & Lowe)

Heliacus chiquita Pilsbry & Lowe, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 83, pl. 8, figs. 12, 13, 14; 1932.

Type locality: "Acapulco, Mexico".

A small *Torinia* of the group of *T. panamensis* Bartsch.

T. concava Thiele

Torinia concava Thiele, Wiss. Ergebn. "Valdivia", vol. 17, Gastropoda der Tiefsee-Exp., II, p. 81 (115) & p. 268 (302), pl. 9 (21), figs. 4, 5; (1918) 1925.

Type locality: "Station 244" (5°55, 8′ südl. Br., 39° 1,2′ östl. L., bei Ostafrika).

Related to *T. architae* Costa and *T. homalaxis* Melv., according to Thiele.

T. conica Pease vide *T. trochoides* (Deshayes).

T. costata Schepman

Torinia costata Schepman, Prosobr. "Siboga" Exp., Mon. 49[1]b, p. 221, pl. 14, fig. 5 a, b, c; 1909.

Type locality: "Stat. 279. Rumah-Kuda-bay, Roma-island. 36 M.".

T. crenellus (Linné)

Turbo crenellus Linné, Syst. nat., ed. 12, p. 1236; No. 628; 1767.
Trochus planior infundibuliformis Chemnitz, Syst. Conch. Cab., vol. 5, p. 133, pl. 173, figs. 1706, 1707; 1781.
Trochus. Der flache trichterförmige Kräussel Schröter, Einl. Conchylienkenntn., vol. 1, p. 718, No. 97; 1783.
Trochus infundibuliformis Gmelin, Linné, Syst. nat., ed. 13, p. 3575, No. 58; 1791-1792.
Turbo crenellus, Gmelin, Linné, Syst. nat., ed. 13, p. 3602, No. 60; 1791-1792.
Trochus infundibuliformis, Dillwyn, Descr. catal. recent shells, vol. 2, p. 783, No. 60; 1817.
Trochus infundibuliformis, Wood, Index testac., 2nd. ed., p. 137, pl. 29, fig. 60; 1828.
Solarium Chemnitzii Kiener, Icon. coq. viv., Solarium, p. 12, No. 9, pl. 4, fig. 8; 1838-1839.
Solarium infundibuliformis, Mörch, Catal. conch. Yoldi, Cephalophora, p. 47; 1852.
Solarium infundibuliforme (*Trochus*), Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 11, No. 7, pl. 2, figs. 8, 9; 1853.
Turbo crenellus, Hanley, Ipsa Linnaei Conchylia, p. 337; 1855.
Torinia infundibuliformis, Adams, Genera rec. Moll., vol. 1, p. 242, pl. 25, fig. 7; 1858.
Solarium Chemnitzi, Deshayes, Catal. Moll. Ile de la Réunion, p. 68; 1863.
Solarium (*Torinia*) *infundibuliforme,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 243, pl. 5, figs. 91, 92, 93; 1863 (1866).
Solarium (*Torinia*) *cylindraceum* (non Chemn.) Hanley (syn. exclus.), Sowerby, Thesaurus Conchyl., vol. 3, p. 242, pl. 5, figs. 98, 99 (tantum); 1863 (1866).
Solarium (*Torinia*) *infundibuliforme,* Chemn. Var. *Chemnitzii,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 243; 1863 (1866).
Torinia infundibuliformis, Mörch, Malakoz. Bl., vol. 22, p. 155; 1875.
Torinia crenella, v. Martens, Beitr. Meeresfauna Mauritius u. Seychellen, p. 290; 1880.
Torinia infundibuliforme, Marshall, Tryon, Manual of Conch., vol. 9, p. 19, pl. 8, figs. 97, 98; 1887.
Solarium (*Torinia*) *crenella,* Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium (*Torinia*) *Chemnitzii,* Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium (*Torinia*) *infundibuliforme,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Torinia infundibiliformis, Hidalgo, Catal. mol. testác. Filipinas, vol. 1, Mol. marinos, p. 188; 1904-1905.
Solarium (*Torinia*) *infundibuliforme,* Couturier, Journ. de Conch., vol. 55, p. 161; 1907.
Heliacus (*Torinista*?) *crenellus,* Kuroda, Catal. Moll. shells Taiwan, p. 86, No. 203; 1941.

Type locality: ?; ? (Gmelin); ? (Dillwyn); "habite la mer des Indes, l'île Bourbon et la mer de la Chine" (Kiener); "Puerto Cabello" (Philippi).

Until the midst of the previous century, *Turbo crenellus,* a species of Linné belonging to the section of the Turbines cancellati, was recognized by none of the authors. This was due non solely to the extreme conciseness of the diagnosis and description, but also because the locality and quotations of figures from other works were lacking. In relation to this Hanley (1855, p. 337) observes: "Consequently, however interesting it may be to

ascertain what our author intended, the name *crenellus* cannot be preserved, since it was utterly impossible for any one to recognise the species by his publications". Although the question therefore could not be solved by the literature, this conchologist succeeded in determining the species to which the name, *crenellus,* was fitting. "By a process of analysis", he writes, "there being luckily but one shell in the entire collection of Linnaeus which coincides exactly with the diagnosis, the *Solarium Chemnitzii* of Kiener (Coq. Viv. Sol. pl. 4, f. 8) was found to have been the primitive type of the species". And indeed the diagnosis, as well as the description, fits exactly *T. chemnitzii* (= *T. infundibuliformis* Gm.).

Characteristic of this species is the very large infundibuliform umbilicus, but, in contradistinction to most of the other species of *Torinia,* it is devoid of margin and crenulations. Chemnitz (1781, p. 134) writes, in relation to this umbilicus: "Wer jemals den umgekehrten Conum gesehen, welchen der Formica Leo, oder, nach dem Linne, der Myrmeleo im Sande zu machen pfleget, um darinnen die herabfallenden Ameisen zu erhaschen, der wird gestehen, dass der Nabel dieser Schnecke ihm völlig gleiche".

S. (Torinia) cylindraceum (non Chemn.) Hanley (1863, p. 242, pl. 5, figs. 98, 99, non 100) undoubtedly is *T. crenellus,* as results from Hanley's description and figures; only the synonyms are fitting to *T. cylindrica* (Gm.) [=*T. cylindracea* (Chemn.)]. Marshall and Paetel also place this *Torinia* amongst the synonyms of *T. infundibuliformis* (Gm.) (= *T. crenellus).*

Hanley (1863, p. 243) moreover describes a variety of his "*Solarium cylindraceum*", namely, the var. *vermetiformis,* the diagnosis of which is as follows: "subovata; anfractus laxi, permulti; umbilicus magis coarctatus". Probably this variety is represented on fig. 100 of pl. 5, although the author does not mention it and indicates it only as "*S. cylindraceum* Chemn.". Philippi's locality: "Puerto Cabello", ought to be confirmed, as all other specimens come from the Indo-pacific.

a. 1. Mauritius, H. B. Preston. — b. 1.?, Cabinet Voigt. — c. 1. Point de Galle (Ceylon), J. Knock. — d. Oshima (Japan), H. C. Fulton.

var. **strigata** (Hanley)

Solarium (Torinia) infundibuliforme, Chemn. Var.? *strigata* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 243, pl. 5, fig. 94; 1863 (1866).

Torinia infundibuliforme, Gmelin Var. *strigata,* Marshall, Tryon, Manual of Conch., vol. 9, p. 20, pl. 6, fig. 99; 1887.

Solarium (Torinia) infundibuliforme Gm. Vr. *strigata,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality:?;? (Marshall);? (Paetel).

T. cyclostomum (Menke)

Solarium cyclostomum (non Mighels) Menke, Synopsis meth. Moll., ed. 2, p. 142 & p. 53; 1830.

Solarium cyclostomum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 25, No. 27, pl. 4, fig. 3; 1853.

Solarium (*Torinia*) *cyclostoma,* Hanley (syn. nonnull. exclus.), Sowerby, Thesaurus Conchyl., vol. 3, p. 239, No. 29, pl. 5, figs. 65, 66, 67; 1863 (1866).

Solarium (*Torinia*) *Aethiops* (non Menke) Hanley (syn. exclus.), Sowerby, Thesaurus Conchyl., vol. 3, p. 240, No. 30, pl. 5, figs. 68, 69, 70; 1863 (1866) (fide Marshall & Paetel).

Torinia cyclostoma, Mörch (syn. nonnull. exclus.), Malakoz. Bl., vol. 22, p. 156; 1875.

Torinia cyclostoma, Marshall, Tryon, Manual of Conch., vol. 9, p. 18, pl. 5, figs. 83, 84; 1887.

Solarium (*Torinia*) *cyclostomum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: ?; "die Antillen, Puerto Cabello" (Philippi).

Marshall (1887, p. 26) and Paetel (1887, p. 286) regard *T. cyclostomum* (non Menke) (Hanley) as a synonym of *T. cylindrica* (Gm.), I cannot accept this point of view. If we examine the most prominent differences between the two species, we remark, indeed, that they are rather few and that it would perhaps be preferable to regard *T. cyclostomum* as a variety of *T. cylindrica.* With regard to the pattern, the former has the fourth cingulum (sometimes also the third) with alternating black and white spots, whereas *T. cylindrica* is unspotted or with only faint and indistinct spots on the fourth cingulum. The whorls of *T. cylindrica,* moreover, are more rounded and in consequence the aperture also is more circular.

Let us now consider the figures and description of Hanley's "*Solarium* (*Torinia*) *cyclostoma*", to judge if it resembles to *T. cyclostomum* (Mke.) or to *T. cylindrica* (Gm.). Hanley's figure (1863, pl. 5, fig. 66) represents a *Torinia* with an aperture which is not exactly circular and which has the whorls less rounded than *T. cylindrica.* Above the suture and on the periphery of the last whorl it bears a band with light and dark spots. The whole appearence corresponds therefore to that of *T. cyclostomum* (Mke.). This is also confirmed by the words of Hanley (1863, p. 239): "ad peripheriam articulata. Anfractus spirae superne declives, in cingula 4, quorum inferiora 2... albo (nonnunquam, autem, ultimum solum) sunt articulata". The synonyms, quoted by Hanley, however, are not quite correct: *S. herberti* Dh. and *cylindraceum* Dh. must be removed.

var. **latior** Hanley

Solarium (*Torinia*) *cyclostoma,* Menke. Var. *latior* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 239, No. 29; 1863 (1866).

Type locality: ?

T. cylindrica (Gmelin)

Trochus cylindraceus Chemnitz, Syst. Conch. Cab., vol. 5, p. 11 & p. 85, pl. 170, figs. 1639 a, b; 1781.
Trochus, Der cylindrische Kräussel Schröter, Einl. Conchylienkenntn., vol. 1, p. 703, No. 60; 1783.
Trochus cylindricus Gmelin, Linné, Syst. nat., ed. 13, p. 3572, No. 32; 1790.
Trochus cylindraceus, Dillwyn, Descr. catal. recent shells, vol. 2, p. 767, No. 18; 1817.
Solarium Herberti Deshayes, Encycl. méthodique, Vers, vol. 2, p. 159, No. 6; 1830.
Solarium cylindraceum, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 101, No. 9; 1843.
Solarium Herberti, Mörch, Catal. conch. Yoldi, Cephalophora, p. 47; 1852.
Solarium Herberti, d'Orbigny, Ramon de la Sagra, Descr. Moll. de Cuba, vol. 2, p. 68; 1853.
Solarium cylindraceum (Trochus), Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 26, pl. 4, fig. 4; 1853.
(non) *Torinia cylindracea,* Adams, Genera rec. Moll., vol. 1, p. 243, pl. 25, fig. 7d; 1853 (1858).
Heliacus Heberti, Gray, List of shells of Cuba, p. 22; 1854.
Solarium (*Torinia*) *cyclostoma,* Menke Var. *cylindracea,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 239, No. 29; 1863 (1866).
(non) *Solarium* (*Torinia*) *cylindraceum,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 242, No. 38, pl. 5, figs. 98, 99, 100; 1863 (1866).
Torinia cylindracea, Mörch, Malakoz. Bl., vol. 22, p. 156; 1875.
Torinia cylindrica, Marshall, Tryon, Manual of Conch., vol. 9, p. 17, pl. 5, fig. 82; 1887.
Torinia Heberti, Marshall, Tryon, Manual of Conch., vol. 9, p. 27 & p. 18; 1887.
Solarium (*Torinia*) *cylindraceum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Torinia cylindrica, Hidalgo, Catal. mol. testác. Filipinas, vol. 1, Mol. marinos, p. 188; 1904-1905.

Type locality: ?; ? (Dillwyn); "Habite les Antilles" (Deshayes).

"Der cylindrische Kräusel gleichet in seiner Form einer zusammengerollten Tabacksrolle", says Chemnitz (1781, p. 95) in relation to this *Torinia.* His picture of this species is rather clumsy, as Deshayes (1843, p. 101, No. 9) also already remarked.

The shell figured by Adams (1858, p. 243, pl. 25, fig. 7 d) under the name *T. cylindracea* agrees with this species neither in form, nor in the pattern of the coloration, the aperture also is quite different. The figure represents as shell purely conical in profile, with flattened whorls, except the last which is rounded at the periphery and tessellated as *T. gyrus* (Meusch.) (= *T. areola* Gm.).

T. dealbata (Hinds) vide *T. trochoides* (Deshayes).

T. delectabilis (Melvill)

Solarium (*Torinia*) *delectabile* Melvill, Mem. & Proc. Manchester Lit. & Phil. Soc., vol. 7, p. 57 (6), pl. 1, fig. 11; 1893.

Type locality: "Bombay".

T. delphinuloïdes (d'Orbigny)

Solarium delphinuloïdes d'Orbigny, Ramon de la Sagra, Descr. Moll. de Cuba, vol. 2, p. 67, pl. 19, figs. 21, 22, 23, 24; 1853.
Solarium delphinuloides, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 35, No. 40; 1853.
Solarium delphinuloides, Gray, List of shells of Cuba, p. 22; 1854.
Solarium delphinuloides, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 244; 1863 (1866).
Torinia delphinuloides, Marshall, Tryon, Manual of Conch., vol. 9, p. 22, pl. 6, figs. 17, 18, 19; 1887.
Solarium delphinuloides, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Jamaica".

"The figure neither displays the trochoid shape nor the elevated spire attributed to the species. If a *Solarium,* it is an abnormal one. The type is not recorded as present in the British Museum catalogue of D'Orbigny's collection" (Hanley, l.c., p. 245).

T. densegranosa Pilsbry

Torinia densegranosa Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 57, p. 106, pl. 3, figs. 15, 16, 17; 1905.

Type locality: "Fukura, Awaji".

Our two specimens agree completely with the description and figure of Pilsbry, except that the larger specimen is a trifle flattened at the top. A second point of difference is the development of the fila (threads), that are found in some of the sulci. In the larger specimen the first and the fourth filum, counted from the top, are absent. Our smaller shell carries the four threads mentioned by Pilsbry, but the fourth filum has the thickness of a cingulum. The 4 cingula of the base, namely, and also that which forms the crenae umbilici have normally developed; the filum near the cingulum externum at the side of the carina has also normally developed, but at the side of the umbilicus of the above mentioned cingulum we remark, at the place of the filum, a cingulum at least as thick as the cingulum externum, which makes at first the impression that the base carries 5 cingula instead of 4.

a. 2. Awaji (Japan), H. C. Fulton.

T. dilecta (Deshayes)

Solarium dilectum Deshayes, Catal. Moll. île de la Réunion, p. 68, pl. 9 (36), figs. 3, 4, 5, 6; 1863.
Solarium (Torinia) dilectum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 241, pl. 4, figs. 50, 51; 1863 (1866).
Torinia dilecta, Marshall, Tryon, Manual of Conch., vol. 9, p. 19, pl. 6, figs. 91, 92; 1887.

Solarium (*Solarium*) *dilectum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Ile de la Réunion (Bourbon)".

According to Deshayes, very nearly related to *S. canaliculatum* Lm., a fossil of Grignon.

T. discoidea Pease

(non) *Solarium discoideum* J. Sowerby, Min. Conchol., vol. 1, p. 36, pl. 11, fig. 4; 1813.

Torinia discoidea Pease, Amer. Journ. of Conch., vol. 4, p. 102, pl. 12, fig. 18; 1868.

Torinia discoidea, Marshall, Tryon, Manual of Conch, vol. 9, p. 21, pl. 6, fig. 6; 1887.

Solarium (*Torinia*) *discoideum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Paumotus".

var. **sterkii** Pilsbry & Vanatta

Torinia discoidea sterkii Pilsbry & Vanatta, Nautilus, vol. 22, p. 57, fig. 2; 1908.

Type locality: "Waikiki Beach, Honolulu, H.I.".

T. dollfusi (Dautzenberg & Fischer)

Solarium Dollfusi Dautzenberg & Fischer, Mém. Soc. Zool. France, vol. 9, p. 453, pl. 19, figs. 6, 7, 8; 1896.

Solarium Dollfusi, Dautzenberg, Rés. Camp. Sci. Prince de Monaco, fasc. 72, p. 122, pl. 4, figs. 1, 2, 3; 1927.

Type locality: "Açores: Hirondelle (1888), Stn. 70, 454 m."

Related to *T. borealis* Verr. & Sm. and to *Ph. certesi* "diffère du *S. Certesi,* non-seulement par sa sculpture, mais aussi par l'embryon, qui est beaucoup plus petit que chez le *Certesi*" (Dautzenberg & Fischer, l.c., p. 454).

T. dorsuosa (Hinds)

Solarium dorsuosum Hinds, Proc. Zool. Soc. London, p. 23; 1844.

Solarium dorsuosum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 439; 1844.

Solarium dorsuosum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 37, No. 45; 1853.

Solarium (*Torinia*) *dorsuosum,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 238, pl. 5, figs. 73, 74; 1863 (1866).

Torinia dorsuosa, Marshall, Tryon, Manual of Conch., vol. 9, p. 17, pl. 5, figs. 80, 81; 1887.

Solarium (*Torinia*) *dorsuosum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Torinia dorsuosa, Hidalgo, Catal. mol. testác. Filipinas, vol. 1, Mol. marinos, p. 188; 1904-1905.

Torinia dorsuosa, Hedley, Proc. Linn. Soc. New S. Wales, vol. 32, p. 483; 1907.

Torinia dorsuosa, Hedley, Australas. assoc. for advancement sci., p. 360; 1909.

Torinia dorsuosa, Schepman, Prosobr. "Siboga" Exp., Mon. 49[1]b, p. 221; 1909.

Torinia dorsuosa, Dautzenberg, Faune Colonies françaises, vol. 3, p. 497; 1929.

Solarium dorsuosum, Turton, Mar. shells Port Alfred, p. 134, No. 969; 1932.

Type locality: "Puerto Galero, island of Mindoro, Philippines; in seven fathoms, sandy mud".

a. 2. Andaman Is., H. C. Fulton. — b. 1. Larantoeka (E. of Flores), J. Semmelink.

var. **africana** (Bartsch)

Heliacus africanus Bartsch, Bull. U.S. Nation. Mus., No. 91, p. 123, pl. 24, figs. 1, 3, 5; 1915.

Heliacus africanus, Tomlin, Ann. S. African Mus., vol. 25, p. 333; 1928.

Heliacus africanus, Tomlin, Ann. Natal Mus., vol. 6, p. 432; 1931.

Solarium africanum, Turton, Mar. shells Port Alfred, p. 134, No. 966; 1932.

Type locality: "The type and another specimen ... come from Port Alfred".

Bartsch does not mention, after his diagnosis of *T. africana,* by which characteristics it is differentiated from *T. dorsuosa* Hinds and it is impossible to me to find constant differences between these species. Tomlin (1928, p. 334), who knows so well the South African molluscs, expresses himself very cautiously with respect to the relations of *T. africana* to *T. dorsuosa*: "It (*T. africana*) is unquestionably very closely related (viz., to *T. dorsuosa*) but can, I t h i n k [1]), be discriminated" and in another paper he writes (1931, p. 432): "Bartsch is p r o b a b l y [1]) right in discriminating this (*T. africana*) from the oriental *H. dorsuosus* (Hinds)". As differences between both species he mentions (1928, p. 334): 1) "The two peripheral keels in *dorsuosus* are more nearly of a size and between them runs a distinct spiral line, varying in degree from a raised thread to quite a strong beaded cord. In *africanus* the lower keel is generally the smaller and stands out less, and there is no intercarinal line". 2) "The beading in *dorsuosus* is throughout very regular in size and shape, the beads or tubercles being mainly elongate-oblong; in *africanus* they are elongate, but rounded elongate, and by no means so regular in size".

Let us examine the given characteristics: 1) In relation to the difference of the cingula peripheralia in both species. — In the specimens of *T. dorsuosa* of the eastern part of the Indian Ocean, which I examined, the keels are not of a size, as Tomlin stated it for this species, but the lower is distinctly smaller, as it is indicated for *T. africana.* This is also confirmed by Hanley (1863, p. 239) who, if we may judge from the mentioned locality, viz., "Mindoro, Philippines", described *T. dorsuosa* from specimens from the western part of the Pacific, not from S. Africa. This author writes in his diagnosis: "Peripheria obtusè bicarinata; cingulum infra sulcum medium angustissimum (aliquando autem filosum) minus quam alterum eminens".

1) Spacing by me.

As far as concerns the spiral-line running between the peripheral cord and the basal cord, which should be absent, Bartsch (1915, p. 124) says in his diagnosis of *T. africana:* "There is a deep sinus between the peripheral cord and the basal cord, fully twice as wide as any of the sulci on the rest of the spire. Two slender spiral threads are present in the sulcus", this does not agree with Tomlin's assertion that the intercarinal line is absent and proves that this characteristic, as the preceding, cannot be used as a constant difference between these two species. 2) The more or less pronounced regularity of the granulation. — This is only a difference in degree proper to define a variety, not to separate a species.

It is on account of this lack of sharp distinctions between *T. africana* and *dorsuosa,* that I have placed the former as a variety of the latter.

var. **alfredensis** (Turton)

Solarium alfredensis Turton, Mar. shells Port Alfred, p. 134, No. 967, pl. 29, fig. 967; 1932.

Type locality: "P. A." (= Port Alfred, S. A.).

After his diagnosis of *T. africana,* Bartsch (1915, p. 124) wrote already: "There is considerable variation in the width of the umbilicus of this species, the following two having an umbilicus fully twice as wide as the specimens alluded to above. In addition to this increased width of umbilicus, they also have a little larger number of axial riblets", and Tomlin (1931, p. 433) says: "There is a puzzling form, with umbilicus fully twice as wide as in the type form, mentioned by Bartsch on p. 124. It seems to grade into the type but much more material is wanted".

In 1932 Turton described this aberrant form as a new species: *T. alfredensis,* adding to his description: "This differs from *africanum* in having a much wider umbilicus and a flatter top".

T. enoshimensis (Melvill)

Solarium (*Torinia*) *enoshimense* Melvill, Journ. of Conch., vol. 6, p. 411, pl. 2, fig. 12; 1891.

Torinia densegranosa Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, p. 106, pl. 3, figs. 15, 16, 17; 1905.

Torinia enoshimensis, Melvill, Proc. Malac. Soc. London, vol. 10, p. 317; 1913.

Type locality: "Enoshima, Japonia".

The figure is very poor.

T. fallaciosa (Tiberi) vide *T. sicula* (Cantraine).

T. fenestrata (Hinds)

Solarium fenestratum Hinds, Proc. Zool. Soc. London, p. 25; 1844.
Solarium fenestratum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 440; 1844.
Solarium fenestratum, Hinds, Zool. Voyage Sulphur, p. 52, pl. 14, figs. 21, 22; 1844.
Solarium fenestratum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 23, No. 23, pl. 3, fig. 13; 1853.
Solarium (*Torinia*) *fenestratum,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 241, pl. 5, figs. 77, 78 (errore pro 79, 80); 1863 (1866).
Torinia fenestrata, Marshall, Tryon, Manual of Conch., vol. 9, p. 20, pl. 6, figs. 100, 1; 1887.
Solarium (*Torinia*) *fenestratum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "New Guinea".

T. foveolata Tate

Torinia foveolata Tate, Trans. Roy. Soc. S. Austral., vol. 17, p. 191, pl. 1, figs. 13, 13a; 1893.
Heliacus foveolatus, Hedley, Proc. Linn. Soc. New S. Wales, p. 93; 1900.
Heliacus foveolatus, Cotton & Godfrey, S. Austral. Naturalist, vol. 14, p. 73, pl. 1, fig. 2; 1933.

Type locality: "Aldinga Bay and Semaphore" S. Australia.

"Its near allies are *T. aspera* and *T. fenestrata,* but it is flatter than the former, and more angulated than the latter" (Tate, l.c., p. 192).

T. fulva (Hinds) vide *T. straminea* (Gm.) var.

T. gemmulata Thiele

Torinia gemmulata Thiele, Wiss. Ergebn. "Valdivia", vol. 17, Gastropoda der Tiefsee-Exp., II, p. 80 (114), pl. 9 (21), figs. 2, 3; (1918) 1925.

Type locality: "Station 244 (5° 55,8′ südl. Br., 39° 1,2′ östl. L., bei Ostafrika)".

"erinnern durch die Skulptur der Unterseite und den ziemlich engen Nabel etwas an *Solarium* (*Torinia*) *cerdaleum* Melvill u. Standen, doch ist sonst die Form und Skulptur beträchtlich verschieden" [Thiele, l.c., p. 81 (115)].

T. granosa (Valenciennes)

Solarium granosum Valenciennes, Humboldt & Bonpland, Recueil d'observations de Zoologie, vol. 2, p. 269; 1833.
Torinia? granosa, Carpenter, Cat. Mazatlan shells, p. 408; 1857.
Solarium granosum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 244; 1863 (1866).

Type locality: "Habitat ad Acapulco Mexicanorum".

It is very near to the Italian fossil *S. millegranum* Lm.

T. gyrus (Meuschen)

Areola Chemnitz, Syst. Conch. Cab., vol. 5, p. 13, pl. 173, figs. 1710, 1711; 1781.
Areolo. Trochus exiguus Chemnitz, Syst. Conch. Cab., vol. 5, p. 134, pl. 173, figs. 1710, 1711; 1781.
Trochus gyrus Meuschen, Gronovius, Zoophylac. Gronov., fasc. 3, p. 323, No. 1487 & Index Vermium; 1781.
Trochus. Das Gartenbeetchen Schröter, Einl. Conchylienkenntn., vol. 1, p. 718, No. 99; 1783.
Trochus Areola Gmelin, Linné, Syst. nat., ed. 13, p. 3575, No. 61; (1790) 1791.
Trochus areola, Dillwyn, Descr. catal. recent shells, vol. 2, p. 782, No. 56; 1817.
Trochus Areola, Wood, Index testac., 2nd ed., p. 137, pl. 29, fig. 56; 1828.
Solarium tessellatum Deshayes, Encycl. méth., Vers, vol. 2, p. 160, No. 7; 1830.
Solarium areola (*Trochus*), Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 13, No. 9, pl. 2, figs. 12, 13 & pl. 4, fig. 14 (errore pro 15); 1853.
Solarium areola, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 100, No. 8; 1843.
Solarium perspectiviunculum Meuschen var. Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30, pl. 4, fig. 13; 1853.
Solarium tessellatum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30, No. 34, pl. 4, fig. 12; 1853.
Solarium perspectiviunculum Meuschen var. *pallida* Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 41, pl. 4, fig. 13; 1853.
Solarium (*Torinia*) *perspectiviunculus,* Chemn. Var. *tessellata,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 238, pl. 5, figs. 61, 62; 1863 (1866).

Type locality: "Habitat in Mari Americano"; ?(Gmelin); ?(Dillwyn); ?(Wood); "das Stille Meer, namentlich die Marquesas-Inseln" (*S. tessellatum*) (Philippi).

Until now the name *areola* Gm. was generally used for this species. The shell is white and tessellated with reddish spots, "alba maculis quadratis rubellis varia" (Gmelin, 1791, p. 3575, No. 61), whereas the cingulum suturale is of a white colour. Chemnitz's figure, to which Gmelin refers ("Chemn. Conch. 5. t. 173. f. 1710. 1711."), clearly shows that this *Torinia* "auf weissem Grunde von lauter Queerstreifen umzingelt, und dergestalt von kleinen röthlichen viereckigen Flecken bezeichnet (wird), dass er dadurch das Ansehen eines Bretspiels und Gartenbeetchens bekömmt", as the author of the Conchylien-Cabinet (1781, p. 134) has expressed it so typically; this will be also the cause that he has named this *Torina* "Das Gartenbeetchen". This name is more appropriately chosen than "le lépreux de la Nouvelle-Zélande", as the sub-species *variegata* of *T. gyrus* was called in former days in France.

It is to be regretted that, according to the rules of nomenclature, the name *T. areola* (Gm.) is not available, as "*Trochus gyrus*" Meuschen has priority. The diagnosis and description of *Trochus gyrus* are fairly extensive, but give no good impression of the species. Fortunately the figure with description of Gualterius, quoted by Meuschen ("Gualt. Ind. Test.

tab. 65. fig. L.") as further specification of his *Torinia,* is rather clear. The text runs: "Cochlea marina Depressa, insigniter umbilicata, striata striis nodosis; ex albo, & fusco punctatim variegata". The figure represents a *Torinia* seen from the top and from the base, but, as a side view is missing, little can be said in relation to the height, that Meuschen gives as "depressiuscula" and Gualterius as "depressa". The figured shell for the rest shows the outline and pattern of *T. areola,* but differs from the latter in that the quadratic spots cover also the cingulum suturale, which Gmelin in his description mentions as being white ("anfractibus stria alba discretis").

Though it seems as if, by Gualterius' figure and description, is defined what Meuschen understands by *T. gyrus,* the drawing of Lister ("List. Hist. Conch. tab. 635. fig. 23") on the other hand, which is also quoted by the author of the last fascicule of the Zoophylacium, leads us astray. This poorly executed picture represents a *Torinia* which is wholly different from the specimen figured by Gualterius. Gmelin quotes the same figure for *"Trochus stramineus"* (= *Torinia straminea*) and with more reason.

We have here thus the case that under one name, viz., *Tr. gyrus* Meusch., the author has included two species, *T. areola* and *T. straminea.* Marshall (1887, p. 17) selected from this combination the *Torinia,* which corresponds partially with *T. areola,* by placing *T. gyrus* under the synonyms of *T. variegata,* to which he considers *T. areola* also to pertain. *T. gyrus* (Meusch.), 1781, partim, Marshall, has priority, however, against *T. areola* (Gm.), 1790 and thus we must use Meuschen's name for the species with quadratic spots. The name *variegata,* however, must be preserved for the subspecies with radiating stripes of white and brown.

We may discern two forms in this species, according to the greater or lesser extension of the quadratic spots on the whorls of the shell, viz.:

1) the forma *typica,* corresponding with the figure of Gualterius quoted by Meuschen, in which, as I have already mentioned, the quadratic spots also cover the cingulum suturale;

2) the forma *areola,* with a completely white cingulum suturale, whereas the rest of the whorl is tessellated, as is shown in Chemnitz's figure 1710 on plate 173 (Chemnitz, 1781).

1) forma *typica:*

a. 1. Pondoland (S. Africa), J. Mulder. — b. 2. Leiden Isl., Bay of Batavia (Java), J. Knock. — c. 2.Straits of Larantoeka (E. of Flores), J. Semmelink. — d. 1. Madoera, from E. F. Jochim's collection. — e. 1. Surinam, from the Old Collection. — f. 1. Timor, G. van Zijnen Wartel.

2) forma *areola:*

a. 11. Timor, G. van Zijnen Wartel. — b. 6. Indian Ocean, ? — c. 1.

Edam Isl., Bay of Batavia (Java), W. C. van Heurn. — d. 3. Surinam, from the Old Collection. — e. 1. Madoera, from E. F. Jochim's collection. — f. 1. Bay of Batavia (Java), W. C. van Heurn. — g. 1. Skroë (New Guinea), K. Schädler. — h. 1. Pondoland (S. Africa), J. Mulder. — i. 1. Enoshima, W. of Nagasaki (Japan), H. van Oordt van Lauwenrecht.

subsp. **depressiuscula** nom. nov.

Geve, Monatl. Belustigungen, pl. 25, fig. 276a, b; 1755.

(non) *Solarium depressum* Grateloup, Actes Soc. Linnéenne Bordeaux, vol. 5, p. 137; 1832.

(non) *Solarium planulatum* Grateloup, Actes Soc. Linnéenne Bordeaux, vol. 5, p. 137; 1832.

(?) *Euomphalus radiatus* Menke, Zeitschr. f. Malakozool., vol. 7, p. 170; 1850.

Solarium perspectiviunculum Meuschen var. Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30, pl. 4, fig. 10; 1853.

Solarium perspectiviunculum Meuschen var. *depressa* Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30 & p. 41, pl. 4, fig. 10; 1853.

Solarium articulatum Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30; 1853.

Solarium (Torinia) perspectiviunculus, Chemn. Var. ? *planulata* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 238, pl. 5, fig. 63; 1863 (1866).

Torinia perspectiviunculus, var. Smith, Proc. Zool. Soc. London, p. 818, pl. 50, figs. 17, 17a, 17b; 1878.

Torinia variegata, Gmelin Var. *depressa,* Marshall, Tryon, Manual of Conch., vol. 9, p. 17, pl. 5, figs. 78, 79; 1887.

Torinia varcigata, Gmelin Var. *planulata,* Marshall, Tryon, Manual of Conch., vol. 9, p. 17, pl. 5, fig. 77; 1887.

Solarium (Torinia) variegatum Gm. Vr. *depressum,* Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Solarium (Torinia) variegatum Gm. Vr. *planulatum,* Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Torinia planulata, Schepman, Prosobr. "Siboga" Exp., Mon. 49[1]b, p. 221; 1909.

Torinia varicgata Gm. Var. *depressa,* Dautzenberg, Faune Colonies françaises, vol. 3, p. 497; 1929.

Type locality: ?; "As a general rule the depressed specimens, if dark, come from the Sandwich Isles, if with much white from Annaa" (Hanley).

In contradistinction to the diagnosis of Philippi (1853, p. 30) of this subspecies, Marshall (1887, p. 17) mentions as pattern "color white with radiating brown streaks, interrupted white bands on the strong ribs about the periphery". This is not correct, as Philippi writes "dass der vierte und fünfte Gürtel stärker hervortreten und allein gefleckt sind, während die übrigen Gürtel einfarbig braun erscheinen, bis auf den, welcher den Nabel umgibt und weiss ist", his figure too confirms the diagnosis.

There is no noteworthy difference between the figures of Philippi of his var. *depressa* and those of Hanley of his var. *planulata,* at the most the

var. *depressa* may be a trifle less flattened. It is for this reason that I have united both varieties.

Torinia perspectiviunculus, var. Smith belongs also to this subspecies and keeps the mean, in relation to the height, between the specimens figured by Hanley and by Philippi.

a. 2. ?, from the Old Collection. — b. 1. Straits of Larantoeka (E. of Flores), J. Semmelink. — c. 1. Timor, G. van Zijnen Wartel. — d. 1. Reefs of Poeloe Raja, W. of Atjeh (N.W. Sumatra), G. A. J. v. d. Sande. — e. 1. Banda Neira, J. Semmelink.

subsp. **variegata** (Gmelin)

Geve, Monatl. Belustigungen, pl. 25, figs. 275 a, b, c; 1755.

Trochus perspectiviunculus Chemnitz, Syst. Conch. Cab., vol. 5, p. 13, pl. 173, figs. 1708, 1709; 1781.

Trochus perspectiviunculus variegatus Chemnitz, Syst. Conch. Cab., vol. 5, p. 134, pl. 173, figs. 1708, 1709; 1781.

Trochus. Das bunte Perspectivchen Schröter, Einl. Conchylienkenntn., vol. 1, p. 718, No. 98; 1783.

Trochus perspectiviunculus, Schröter, Namen-Register syst. Conch. Cab., p. 107; 1788.

Trochus variegatus Gmelin, Linné, Syst. nat., ed. 13, p. 3575, No. 60; (1790) 1791.

(non) *Trochus variegatus,* Brocchi, Conch. foss. subapennina, vol. 2, p. 360; 1814.

Solarium perspectiviunculum Meuschen var. Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 30, pl. 4, fig. 13; 1853.

Solarium variegatum Lamarck, Tableau encycl. et méth., vol. 21, Moll. testac., pl. 446, figs. 6a, 6b; (An VI) 1816.

Trochus perspectiviunculus, Dillwyn, Descr. catal. recent shells, vol. 2, p. 783, No. 59; 1817.

Solarium variegatum, Lamarck, Anim. s. Vert., vol. 7, p. 4, No. 6; 1822.

Solarium variegatum, Blainville, Dict. Sciences Nat., vol. 49, p. 411; 1827.

Trochus variegatus, Wood, Index Testac., 2nd ed., p. 137, pl. 29, fig. 59; 1828.

Solarium variegatum, Deshayes, Encycl. méth., Vers, vol. 2, p. 159, No. 4; 1830.

Solarium variegatum, Sowerby, Genera of shells, vol. 2, No. 38, pl. 202; (1820-1825) 1831.

Solarium variegatum, Potiez & Michaud, Galérie Moll. de Douai, vol. 1, p. 232; 1838.

Solarium variegatum, Kiener (pars), Icon. coq. viv., Solarium, p. 10, No. 7, pl. 4, fig. 7; 1838-1839.

Solarium variegatum, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 99, No. 6; 1843.

Solarium perspectiviunculum (*Trochus*), Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 12, No. 8, pl. 2, figs. 10, 11; 1853.

Torinia? variegata, Carpenter, Cat. Mazatlan shells, p. 407, No. 484; 1857.

Torinia variegata, Adams, Genera rec. Moll., vol. 1, p. 243, pl. 25, figs. 7 a, b, c; 1858.

Solarium (*Torinia*) *variegatum,* Chenu, Man. de Conchyl., vol. 1, p. 233, fig. 1354; 1859.

Solarium (*Torinia*) *perspectiviunculus,* Hanley (syn. exclus.), Sowerby, Thesaurus Conchyl., vol. 3, p. 237, pl. 5, figs. 59, 60, 64; 1863 (1866).

Torinia corrugata Pease, Proc. Zool. Soc., p. 516; 1865 (fide Cuming).

Solarium variegatum, Gray, Figures of Moll. anim., vols. 1 & 2, pl. 41, figs. 3, 4; 1874.
Torinia variegata, Fischer, Manual de Conchyliol., p. 714, fig. 484; 1885 (1887).
Torinia variegata, Marshall, Tryon, Manual of Conch., vol. 9, p. 16, pl. 5, fig. 76 (tantum); 1887.
Solarium (*Torinia*) *variegatum,* Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.
Solarium variegatum, Sowerby, Marine shells of S. Africa, p. 28; 1892.
Torinia variegata, Hidalgo, Catal. mol. testác. Filipinas, vol. 1, Mol. marinos, p. 189; 1904-1905.
Torinia variegata, Hedley, Proc. Linn. Soc. New S. Wales, vol. 32, p. 483; 1907.
Torinia variegata, Hedley, Australas. assoc. advancement science, p. 360; 1909.
Torinia variegata, Ayres, Catál. conchas exót., vol. 1, p. 244, No. 885; 1916.
Heliacus variegatus, Finlay, Trans. & Proc. N. Zealand Inst., vol. 57, p. 401; (1926) 1927.
Heliacus variegatus, Tomlin, Ann. S. African Mus., vol. 25, p. 333; 1928.
Torinia variegata, Dautzenberg, Faune colonies françaises, vol. 3, p. 497; 1929.
Solarium variegatum, Turton, Mar. shells Port Alfred, p. 134, No. 968; 1932.

Type locality: ?; ? (Dillwyn); "Habite les mers australes" (Lamarck).

The typical "*Trochus variegatus*" Gm. is coloured with brownish streaks on a lighter ground, as is shown by the diagnosis in the Systema Naturae ed. 13: "testa alba subfusco radiata". Chemnitz's figures, quoted by Gmelin ("Chemn. Conch. 5. t. 173. f. 1708. 1709"), give a good representation of the form and colour of this subspecies, although they are coarsely executed and the umbilicus is drawn a trifle to large.

Besides a reference to Geve "Belust. tab. 25. fig. 275. lit. a.b.", by which figure *T. variegata* can easily be identified, Chemnitz (1781, p. 134) quotes moreover, under the name "*Trochus perspectiviunculus variegatus*": "An *Trochus Perspectiviunculus* Meuschenii in Museo Gronoviano, no. 1311. pag. 125". The author must have made an error in this quotation, as neither the page, nor the number are correct. P. 125 is in fasciculus I, among the "*Pisces branchiales*", and No. 1311 refers to a "*Voluta maculatus*", a species of the genus *Oliva.* If we look under the name "*perspectiviunculus*" mentioned by Chemnitz, we find in the Index Vermium of the Museum Gronovianum a reference to No. 1486, where under the genus "*Trochus*" a Solariid is described with quotation of a figure of Gualterius. The short diagnosis, however, does not tally with that of *Torinia variegata,* which may be proved by the following passage: "marginata, glabra, laevi", three adjectives none of which is applicable to the above-mentioned "*Trochus*". The quoted figure ("Gualt. Ind. Test. tab. 65, fig. D") is in no way a *Torinia,* but a *Philippia.* As Chemnitz's names, being for the most part non-binominal, have no validity, the above mentioned question is of no great importance, but Philippi (1853, p. 12, No. 8), who mentions the quotation of Chemnitz altogether with errors and all, omits the conjunction "an", which the lastnamed author had added by way of pre-

caution, hereby sanctioning the wrong quotation. He names, moreover, this *Torinia*: "*Solarium perspectiviunculum* Meuschen", which denomination, as we showed above, is quite wrong, it might have been better if he had mentioned Chemnitz as the author, as this scholar has clearly represented and described this species.

Dautzenberg & Bouge (1933, p. 361) use the name "*Solarium* (*Torinia*) *perspectiviunculum* (Meuschen) Schröter" for this species, asserting that this name has acquired validity because Schröter has placed it in his "Namen-Register des systematischen Conchylien-Cabinets" (1788, p. 107). I quote here the passage in question: "Chemnitz dit que le *Tr. perspectiviunculus* Meuschen est douteux. Il a cependant utilisé ce nom, bien que non binominal, dans le Conchylien Cabinet. Mais il l'est devenu en 1788, dans le Namen Register de Schröter, et doit donc être préféré à *variegatus* qui n'a été publié par Gmelin qu'en 1790". I do not believe that this opinion is correct. Schröter, who has composed this Namen-Register, says in his preface that the editor has insisted on keeping the work not too voluminous in relation to the price; and continues: "Aus diesem so billigen Grunde habe ich ... die deutschen Beschreibungen derer beyden Herrn Verfasser ... aber so sehr zusammen gedrängt, als es mir nur möglich war". It is therefore probably for want of space, that Schröter, for the sake of brevity, in his Register only used the two first words (sometimes also a single word, e.g., "Flavosculum", "Labeo", "Carneolus", "Vulsella", "Sparverius") also of the long Latin descriptive names, or more correctly parts of diagnoses, of Martini & Chemnitz, just as he did it for the German names, and not to bring the work into line with the binominal nomenclature [1]).

This assertion may be proved by the following example: Chemnitz has described and figured in his Conchylien-Cabinet:

Trochus solaris Indiae orientalis = *Trochus indicus* Gm. = *Xenophora (Tugurium) indica* (Gm.);

Trochus solaris Indiae orientalis = *Trochus solaris* L. = *Xenophora (Onustus) solaris* (L.);

Trochus solaris Indiae Occidentalis = *Trochus inermis* Gm. = *Astralium (Astralium) longispina* (Lm.) var. *spinulosa* (Lm.) worn out;

Trochus Solaris Imperialis = *Trochus imperialis* Gm. = *Astralium (Lithopoma) heliotropium* Martyn;

Trochus solaris Indiae occidentalis umbilicatus = *Trochus heliacus* Phil. = *Astralium (Astralium) longispina* (Lm.);

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1) Generally Schröter mentions in extenso the synonyms, or more correctly the names, or parts of diagnoses of other authors, quoted by Martini & Chemnitz.

Trochus solaris complanatus = *Trochus planus* Gm. = *Astralium (Astralium) longispina* (Lm.) juv.

The above mentioned shells, which are all good species or varieties, belonging to different subgenera, and even to different genera, and which Chemnitz has clearly separated although he has not given them binominal names, are altogether mentioned by Schröter in his Index under the single name: "*Trochus solaris*". This would of course be absurd if Schröter did it in order to make the names of Chemnitz binominal, as he would have united in this way several good species. Quite right and logical, on the other hand, is his way of acting if it was only his purpose to compose a register of not to great extent. As it has also been said by other authors that Schröter used in his Register the binominal nomenclature, it seemed useful to call attention to this point.

Philippi (1853, p. 12, No. 8) mentions that *S. perspectiviunculum* (= *T. variegata*) has 11 cingula on the body whorl: "etwa eilf erhabene Quergürtel auf der letzten Windung" and concerning *S. areola* (= *T. gyrus* [Roed.]) he (1853, p. 13, No. 9) writes likewise: "undecim (cingula) in ultimo (anfractu)". In all the specimens I have examined I counted, however, 10 cingula from the suture till the crenae umbilici included, this agrees with the statement of Marshall (1887, p. 16), who mentions also 10 cingula on the body whorl. The difference of this number from that given by Philippi is perhaps caused by the fact that this author may have counted also the spiral rib on the umbilical wall, which shows itself half-way the margo columellaris as a little canal.

The opercula of our specimens agree completely with the figures of Adams (1858, pl. 25, figs. 7a, 7b, 7c). Sowerby (1831) on his pl. 202 shows a figure of the operculum of *T. variegata* resembling that of Adams, but rather coarsely executed. It is reproduced in the centre of fig. 2 of my paper (1940, p. 240, fig. 2) on *Solarium* s.s. The figure of an operculum of this *Torinia* by Marshall (1887, pl. 1, figs. 14, 15, 16) differs completely from the figures of Adams and Sowerby. Pease, after whom Marshall has reproduced this drawing, says that it belongs to a specimen from the West coast of America, according to the former author the opercula of the animals of that region differ widely from the specimens of the same species from Hawaii and the East Indies. Our specimen from the West coast of America (b. Mexico, H. Cuming), however, has a quite normal operculum, this justifies the remark by Marshall (1887, p. 17): "I have examined specimens of the West Coast species, ... and am unable to verify Mr. Pease's statement, the opercula being normal".

Menke (1850, p. 170) describes a *Euomphalus radiatus* and refers to

the figures of Geve and Chemnitz already mentioned above on p. 11. In my opinion, however, he is on the wrong track, as he reproaches Lamarck, and with him Kiener and Deshayes, for having quoted the figure of Chemnitz (1781, pl. 173, figs. 1708, 1709) for *T. variegata*: "Die allegirte Chemnitz'sche Figur citirt Lamarck ganz unrichtig unter seinem *Solarium variegatum*. Kiener, dessen Kritik sich unter dieser Art besonders oberflächlich erweiset, ist Lamarck's Vorgange unbedenklich gefolgt. Hr. Deshayes hat die Lamarck'sche fehlerhafte Citation ungerügt gelassen". If Menke had looked more accurately he would have noticed that Lamarck has copied this quotation from Gmelin (1791, p. 3575, No. 60), who, as we have seen, mentioned this figure to illustrate his diagnosis of "*Trochus variegatus*" and as the author of that species surely was the most able to know if it resembled Chemnitz's picture.

Lamarck's distinct figure of this species in the Tableau Encyclopédique (1816, livr. 4, pl. 446, figs. 6a, 6b) is also disapproved by Menke: "Wenn die von Lamarck ebenfalls unter *Solarium variegatum* citirte Figur der Enc. méth. pl. 446. fig. 6 wirklich diese Art (*Solar. varieg.*) vorstellen soll, so ist sie jedenfalls als sehr misslungen zu bezeichnen". The sole thing to reproach this, for the rest good figure, is that in the specimen seen from the base the umbilicus is rather large for a typical *T. variegata*.

According to Menke his *Euomphalus radiatus* resembles the figures of *T. variegata* in Gève and Chemnitz, one may consider it therefore as a synonym of the latter. As Menke, however, characterizes it in his diagnosis as a "testa ... convexo-depressa, spira planiuscula", mentions an "umbilicum patulum" and gives as size: "Alt. 2,4, diam. 5,5 lin.", it remains possible that his species is related to or identical with the var. *depressa* Phil. or *planulata* Hanl. of *T. gyrus*, which, according to the diagnosis of Hanley (1863, p. 238), has an "umbilicus patens" and which agrees with the proportion between height and breadth of the specimen of Menke. At the end of his description the latter writes "Unsere Schnecke ist zunächst mit *Euomphalus infundibuliformis* (*Trochus infundibuliformis* Chemn.) verwandt", which may be said of the subsp. *depressiuscula*.

It is probable, principally on account of the sentence of Menke quoted just now, that Hanley (1863, p. 243) supposes that *Euomphalus radiatus* possibly is his "*S. infundibuliforme*, Chemn. Var. *?strigata*": "Menke has described", says he, "as nearly related to this species (viz., *S. infundibuliforme*) a Mazatlan shell which, if not this doubtful variety (viz., var. *strigata*), is entirely unknown to me. The somewhat rude figures he refers tc as illustrative, which are almost universally accepted as representations

of *perspectiviunculus,* do not exhibit the patulous umbilicus he especially indicates".

a. 2. Gulf of California, W. Newcomb. — b. 1. Mexico, H. Cuming. — c. 2. San Diego (California), Geological Mus. Wageningen. — d. 3. Pacific Is., H. C. Fulton. — e. 2. Surinam, from the Old Collection. — f. 1. Timor, G. van Zijnen Wartel. — g. 3. Straits of Larantoeka (E. of Flores), J. Semmelink. — h. 1. Reefs of Poeloe Raja, W. of Atjeh (N.W. Sumatra), G. A. J. v. d. Sande.

var. **sinistrorsa** Lagoda

Torinia variegata, Lamarck, var. *sinistrorsa* Lagoda, Journ. de Conch., vol. 16, p. 264, pl. 9, fig. 7; (1867) 1868.

Type locality: "Californie".

A laeotropic scalarid.

T. herberti (Deshayes) vide *T. cylindrica* (Gmelin).

T. homalaxis (Melvill)

Solarium (*Torinia*) *homalaxis* Melvill, Mem. & Proc. Manchester Lit. & Phil. Soc., vol. 7, p. 58 (7); 1893.

Solarium (*Torinia*) *homalaxis,* Melvill, Proc. Malac. Soc. London, vol. 2, p. 110, pl. 8, fig. 12; 1896.

Type locality: "Bombay".

T. jeffreysiana (Tiberi)

Gyriscus Jeffreysianus Tiberi, Journ. de Conch., vol. 15, p. 303; 1867.

Gyriscus Jeffreysianus, Tiberi, Journ. de Conch., vol. 16, p. 59, pl. 5, fig. 1; 1868.

Solarium (*Torinia*) *Jeffreysianum,* Weinkauff, Conchyl. des Mittelmeeres, vol. 2, p. 448; 1868.

Gyriscus Jeffreysianus, Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 121 & p. 269; 1869.

Gyriscus Jeffreysianus, Monterosato, Giorn. Sci. Naturali, Palermo, vol. 13, p. 97; 1878.

Torinia (*Gyriscus*) *Jeffreysiana,* Marshall, Tryon, Manual of Conch., vol. 9, p. 23, pl. 6, figs. 29, 30 & pl. 1, fig. 17; 1887.

Solarium Jeffreysianum, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Solarium (*Gyriscus*) *Jeffreysianum,* Kobelt, Prodromus faunae Moll., p. 216; 1888.

Torinia (*Gyriscus*) *jeffreysiana,* Thiele, Handb. syst. Weichtierkunde, vol. 1, p. 184; 1931.

Type locality: "In fundis coralligenis maris Sardiniam meridionalem ambientis".

T. kochii (Dall)

(non) *Solarium nanum* Grateloup, Actes Soc. Linnéenne Bordeaux, vol. 5, p. 138; 1832.

Solarium nanum Koch, Zeitschr. f. Malakozool., 1851 (f. Philippi).

Solarium nanum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 27, No. 29, pl. 4, fig. 5; 1853.

Solarium nanum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866).
Torinia nana, Marshall, Tryon, Man. of Conch., vol. 9, p. 22, pl. 6, figs. 20, 21; 1887.
Solarium (Torinia) nana, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Architectonica kochii Dall, Proc. U. S. Nation. Mus., vol. 37, p. 232; 1909 (1910).

Type locality: "Chile, nach Angabe eines Pariser Naturalienhändlers".

Philippi mentions Koch as the author of this species and quotes in connection therewith: "Zeitschr. f. Malakoz. 1851". It was, however, impossible for me to find the diagnosis of Koch in this periodical.

T. madurensis Schepman

Torinia madurensis Schepman, Prosobr. "Siboga" Exp., Mon. 49[1]b, p. 222, pl. 14, fig. 4 a, b, c; 1909.

Type locality: "Stat. 51. Madura-bay. 69-91 M.".

T. malani Dautzenberg

Torinia Malani Dautzenberg, Actes Soc. Linn. Bordeaux, vol. 64, p. 128, pl. 2, figs. 15, 16, 17; 1910.
Torinia malani, Tomlin & Shackleford, Journ. of Conch., vol. 14, p. 252; 1914.

Type locality: "Drag. Baie de Rufisque, 18-20 mètres".

T. mazatlanica (Pilsbry & Lowe)

Heliacus mazatlanicus Pilsbry & Lowe, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 83, pl. 8, figs. 6, 7, 8; 1932.

Type locality: "Mazatlan, Mexico".

"This shell belongs in the same group as *Heliacus panamensis* Bartsch", (Pilsbry & Lowe, l.c.).

T. mighelsi (Philippi)

Solarium cyclostomum (non Menke) Mighels, Proc. Boston Soc. nat. hist., vol. 2, p. 22; 1845 (1848).
Solarium Mighelsi Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 36, No. 43; 1853.
Solarium (Torinia) Mighelsii, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 240, pl. 5, figs. 87, 88; 1863 (1866).
Torinia Mighelsi, Marshall, Tryon, Manual of Conch., vol. 9, p. 19, pl. 6, figs. 89, 90; 1887.
Solarium (Torinia) Mighelsi, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Oahu"; "Oahu" (Philippi).

a. 2. Hawaiian Is., H. C. Fulton.

T. mirabilis Schepman

Torinia mirabilis Schepman, Prosobr. "Siboga" Exp., Mon. 49[1]b, p. 222, pl. 14, fig. 6a, b, c; 1909.

Type locality: "Stat. 212. 5° 54'.5 S., 120° 19'.2 E. Banda Sea. 462 M.".

T. monilifera (Monterosato) vide *T. carocollata* (Lamarck).

T. nana (Koch) vide *T. kochii* (Dall).

T. nubila (Philippi)

Solarium nubilum Menke (in lit.) Philippi, Zeitschr. f. Malakozool., vol. 5, p. 170; (1848) 1849.

Solarium nubilum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 25, No. 26, pl. 4, fig. 2; 1853.

S. nubilum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 239; 1863 (1866).

Torinia cyclostoma Menke var. γ, Mörch, Malakoz. Bl., vol. 22, p. 157; 1875.

Torinia nubila, Marshall, Tryon, Manual of Conch., vol. 9, p. 18, pl. 5, fig. 86a; 1887.

Solarium (*Torinia*) *nubila,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Cap Haiti"; "Cap Haiti" (Philippi in Syst. Conch. Cab.).

T. panamensis (Bartsch)

Heliacus panamensis Bartsch, Proc. U.S. Nation. Mus., vol. 54, p. 573, pl. 88, figs. 6, 7, 8; 1918 (1919).

Type locality: "Punta Paitilla, near Panama City, Panama, in siftings from sand and worm burrows".

T. petasus (Tomlin)

Heliacus petasus Tomlin, Ann. S. African Mus., vol. 25, p. 334, pl. 26, fig. 4; 1928.

Heliacus petasus, Tomlin, Ann. Natal Mus., vol. 6, p. 433; 1931.

Type locality: "Scottburgh, dredged in 92 fathoms".

The species the most related with this one is *T. dilecta* (Dh.), "but the two species differ in size, proportions and details of sculpture" [Tomlin (1928, p. 335)].

T. planispira (Pilsbry & Lowe)

Heliacus planispira Pilsbry & Lowe, Proc. Acad. Nat. Sci. Philadelphia, vol. 84, p. 83, pl. 8, figs. 9, 10, 11; 1932.

Type locality: "Mazatlan, Mexico".

"This shell is about the same size as *H. panamensis* Bartsch, but with entirely different sculpture" (Pilsbry & Lowe, l.c.).

T. radialis (Dall)

Architectonica radialis Dall, Bull. Mus. Compar. Zoöl. Harvard Coll. Cambridge, vol. 43, No. 6, p. 327; 1908.

Type locality: "Station 3392, in 1270 fathoms, hard bottom, ... in the Gulf of Panama".

"The operculum is peculiar and apparently related to that of *Torinia*" (Dall, l.c. p. 328).

T. riisei Mörch

Torinia Riisei Mörch, Malakoz. Bl., vol. 22, p. 156; 1875.
Solarium Riisei, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "St. Thomas".

Mörch adds to his description: "*Solarium asperum* Hanl. Thes. f. 77-78 non absimilis", but the latter inhabits the Indian Ocean.

T. rosulenta (Watson)

Solarium (Torinia) rosulentum Watson, Journ. Linn. Soc., vol. 16, p. 610; 1883.
Solarium (Torinia) rosulentum, Watson, Rep. voy. "Challenger', Zool., vol. 15, Gasteropoda, p. 136, pl. 8, fig. 12; 1886.
Torinia rosulenta, Marshall, Tryon, Manual of Conch., vol. 9, p. 23, pl. 6, fig. 34; 1887.
Solarium (Solarium) rosulenta, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "St. 163 A. (Station 163 B) ... Lat. 33° 51′ 15″ S., long. 151° 22′ 15″ E. off Port Jackson. 35 fms.".

T. sicula (Cantraine)

(non) *Trochus stramineus* Gmelin, Linné, Syst. nat., ed. 13, p. 3575, No. 59; (1790) 1791.
Trochus stramineus, Costa (syn. exclus.), Catal. sist. e ragionato testac. due Sicilie, p. 92, No. 14 & p. 99, No. 14; 1829.
Solarium stramineum, Philippi (syn. exclus.), Fauna Moll. utr. Siciliae, vol. 1, p. 173; 1836.
Solarium stramineum, Potiez & Michaud (pars una), Galérie Moll. de Douai, vol. 1, p. 324; 1838.
Solarium stramineum, Kiener (pars una), Icon. coq. viv., Solarium, p. 11; 1838-1839.
Solarium siculum Cantraine, Bull. Acad. Sci. Bruxelles, vol. 9, part 2, p. 343; 1842.
Solarium stramineum, O. Costa, Atti della R. Accad. Scienze, vol. 5, pars 2, p. 48; 1844.
Solarium stramineum, Philippi, Fauna Moll. utr. Siciliae, vol. 2, p. 148; 1844.
Solarium stramineum, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 177; 1852.
Solarium stramineum (Trochus), Philippi (pars una), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 32, No. 36, pl. 4, fig. 14 a, b, c (tantum); 1853.
Solarium stramineum Gm. var. *mediterranea* (non Mtros.) Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 41, pl. 4, fig. 14 a, b, c; 1853.
Solarium Spencerii Allen, Catal. Molusc. Mus. Pôrto, p. 158; 1856-1858 (fide Nobre).
Solarium stramineum, Petit de la Saussaye (syn. exclus.), Journ. de Conch., vol. 8, p. 252; 1860.
(pullus) *Ammonicerina mutabilis* Costa, Microdoride Mediterranea, p. 72, pl. 12, figs. A, B (a dextra); 1861.
Solarium stramineum, Weinkauff (syn. exclus.), Journ. de Conch., vol. 10, p. 349; 1862.
Solarium stramineum, Hidalgo (syn. exclus.), Journ. de Conch., vol. 15, p. 377; 1867.
Solarium siculum, Weinkauff, Conchyl. des Mittelmeeres, vol. 2, p. 262; 1868.
Solarium Fallaciosum, Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 120; 1869.
(non) *Solarium Siculum,* Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 120; 1869.

Solarium fallaciosum Tiberi, Bolet. Soc. Malac. italiana, vol. 5, p. 35; 1872.
Solarium fallaciosum, Monterosato, Notizie Solarii Mediterraneo, p. 8, pl. 1, figs. 12-20; 1873.
Solarium fallaciosum, Monterosato, Journ. de Conch., vol. 22, p. 271; 1874.
Solarium fallaciosum, Monterosato, Giorn. Sci. Naturali, Palermo, vol. 13, p. 97; 1878.
Solarium siculum, Jeffreys, Proc. Zool. Soc. London, p. 39; 1885.
Solarium fallaciosum, Locard, Catal. gén. Moll. de France, p. 303; 1886.
Solarium Siculum, Locard, Catal. gén. Moll. de France, p. 303; 1886.
Torinia straminea, Gmel. Var. *sicula,* Marshall, Tryon, Manual of Conch., vol. 9, p. 19, pl. 6, figs. 95, 96; 1887.
Solarium (*Torinia*) *fallaciosum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Solarium (*Solarium*) *Siculum,* Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.
Solarium fallaciosum, Kobelt, Prodromus faunae Moll., p. 215; 1888.
Solarium fallaciosum, Dautzenberg, Mém. Soc. Zool. France, vol. 4, p. 607; 1891.
Solarium fallaciosum, Locard, Expéd. sci. "Travailleur" & "Talisman", Moll. testac., vol. 2, p. 14; 1898.
Solarium (*Torinia*) *fallaciosum,* Dautzenberg, Rés. Camp. Sci. Prince de Monaco, fasc. 72, p. 123; 1927.
Solarium fallaciosum, Nobre, Mol. marinhos Portugal, p. 151, pl. 15, fig. 4; 1932.

Type locality: "trouvée à l'état fossile près de Messine"; "Trovato l'ho io più volte nel Golfo di Napoli presso Cuma, siccome in Taranto, benchè più raro" (O. Costa); "Unicum specimen prope Aci Castello lectum accepi, ... et plura pulla Panormi" (Philippi).

Very nearly related to this *Torinia* is *S. canaliculatum* Lm., a fossil from the Parisien (Lutétien), middle Eocene, of which Philippi (1836, p. 173) says: "Specimina fossilia *S. canaliculati* prope Grignon [1]) lecta marginem umbilici paullulum magis prominentem ostendunt, caeterum ad amussim cum vivis nostris (vid. speciminibus *S. straminei* [= *T. sicula*]) conveniunt". Besides the difference indicated by Philippi, *S. canaliculatum* has a larger and somewhat funnel-shaped umbilicus, concerning which Lamarck says nothing in his diagnosis, but which is described by Deshayes (1824, pp. 220, 221) as "umbilico magno" and "ombilic ... fort large", and also (1830, p. 161) as "un très-grand ombilic". This large umbilicus is also clearly visible in the fine figure which Deshayes (1837, pl. 24, fig. 20) gives of this species. *S. siculum* on the other hand has a smaller umbilicus, Philippi (1853, p. 33, No. 36) calls it "ziemlich eng" and says, moreover, in comparing this species with *T. straminea* (Gm.), in relation to the umbilicus of the latter: "Chemnitz nennt den Nabel 'weit' und Lamarck 'patulus', was n i c h t a u f d i e F o r m d e s M i t t e l m e e r e s p a s s t [2])".

Probably *S. sicula* may be considered as a variety of *T. canaliculata,* especially as the latter is a very variable species, this appears also in that

1) The locality of the type of *S. canaliculatum.*
2) Spacing by me.

Sowerby (1842, p. 546) in his "Mineral Conchology" discerns already three varieties of *S. canaliculatum.*

Weinkauff (1868, p. 263) and Dautzenberg (1927, p. 123) suppose that Philippi has confounded this species, viz., *T. sicula,* with *T. straminea* (Gm.): "Auch diese Art", writes Weinkauff, "hat Philippi fälschlich mit dem viel grösseren *S. stramineum* Gmel. von der Ostküste Südafrika's verwechselt und geglaubt, die Beziehungen beider seien dieselben, wie zwischen der *S. luteum* und *S. conulus*". This refers probably only to Philippi's statement in the "Enumeratio molluscorum Siciliae", in which he indeed confounded both these species, but in his revision of the Solariidae in the Conchylien-Cabinet (1853, p. 32) this author discerns not only the species of the Indian Ocean from that of the Mediterranean, but names, moreover, on p. 41, the species of the Mediterranean "var. *mediterranea*" [1]).

This *Torinia* is named by Dautzenberg (1927, p. 123): *Solarium* (*Torinia*) *fallaciosum* Tiberi. The author writes in elucidation of this denomination: "d'autres l'ont (viz., *S. fallaciosum*) identifiée au *S. siculum* Cantraine, mais cette assimilation est fort douteuse puisque Petit de la Saussaye a rapporté l'espèce de Cantraine au *Solarium hybridum* de Lamarck. La description du *S. siculum* est d'ailleurs précaire et n'est pas accompagnée de figure". Against this we might remark that Petit de la Saussaye indeed regarded *S. siculum* as a synonym of *S. hybridum* (L.), but that, in opposition to this single author, there are many, such as Jeffreys, Weinkauff, Locard, Marshall, Nobre, who regard *S. siculum* the same as the var. *mediterranea* Phil. of *S. stramineum* (= *S. fallaciosum* Tib.). Cantraine (1842, p. 343), it is true, gives no figure, but his diagnosis in my opinion in rather clear, and as this author describes Mollusca from the Mediterranean only in his publication, the number of the species to which this diagnosis refers is very limited. Moreover, and what is more important, Cantraine's description is completed by this remark: "Cette espèce... me paraît être celle que M. Philippi a rapportée au *S. stramineum.* Lam." Cantraine means here, of course, *S. stramineum* (non Gm.) auct., namely *S. stramineum* var. *mediterranea* Phil. This proves that therefore there is here no reason to reject this name *T. sicula,* which has priority against *S. fallaciosum* Tib.

It seems to me that Philippi (1853, pl. 4, fig. 14) has not very accurately reproduced the base of this *Torinia,* in relation to its details. The figure is too diagrammatic, the cingula seem to be drawn in a haphazard manner

1) Not to be confounded with *Solarium mediterraneum* Mtros. 1872 (= *Philippia lepida* mihi) and with *Solarium luteum* Lm. var. *mediterranea* Phil. 1853 [= *Philippia hybrida* (L.)].

and the sulci are too large. Philippi writes for instance: "die beiden Leisten, welche ihn (den Nabel) umgeben, sind weitläuftiger und gröber gekerbt als die übrigen", nothing of which is visible in the figure.

If the opinion of Monterosato is true, *Solarium brocchii* Cantr. ought to be placed among the synonyms of this *Torinia*. "Je considère comme probablement synonyme de cette dernière espèce le *S. Brocchii* de Cantraine", writes this author (1874, p. 360), "dont j'ai recemment examiné ... quelques exemplaires fossiles, vraisemblablement authentiques, qui se rapportent à notre coquille et à la description publiée par Cantraine".

a. 2. Naples (Italy), H. C. Fulton.

T. sigsbeei (Dall)

Solarium Sigsbeei Dall, Bull. Mus. Comp. Zoöl. Harvard College Cambridge, vol. 18, p. 275 & p. 24, pl. 23, figs. 3, 3a; 1889.

Solarium Sigsbeei, Dall, Bull. U.S. Nat. Mus., No. 37, p. 148, pl. 23, figs. 3, 3a; 1889.

Type locality: "Off Bahia Honda, Cuba, at Station 19, in 310 fms."

'The other recent species most like this is the *S. borealis* of Verrill, in which the sculpture of the umbilical margin is wholly dissimilar, and quite faint in comparison" (Dall, l.c., p. 276).

T. soverbii (Hanley) vide *T. architae* (O. Costa) var.

T. straminea (Gmelin)

Trochus perspectivus stramineus Chemnitz, Syst. Conch. Cab., vol. 5, p. 13, pl. 172, fig. 1699; 1781.

Trochus perspectivus stromineus Chemnitz, Syst. Conch. Cab., vol. 5, p. 128, pl. 172, fig. 1699; 1781.

Trochus. Die strohfarbene Perspectivschnecke Schröter, Einl. Conchylienkenntn., vol. 1, p. 717, No. 96; 1783.

Trochus perspectivus, Schröter, (pars), Namen-Register syst. Conch. Cab., p. 107; 1788.

Trochus stramineus Gmelin, Linné, Syst. nat., ed. 13, p. 3575, No. 59; 1790.

Architectonica Gothica Roeding, Bolten, Mus. Boltenianum, p. 78, No. 1026; 1798.

Trochus stramineus, Dillwyn, Descr. catal. recent shells, vol. 2, p. 785, No. 63; 1817.

Solarium stramineum, Lamarck, Anim. s. Vert., vol. 7, p. 4, No. 4; 1822.

Solarium stramineum, Blainville, Dict. Sciences Naturelles, vol. 49, p. 411; 1827.

Trochus stramineus, Wood, Index testac., 2nd ed., p. 137, pl. 29, fig. 63; 1828.

Solarium stramineum, Potiez & Michaud (pars altera), Galérie Moll. de Douai, vol. 1, p. 324; 1838.

Solarium stramineum, Kiener (pars), Icon. coq. viv., Solarium, p. 11, No. 8, pl. 3, fig. 4; 1838-1839.

Solarium stramineum, Deshayes, Lamarck, Anim. s. Vert., vol. 9, p. 99, No. 4; 1843.

Solarium stramineum, Mörch, Catal. conch. Yoldi, Cephalophora, p. 47; 1852.

Solarium stramineum (*Trochus*), Philippi (pars altera), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 32, No. 36 & p. 11, pl. 2, fig. 7 (tantum); 1853.

Solarium (*Torinia*) *stramineum,* Chenu, Man. de Conchyl., vol. 1, p. 233, fig. 1353; 1859.

Solarium (*Torinia*) *stramineum,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 242, pl. 5, figs. 95, 96, 97; 1863 (1866).

Solarium stramineum (*Trochus*), Hidalgo, Journ. de Conch., vol. 15, p. 377; 1867.

Torinia straminea, Angas, Proc. Zool. Soc. London, p. 92; 1871.

Torinia straminea, Marshall, Tryon, Manual of Conch., vol. 9, p. 19, pl. 6, figs. 93, 94 (tantum); 1887.

Solarium (*Torinia*) *stramineum,* Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Torinia straminea, Hidalgo, Catal. mol. testác. Filipinas, vol. 1, Mol. marinos, p. 188; 1904-1905.

Heliacus stramineus, Cotton & Godfrey, S. Austral. Naturalist, vol. 14, p. 74; 1933.

Type locality: "Habitat ad Tranquebariae littora".

Several authors, e.g., Philippi (1836, non 1853), Potiez & Michaud, O. Costa, Kiener, Petit de la Saussaye (1860, non 1869), Weinkauff (1862, non 1868), Hidalgo, have confounded *T. sicula* (Cantraine) with this *Torinia* or have considered both as the same species. It is in connection with this I give the following list containing the principal differences between the two species.

T. straminea (Gm.)	*T. sicula* (Cantr.)
Shell: conoid,	Shell: depressed-conoid, subdiscoid,
Whorls: convex, "pulvinatus",	Whorls: flattened,
Periphery of the last whorl rather rounded,	Last whorl with a carina formed by the cingulum basale (marginale),
Diameter: 25-34 mm,	Diameter: 8-15 mm,
Habitat: Indian Ocean,	Habitat: Mediterranean.

Besides *T. sicula,* Kiener includes also wrongly *T. herberti* (Dh.), from Martinique, in *T. straminea* and therefore the locality "la Martinique", must be dropped. In the same manner "la Méditerranée, les côtes de Palerme" are to be suppressed.

Our specimen (a. 1. Indian Ocean, H. Boie & H. C. Macklot) corresponds completely with the excellent figure of Kiener.

a. 1. Indian Ocean, H. Boie & H. C. Macklot. — b. 1. Madoera, from E. F. Joachim's collection.

var. **fulva** (Hinds)

Solarium fulvum Hinds, Proc. Zool. Soc. London, p. 241, No. 9; 1844.

Solarium fulvum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 439; 1844.

Solarium fulvum, Hinds, Zool. Voyage Sulphur, vol. 2, p. 51, pl. 14, figs. 17, 18; 1844.

Solarium fulvum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 21, No. 21, pl. 3, fig. 11; 1853.

Solarium (*Torinia*) *stramineum* Chemn. Var. *fulva,* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 242; 1863 (1866).

Type locality: "New Guinea".

T. trochoides (Deshayes)

Solarium trochoides Deshayes, Encycl. méth., Vers, vol. 2, p. 160, No. 8; 1830.
Solarium dealbatum Hinds, Proc. Zool. Soc. London, p. 24; 1844.
Solarium dealbatum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 439; 1844.
Solarium dealbatum, Hinds, Zool. voyage Sulphur, p. 51, pl. 14, figs. 13, 14; 1844.
Solarium trochoides, Mörch, Catal. conch. Yoldi Cephalophora, p. 47; 1852.
Solarium dealbatum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 19, No. 17, pl. 3, fig. 7; 1853.
Solarium trochoïdes, Crosse, Journ. de Conch., vol. 7, p. 378, pl. 14, fig. 2; 1858.
Solarium trochoides, Deshayes, Catal. Moll. île de la Réunion, p. 68; 1863.
Solarium (Torinia) trochoides, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 243, pl. 5, figs. 89, 90; 1863 (1866).
Torinia conica Pease, Proc. Zool. Soc. London, p. 514; 1865.
Torinia trochoidea, Marshall, Tryon, Manual of Conch., vol. 9, p. 18, pl. 5, figs. 87, 88; 1887.
Solarium (Philippia) conica, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium (Torinia) trochoideum, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887
Torinia Trochoides, Hidalgo, Catal. mol. testác. Filipinas, p. 189; 1904-1905.
Torinia trochoides, Schepman, Prosobr. "Siboga" Exp., Mon. 49^1b, p. 222; 1909.

Type locality:?; "Manila" (Hinds); "Nouvelle-Calédonie" (Crosse); "Ile de la Réunion (Bourbon)" (Deshayes); "Manilla; Society Islands" (Tryon).

a. 2. New Caledonia, H. C. Fulton. — b. 1.?, J. Sj. Bakker.

T. virgata (Hinds)

Solarium virgatum Hinds, Proc. Zool. Soc. London, p. 24; 1844.
Solarium virgatum, Hinds, Ann. & Mag. of Nat. Hist., vol. 14, p. 440; 1844.
Solarium virgatum, Hinds, Zool. voyage Sulphur, p. 52, pl. 14, figs. 19, 20; 1844.
Solarium virgatum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 21, No. 20, pl. 3, fig. 10; 1853.
Solarium (Torinia) virgatum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 240, pl. 5, figs. 85, 86; 1863 (1866).
Torinia virgata, Marshall, Tryon, Manual of Conch., vol. 9, p. 20, pl. 6, figs. 2, 3; 1887.
Solarium (Torinia) virgatum, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "New Guinea".

SPECIES INCERTAE SEDIS & SPECIES DUBIAE

I have enclosed under this heading the species which had been classed as Solariidae, but of which it has been stated afterwards that they do not belong to this family and I added the dubious species too.

T. bicarinata (Philippi)

(non) *Solarium bicarinatum* Grateloup, Actes Soc. Linnéenne Bordeaux, vol. 5, p. 137; 1832.
Solarium bicarinatum Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 23, No. 24, pl. 3, fig. 14; 1853.

Solarium bicarinatum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866).

Torinia bicarinata, Marshall, Tryon, Manual of Conch., vol. 9, p. 23; 1887.

Type locality: "das Chinesische Meer".

This species probably is no Solariid. This is confirmed by Tryon (1887, p. 23) and by the observation of Hanley (1863, p. 245): "Judging from the figure, I much doubt its being a member of this genus".

T. canalifera „C. B. Adams" Dall

Torinia canalifera C. B. Adams, Dall, Bull. U.S. Nat. Mus., No. 37, p. 148; 1889.

Type locality: ?; "Gulf of Mex." (Dall).

Mr. H. A. Rehder informs me: "As for *Torinia canalifera* C. B. Adams, I have been unable to locate any such species... It may have been due to some kind of a lapsus", and Mr. W. J. Clench writes: "I have checked all sources that I can think of—and can find no diagnosis of *Torinia canalifera* C. B. Adams. There is nothing in the Adams collection. Dall probably used a Mss. name".

T. egena (Gould)

est *Isanda* (*Antisolarium*) *egena* (Gould)

Solarium egenum Gould, Proc. Boston Soc. Nat. Hist., vol. 3, p. 84; (1848) 1851.

Solarium egenum, Gould, Moll. & shells of U.S. expl. exped. Wilkes, p. 196, figs. 226 a, b, c; 1852.

Solarium egenum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866).

Torinia egena, Marshall, Tryon, Manual of Conch., vol. 9, p. 22, pl. 6, figs. 22, 23; 1887.

Solarium (*Torinia*) *egenum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Antisolarium egenum, Finlay, Trans. & Proc. N. Zealand Inst., vol. 57, p. 359 & p. 475; (1926) 1927.

Antisolarium egenum, Powell, Shellfish of New Zealand, p. 64; 1937.

Type locality: ?, "New Zealand".

In the description of this species, Gould (1851, p. 84) is already in doubt whether it pertains really to the genus *Solarium,* he says: "The characters of this shell do not bring it strictly within the typical form of *Solarium,* but its facies is rather that of *Solarium* than of *Trochus.* It is to be grouped with *S. dealbatum,* Hinds, which it closely resembles. It is also similar in form, colour, and size to *Margarita obscura,* Couthouy. Perhaps it would come under the genus *Torinia,* Gray".

T. implexa (Mighels)

Solarium implexum Mighels, Proc. Boston Soc. Nat. Hist., vol. 2, p. 22; 1845 (1848).

Solarium implexum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 37, No. 44; 1853.

Solarium implexum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 244; 1863 (1866).

Torinia implexa, Marshall, Tryon, Manual of Conch., vol. 9, p. 23; 1887.
Solarium implexa, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "Oahu".

"The description is too brief for the determination of a species: it would tolerably suit a young *dorsuosum*" [Hanley (1863, p. 244)]. "Diese Art scheint kein ächtes *Solarium*; vielleicht gehört sie... zu *Liotia* Gray" [Philippi (1853, p. 37)].

T. perrieri (De Rochebrune)

Teretropoma Perrieri De Rochebrune, Bull. Soc. Philomath. Paris, 7e série, 5; 1881.
Teretropoma Perrieri, Crosse, Journ. de Conch., vol. 30, p. 249; 1882.
Teretropoma Perrieri, Dautzenberg, Actes Soc. Linn. Bordeaux, vol. 64, p. 127; 1910.

Type locality: "Falaises trachytiques de la pointe de Dakar (Sénégal)".

This mollusc was found by De Rochebrune (1881, 7e série, 5) at the "pointe de Dakar (Sénégal)", on rocks "à quelques mètres à peine au dessus de la limite où les vagues viennent se briser", in an environment "chargée de particules salines, régulièrement baigné, à chaque marée, par l'écume des flots". De Rochebrune supposed this Gastropod to be a land-mollusc, belonging to the "Cyclostomaceae" and created for this species a new genus: *Teretropoma,* which he placed in a new subfamily, the "Teretropomidae".

Crosse (1882, p. 249), who gives an abstract of the above-mentioned paper for the Journal de Conchyliologie, writes: "cette intéressante espèce ... nous paraît tout bonnement un Mollusque marin, voisin des *Torinia* et dont la manière de vivre se rapproche de celle de la plupart des *Littorina,* qui passent hors de l'eau une partie de leur existence. L'opercule calcaire, lamelleux, pyramidal, du côté externe, et terminé par un long processus conique, du côté interne, est absolument celui des *Torinia* l'aspect général, le mode de sculpture et la forme de l'ombilic de la coquille rappellent exactement les espèces du même genre" and further: "...c'est du côté des *Torinia* que sont les véritables affinités conchyliologiques de l'espèce nouvelle, c'est là que se trouve sa place naturelle".

Dautzenberg (1910, p. 127) shares Crosse's views, as he adds to his diagnosis of *T. malani,* which as *T. perrieri* likewise comes from the Senegal: "Sa forme est fort différente de celle du *Torinia* que M. de Rochebrune a décrit comme un mollusque terrestre (!!) sous le nom de *Teretropoma-Perrieri*".

T. perspeculata (Meuschen)

Trochus perspeculatus Meuschen, Gronovius, Zoophylac. Gronov., fasc. 3, p. 323, No. 1485 & Index Vermium; 1781.

Trochus perspeculatus, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866).

Type locality: "Habitat in Mari Indico".

A doubtful species. The diagnosis is exceedingly short and obscure; a figure or a reference to a figure is absent. Hanley (1863, p. 245) states that this shell is a *Solarium.* "The *Trochus perspeculatus* of Meuschen was a *Solarium* ... It is said ... only to differ from his *perspectivus* (the synonymy of which includes *trochleare,* and almost all the then known allied species) by its contiguous, longitudinal, crenated striae".

Solarium philippii (Cantraine)
est *Circulus striatus* (Philippi)

Valvata striata Philippi, Fauna Moll. utr. Siciliae, vol. 1, p. 147, pl. 8 (errore pro 9), figs. 3 a, b, c; 1836.

Solarium Philippii Cantraine, Bull. Acad. Roy. Sci. Bruxelles, vol. 9, part 2, p. 344; 1842.

Adeorbis striatus, Wood, Ann. & Mag. of Nat. Hist., vol. 9, p. 530, pl. 5, figs. 4, 6; 1842.

Valvata? striata, Philippi, Fauna Moll. utr. Siciliae, vol. 2, p. 122; 1844.

Delphinula Duminyi Requien, Catal. coq. Corse, p. 64; 1848.

Adeorbis striatus, Wood, Monogr. Crag Moll., part 1, p. 137, pl. 15, fig. 7; 1848.

(?) *Trochus zonatus* Jeffreys, Ann. & Mag. of Nat. Hist., vol. 17, ser. 2, p. 182, pl. 2, figs. 2, 3; 1856.

Delphinula costata Danilo & Sandri, Elenco nomin., p. 123; 1856 (fide B.D.D. & Mtros.).

Ethalia striata, Adams, Genera of rec. Moll., vol. 2, p. 629; 1858.

Adeorbis striatus, Chenu, Man. de Conchyl., vol. 1, p. 352, figs. 2589, 2590; 1859.

Trochus zonatus, Jeffreys-Capellini, Testac. marini costa Piemonte, p. 37, figs. 2, 3; 1860.

Skenea striatula Weinkauff, Journ. de Conch., vol. 10, p. 343; 1862.

Trochus Duminyi, Jeffreys, British Conchol., vol. 3, p. 315; 1865.

Trochus Duminyi, Weinkauff, Conchyl. des Mittelmeeres, vol. 2, p. 374; 1868.

Cyclostrema striatum, Fischer, Actes Soc. Linnéenne Bordeaux, vol. 27, p. 111; 1869.

Trochus Duminyi, Jeffreys, British Conchol., vol. 5, p. 203, pl. 62, fig. 5; 1869.

Cyclostrema Striata, Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 111; 1869.

Adeorbis striatus, Wood, Suppl. Crag Moll., part 1, p. 84; 1872.

Circulus striatus, Monterosato, Notizie conch. Mediterranee, p. 31; 1872.

Circulus striatus, Monterosato, Journ. de Conch., vol. 25, p. 30; 1877.

Circulus striatus, Monterosato, Giorn. Sci. Naturali Palermo, vol. 13, p. 80; 1878.

Delphinula Duminyi, Tate, Appendix to Woodward, Manual of Moll., p. 35; 1880.

Circulus striatus, Jeffreys, Proc. Zool. Soc. London, p. 95; 1883.

Cyclostrema striatum, Granger, Hist. Nat. France, vol. 6, Mollusques, p. 142; 1884.

Gibbula (Circulus) striatus, Fischer, Manuel de Conch., p. 824; 1885 (1887).

Circulus striatus, Bucquoy, Dautzenberg, Dollfus, Moll. marins Roussillon, vol. 1, p. 420, pl. 51, figs. 1, 2, 3; 1886.

Circulus striatus, Locard, Catal. gén. Moll. de France, p. 299; 1886.

Circulus striatus, Sowerby, Illustr. Index of British shells, pl. 25, fig. 29; 1887.

Circulus Diminyi, Paetel, Cat. Conch. Samml., vol. 1, p. 544; 1887.

Circulus striatus, Paetel, Cat. Conch. Samml., vol. 1, p. 544; 1887.
Circulus zonatus, Paetel, Cat. Conch. Samml., vol. 1, p. 544; 1887.
Circulus striatus, Kobelt, Prodromus faunae Moll., p. 233; 1888.
Circulus striatus, Dautzenberg & Fischer, Moll. marins Finistère, p. 93; 1925.
Circulus striatus, Thiele, Handb. syst. Weichtierkunde, vol. 1, p. 63; 1931.
Circulus striatus, Winckworth, Journ. of Conch., vol. 19, p. 220; 1932.
Circulus striatus, Nobre, Mol. Marinhos Portugal, p. 226, pl. 15, fig. 10; 1932.

Type locality: "Cefali prope Cataniam in argilla ... inter tot testacea marina unicum specimen hujus fluviatilis animalis inveni"; "Vit dans la mer de Sardaigne" (Cantraine).

This is no *Solarium,* in the course of years it has been placed either under the species name *"Philippii"*, or under one of its numerous synonyms [*striata* Philippi, *Philippii* Cantraine, *Duminyi* Réquien, *costata* Danilo & Sandri, *striatula* Weinkauff, *zonatus* Jeffreys (fide Petit de la Saussaye)] in various genera. These are the ten following, among which some are placed rather widely separated in the system, I quote them in a chronological order: *Valvata, Solarium, Adeorbis, Delphinula, Ethalia, Skenea, Trochus, Cyclostrema, Circulus, Gibbula.*

Wood classed this shell in the genus *Adeorbis,* created by him in 1842 (p. 530), placing *Valvata striata* Phil. under the synonyms of *Adeorbis striatus.* In 1848 he wrote (p. 137): "This is probably the same species as M. Philippi's shell, which he considered as a *Valvata* ... I believe our shell, *A. striatus,* to have no connexion with *Valvata,* but that all the species I have included in this genus are marine animals".

When Weinkauff (1868, p. 374), placed this species — which in 1862 he had removed from the genus *Adeorbis* into *Skenea* — in 1868 in the genus *Trochus* (*Gibbula*), he wrote: "Die Stellung dieses kleinen Dinges, das ich zu *Skenea* gebracht hatte, ist durch die Untersuchung des Deckels eines Exemplars aus dem Golf von Lyon nunmehr festgestellt".

In spite of Weinkauff's remark, that the place in the system of this mollusc as a *Trochus* (*Gibbula*) is now decided, Fischer (1885, p. 824) writes: "Cette coquille a l'apparence d'un *Adeorbis* et, en stricte équité, devrait être considérée comme le type de ce genre puisqu'elle est citée la première dans la liste des espèces du genre *Adeorbis* publiée par S. Wood en 1842".

Forty years after Fischer wrote these lines, the genus to which *"Solarium Philippii"* belongs is not yet fixed with absolute certainty: "La classification de ce petit Mollusque", say Dautzenberg & Fischer (1925, p. 93), "ne sera fixée que lorsqu'on connaîtra son anatomie: il a l'aspect d'un *Cyclostrema,* mais son test faiblement nacré à l'intérieur et son opercule multispiré le rapprochent plutôt des Trochidés".

That the shell would be nacreous in the interior is in contradiction with the statement of Fischer (1869, p. 111): "M. Jeffreys l'a (sc. *Cyclostrema striatum*) rapportée à ce dernier genre (sc. *Trochus*), mais il m'est impossible d'accepter ce classement, notre espèce n'étant jamais nacrée à l'intérieur".

Authors of a more recent date generally agree in considering this Gastropod as a *Circulus*. Jeffreys (1865, p. 315) had placed it already in the section *Circulus* of the genus *Trochus*, which section was raised by Monterosato (1872, p. 31) to a genus. Let us hope that it will be its last resting-place.

Solarium planorbis Blainville

Solarium planorbis Blainville, Dict. Sciences Nat., vol. 49, p. 411; 1827.
Solarium planorbis, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 245; 1863 (1866)

Type locality: ?

The description is very incomplete, the habitat is unknown and a figure of the mollusc is wanting. Blainville classes it in one group with "*S. stramineum*" and "*hybridum*", a *Torinia* and a *Philippia*. I for myself agree with the opinion of Hanley (1863, p. 245): "I cannot pretend to identify a species from so inadequate a definition".

T. sulcifera Pease

Torinia sulcifera Pease, Amer. Journ. of Conch., vol. 5, p. 79; 1869.

Type locality: "Insl. Kauai", Polynesia.

A doubtful species.

T. tricincta (Philippi)

Solarium tricinctum Philippi, Zeitschr. f. Malakozool.; 1851 (fide Philippi).
Solarium tricinctum, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 36, No. 42; 1853.
Solarium tricinctum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 244; 1863 (1866).
Torinia tricincta, Marshall, Tryon, Manual of Conch., vol. 9, p. 23; 1887.
Solarium tricinctum, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "Gabon in Guinea".

According to Philippi the diagnosis of this species was published in "Zeitschr. f. Malakoz. 1851", it was, however, impossible for me to find it there.

"The unfigured specimen", writes Hanley (1863, p. 244) in relation to this shell, "was in the collection which M. Llargilliert bequeathed to the city of Rouen. From its minuteness (± 3 mm 75) and the peculiarity of its umbilicus its generic location may be doubted".

ADDENDUM

In the Catalogue of the Solariidae in the Rijksmuseum van Natuurlijke Historie I. Solarium s.s. (1940, p. 252) add:

S. trisulcatum Jousseaume

Solarium trisulcatum Jousseaume, Bull. Soc. Zool. France, vol. 1, p. 270, pl. 5, figs. 14, 15; 1876.

Type locality: "Cette espèce a été recueillie en Nouvelle Calédonie".

CORRIGENDA

In the Catalogue of *Solarium* s.s. (1940, p. 254) I mentioned among the "Species Incertae Sedis" *Solarium calcar* Costa, adding: "In my opinion it is dubious that it should belong to this genus". In a paper by Monterosato (1873, p. 251), on Costa's "Microdoride Mediterranea", I see indeed that the former considers *Solarium calcar* Costa as a juvenile specimen of *Turbo rugosus* L. = *Astraea* (*Bolma*) *rugosa*.

In relation to *Solarium impressum* Nevill, a dubious *Solarium*, which, as I mentioned already (1940, p. 226), I retained in the genus on the authority of Marshall and Paetel, Mr. R. Winckworth was so kind to write me: "*Solarium impressum* Nevill is a Trochid-*Minolia impressa* (Nevill) which occurs at Madras as well as in Ceylon".

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