CATALOGUE OF THE SOLARIIDAE IN THE RIJKSMUSEUM VAN NATUURLIJKE HISTORIE

II. PHILIPPIA

by

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Genus **Philippia** Gray, 1847

Ph. abyssorum (Melvill & Standen)

Solarium abyssorum Melvill & Standen, Ann. & Mag. of Nat. Hist., ser. 7, vol. 12, p. 297, pl. 21, fig. 1; 1903.

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

This *Philippia* is related to *Ph. oxytropis* A. Ad.

Ph. atkinsoni (Smith)

Solarium atkinsoni Smith, Proc. Zool. Soc. London, p. 441, pl. 35, figs. 19, 19a, 19b; 1891.
Architectonica atkinsoni, Hedley, Rec. Austral. Mus., vol. 6, p. 285; 1907.

Type locality: "dredged off Sydney in 410 fathoms", "Station 164 B".

Ph. certesi (Dautzenberg & Fischer)

Solarium Certesi Dautzenberg & Fischer, Mém. Soc. Zool. France, vol. 9, p. 452, pl. 19, figs. 3, 4, 5; 1896.
Solarium Certesi, Dautzenberg & Fischer, Mém. Soc. Zool. France, vol. 10, p. 159; 1897.
Solarium Certesi, Dautzenberg, Rés. Camp. Sci. Prince de Monaco, fasc. 72, p. 121, pl. 4, figs. 4, 5, 6; 1927.

Type locality: "Açores: Hirondelle (1888), Stn. 39, 1557 m., Stn. 47, 1372 m., Stn. 69, 1300 m.; Pr. Alice (1895), Stn. 46, 1385 m., Stn. 71, 1165 m."

Dautzenberg & Fischer place this species in the genus *Solarium*. It is not a *Solarium* s.s., however, but they do not specify the subgenus to which it belongs. The angulate periphery, the more or less triangular aperture and the indistinct sculpture reminds of a *Philippia*, but as no description is given of the operculum this cannot be stated with certainty.

Ph. discus (Philippi)

(non) *Trochus pseudo-perspectivus* Brocchi, Conch. foss. subapennina, vol. 2, p. 359, pl. 5, fig. 18; 1814.
Solarium Discus Philippi, Fauna Moll. utr. Siciliae, vol. 2, p. 225, pl. 28, fig. 12; 1844.
Solarium discus, Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 29, No 33, pl. 4, fig. 9; 1853.
Solarium discus, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 235, pl. 4, figs. 57, 58; 1863 (1866).
Solarium Discus, Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 120; 1869.
Solarium discus, Monterosato, Notizie Solarii Mediterraneo, p. 4, figs. 1, 2, 3, 4; 1873.
Solarium discus, Monterosato, Journ. de Conch., vol. 22, p. 269; 1874.
Solarium discus, Monterosato, Giorn. Sci. Naturali Palermo, vol. 13, p. 97; 1878.
Solarium pseudo-perspectivum, Jeffreys, Ann. & Mag. of Nat. Hist., ser. 5, vol. 6, p. 318; 1880.
Solarium pseudoperspectivum, Jeffreys, Proc. Zool. Soc. London, p. 38; 1885.
Solarium discoideum (non Pease) Locard, Catal. gén. Moll. de France, p. 302; 1886.
Solarium pseudoperspectivum, Marshall, Tryon, Manual of Conch., vol. 9, p. 15; 1887.
Solarium discoideum, Locard, Expéd. sci. Travailleur & Talisman, Moll. testac., vol. 2, p. 13; 1898.
Solarium discus, Nobre, Mol. Marinhos Portugal, p. 152; 1932.
Philippia pseudoperspectiva, Odhner, Arkiv f. Zoologi, vol. 23A, No 14, p. 13, pl. 1, figs. 10, 11, 12; 1932.

Type locality: "Neapoli mihi misit cl. Scacchi".

Concerning *S. pseudoperspectivum* Brocchi, *S. discus* Phil. and *S. pulchellum* Tib. there has arisen considerable confusion, much of which as yet not has become straightened out, consequently it is not always an easy matter to decide which of these three Solariidae is meant when an author uses one of the names.

S. pseudoperspectivum Brocchi is a fossil from the Astien (Pliocene). The recent species quoted under this name are mostly specimens of *Ph. discus* and *Ph. pulchella,* mistaken for the extinct "*Solarium*".

Although *Ph. pseudoperspectiva* varies in form and sculpture, there are still several distinct characteristics by which it differs from *Ph. discus. Ph. pseudoperspectiva* typica, as it is described and figured by Brocchi (1814, p. 359, pl. 5, figs. 18a, 18b), shows a more convex outline and has a slightly rounded carina, whereas the typical *Ph. discus* (Philippi, 1844, p. 225, pl. 28, fig. 12) is more depressed and has a sharp keel. The whorls of *Ph. pseudoperspectiva* are smooth and show only 2 (or 3) cingula running at the lower part of each whorl along the suture (or the carina). *Ph. discus,* on the other hand, has 3 moniliform cingula, alternating with spiral lines, scattered over the whole breadth of the whorl. Whereas *Ph. pseudoperspectiva* on its base shows lines of growth only, in *Ph. discus* we see dichotomous folds arising from the sulcus internus. The umbilicus of the latter, moreover, is much smaller.

It is true that among the varieties of *Ph. pseudoperspectiva,* the var. *complanata* (Defr.), a fossil from the Piacenziano, reminds strongly of *Ph. discus* on account of its depressed shape and sharp carina, but it differs from the latter by its quite different sculpture.

Ph. pseudoperspectiva, as I observed above, is an extinct species from the Pliocene, whereas *Ph. discus* is recent. Sacco (1892, p. 49) supposes the latter to be descended from *Ph. pseudoperspectiva:* "Nell' Eocene troviamo il *S. Picteti* ed il *S. bistriatum,* che potrebbero forse considerarsi come forme indirettamente ataviche del *S. pseudoperspectivum,* del quale pare una derivazione il vivente *S. discus* Ph.".

It is strange that Weinkauff (1868) does not mention *Ph. discus* among the Solariidae of the Mediterranean, not even among the synonyms, or that at least he does not give the reason for omitting *Ph. discus,* especially as he repeatedly quotes other Solariidae from Philippi's Fauna Molluscorum, vol. 2, in which volume this species is described and figured. He has, moreover, used the name "*S. discus,* Phil." in his collection, although for another species, as appears from the following passage from Jeffreys (1885, p. 39): "A specimen in Weinkauff's collection, named '*S. discus,* Phil.', is the young of the present species (viz., *T. sicula* Cantr.)".

Jeffreys (1885, p. 38), in my opinion, goes too far when he considers *S. simplex* Bronn, *S. lyellii* Michelotti, *S. sulcatum* Costa, *S. pulchellum* Tiberi, *S. perspectiviforme* Tiberi, *S. mediterraneum* Mtros. as varieties of *S. pseudoperspectivum* (non Brocchi) = *S. discus* Phil.

The specimen represented in the Manual of Conchology (Marshall, 1887, pl. 5, figs. 67, 68) as *S. pseudoperspectivum* (non Brocchi) Marshall (= *Ph. discus* Phil.) is not this species but *Ph. pulchella* (Tib.) (= *Ph. lepida*).

As diameter Philippi mentions 7''' and Marshall 1.4 inches. Our specimen keeps the mean between both as far as concerns its breadth, as it has a diameter of 24 mm by a height of 11 mm. It is relatively higher than Philippi's specimen which measures 3''', but further agrees completely with his figure and description.

a. 1. Positano, Campania (S. Italy), G. Stiasny.

Ph. hybrida (Linné) (fig. 1a, b)

Trochus hybridus Linné, Syst. nat., ed. 10, p. 757, No 504; 1758.
Trochus hybridus, Linné, Mus. Ulricae, p. 646, No 330; 1764.
Trochus hybridus, Linné, Syst. nat., ed. 12, p. 1228, No 582; 1767.
Trochus hybridus, Gmelin (pars una), Linné, Syst. nat., ed. 13, p. 3567, No 4; (1790) 1791.
Trochus hybridus, Dillwyn (syn. nonnull. exclus.), Descr. catal. recent shells, vol. 2, p. 784, No 61; 1817.

(non) *Solarium hybridum,* Lamarck, Anim. s. Vert., vol. 7, p. 4, No 5; 1822.
(non) *Solarium luteum,* Lamarck, Anim. s. Vert., vol. 7, p. 5, No 7; 1822.
Solarium luteum, Potiez & Michaud (pars una), Galérie Moll. de Douai, vol. 1, p. 324, pl. 29, figs. 18, 19; 1838.
Solarium luteum, Philippi, Fauna Moll. utr. Siciliae, vol. 1, p. 174, pl. 10, fig. 27; 1838.
Solarium luteum, Kiener var., Icon. coq. viv., Solarium, p. 9, No 6, pl. 4, fig. 9a (non 9); 1838-1839.
Solarium luteum, Philippi, Fauna Moll. utr. Siciliae, vol. 2, p. 148; 1844.
Solarium hybridum, Petit de la Saussaye, Journ. de Conch., vol. 3, p. 176; 1852.
Solarium luteum, Philippi (pars una), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 31, No 35, pl. 4, fig. 11 (tantum); 1853.
Solarium luteum Lamk. var. *mediterranea* Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 41, pl. 4, fig. 11; 1853.
Philippia lutea, Adams, Genera rec. Moll., vol. 1, p. 243, pl. 25, figs. 8, 8a, 8b; 1858.
Solarium (Philippia) luteum, Hanley (pars una), Sowerby, Thesaurus Conchyl., vol. 3, p. 237, pl. 4, fig. 52 (tantum); 1863 (1866).
Solarium luteum, Reeve (pars una), Conch. Icon., Solarium, sp. 14, pl. 3, fig. 14; 1864.
Solarium luteum, Hidalgo (syn. exclus.), Journ. de Conch., vol. 15, p. 377; 1867.
Solarium conulus Weinkauff, Conchyl. des Mittelmeeres, vol. 2, p. 261; 1868.
Solarium Siculum (non Cantraine), Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 120; 1869.
Solarium hybridum, Aradas & Benoit, Conchigl. viv. mar. Sicilia e Catania, p. 175; 1870.
Solarium hybridum, Monterosato, Notizie Solarii Mediterraneo, p. 7, pl. 1, figs. 10, 11; 1873.
Solarium hybridum, Monterosato, Journ. de Conch., p. 270; 1874.
Solarium conulus, Monterosato, Giorn. Sci. Naturali Palermo, vol. 13, p. 97; 1878.
Solarium hybridum, Bucquoy, Dautzenberg, Dollfus, Moll. marins Roussillon, vol. 1, p. 256, pl. 28, figs. 16, 17, 18, 19; 1884.
Solarium hybridum, Nobre, Journ. de Conch., vol. 34, p. 21; 1886.
Solarium hybridum, Locard, Catal. gén. Moll. de France, p. 302; 1886.
Solarium (Philippia) conulus, Marshall, Tryon, Manual of Conch., vol. 9, p. 16, pl. 5, figs. 73, 74; 1887.
Solarium (Philippia) conulus, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium (Philippia) hybridum, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Solarium (Solarium) Siculum (non Cantraine), Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.
Solarium hybridum, Nobre, Mol. Marinhos Portugal, p. 150, pl. 15, fig. 3; 1932.

Type locality: "Habitat in M. Mediterraneo".

Linné's description of *Trochus hybridus,* in the 10th edition of his Systema naturae, is very concise and without a reference to any figure to supply the diagnosis. It runs as follows: "T. testa crenato-umbilicata convexa, aperturae columella bidentata". In the Museum Ulricae [1]), to which the author refers at the end of this diagnosis, some characters are added by which *T. hybridus* is slightly further defined, but there is no question of an accurate description of this species. The diagnosis in the Systema naturae editio 12 is about identical to that of the 10th edition.

1) In the manuscript of the Museum Ulricae (Hanley, 1860, p. 80) this *Philippia* is called: "*T. spurius*".

From these three diagnoses and the description we can understand with certainty that Linné has described here a Solariid with a rounded periphery and a subrotundate aperture. It is, therefore, not a *Solarium* s.s., neither a *Torinia* as it is described as "leavis", but a *Philippia*. The size is indicated as being ¼ of that of *S. perspectivum*. Linné gives no dimensions of the latter, but Gmelin (1791, p. 3566) mentions a diameter of "2¼ pollices"

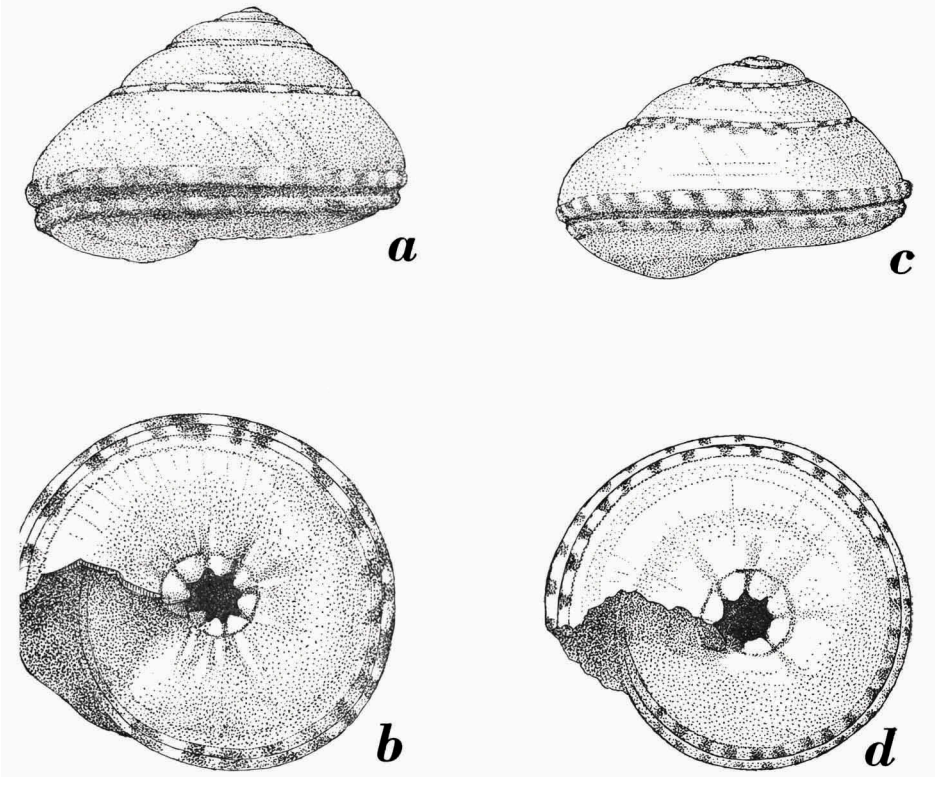

Fig. 1. a, b, *Philippia hybrida* (L.). c, d, *Philippia lutea* (Lm.). × 5.

As we assume that he has used the Swedish "werktum", the species should have a diameter of about 55.6 mm, so that *T. hybridus*, being ¼ of this size therefore has a diameter of 13.9 mm. The colour is described by Linné as "flava nec lucida", "variegata" and in the manuscript of the Museum Ulricae (Hanley, 1860, p. 80) as "albo, flavoque variegata".

Among the *Philippia* of this dimension, answering to Linné's diagnosis and description, only two are to be considered, viz., *Ph. lutea* (Lm.) from Australia and *Ph. conulus* (Weink.) from the Mediterranean. These species differ very little only from each other, by a slight difference in shape

and design. As Linné writes, however, "Habitat in M. Mediterraneo" the Australian species must be excluded.

On two points the diagnosis slightly differs from that of *Ph. conulus,* in the first place because a *Ph. conulus* of about 14 mm is a large specimen, as the diameter of this species varies from 8 to 13 mm, and in the second place the term "variegata" is rather exaggerated for a pattern of white spots on the cingulum supra-suturale and the two cingula of the periphery

As a result of Linné's concise and not very clear description, there has arisen a rather extensive confusion about the identification of this species. The case is similar to that what happened in *S. perspectivum,* but in an inverse direction. In the latter, Linné has enclosed a group of related species under the name *S. perspectivum.* In this case, however, Linné apparently has described a single species, but later authors, deceived by the very concise diagnosis, assigned the name *T. hybridus* L. alternatively to various species.

The first who gave rise to this confusion was Chemnitz (1781, p. 132). He quotes *Trochus hybridus* from the Museum Ulricae, copying the description from that work, and mentions, moreover, although with a note of interrogation, this "*Trochus*" from the Systema naturae, editio 10 and 12. Of the 4 figures, which he represents, figs. 1704 and 1705 form drawings of *Ph. radiata* (Roed.), and figs. 1702, 1703 probably of the var. *subconcolor* Marts. of this species. The colour of *Ph. radiata,* viz., fulvous-red, does not correspond, however, to that of *T. hybridus,* which Linné gives as yellow, its dimensions are also different. We may conclude this from the following. *Ph. radiata* has a diameter of 25 mm, and according to Linné, as we have seen before, *T. hybridus* is four times as small as *S. perspectivum.* If thus the specimen figured by Chemnitz (viz., *Ph. radiata*) were identical with *T. hybridus,* then a *S. perspectivum* of four times its size would measure 10 cm, a dimension which even the largest specimens of this *Solarium* or of *S. maximum* would not easily attain, as these *Solarium*'s have an average diameter of about 6 cm. Finally the locality of *Ph. radiata* (Philippines, Fiji Is., Sandwich Is.) does not agree at all with Linné's statement (Mediterranean).

Gmelin (1790, p. 3567, No 4), after first having used Linné's diagnosis in practically unaltered form and having quoted the habitat given by this author, adds as a reference: "Chemn. Conch. 5. t. 173. f. 1702?—1705?", thereby in consequence making the same mistake as Chemnitz by identifying the figures of *Ph. radiata* of this author with *T. hybridus* L. The additions of Gmelin "albo fuscoque varia, subtus tota alba" also more or less remind of the colour of *Ph. radiata.*

The figures of *S. hybridum* given by Lamarck in his Tableau ency-

clopédique (1816, pl. 446, figs. 2a, 2b) represent *Ph. layardi* A. Ad., just as his diagnosis and the description of this species in the Animaux sans Vertèbres (1822, p. 4, No 5), with exception of the locality "Méditerranée". The dimensions given by this author: "8 lignes un quart", moreover, are much too large for *T. hybridus* (non Lm.) L.

Deshayes' description (1830, p. 158, No 3) of this *Philippia* includes *Ph. layardi* A. Ad. as well as *Ph. radiata* (Roed.) (= *Ph. cingulum* [Kien.]), an error committed by most authors before Kiener (1838-1839, p. 6, No 4, pl. 3, figs. 6, 6a) had clearly defined and pictured the latter.

It is of no use to further discuss the conception of the name *T. hybridus* by later systematists, as their opinions generally coincide with those of one of the authors dealt with before. The data, moreover, are given in the lists of synonyms of *Ph. hybrida* (L.), *Ph. radiata* (Roed.) and *Ph. layardi* A. Ad.

It seems, however, that Philippi (1853, p. 31), presumed that *T. hybridus* L. possibly might be identical with *Ph. conulus* (Weink.), as he writes in the list of synonyms of *Ph. lutea* (Lm.), under which he also encloses *Ph. conulus:* "an *Trochus hybridus* L.? propter patriam M. Mediterraneum?" He again shows this presumption when dealing with *Ph. hybrida* (non L.) (Lm.) (= *Ph. layardi* A. Ad.) where he writes in a footnote (1853, p. 15): "Sollte Linné unter seinem *Trochus hybridus* das *Solarium luteum* verstanden haben?"

But Petit de la Saussaye (1852, p. 176) was the first to use the name *S. hybridum* (L.) for *Ph. conulus* (Weink.).

a. 9. Messina (N. E. Sicily), F. Cantraine. — b. 1. Peniche, Estremadura (Portugal), G. Stiasny. — c. 2. Lisbon (Portugal), G. Stiasny.

Ph. injussa (Iredale)

Solatisonax injussa Iredale, Rec. Austral. Mus., vol. 18, p. 229, pl. 25, figs. 7, 8; 1931.

Type locality: "from about 100 fathoms between Gabo and Flinders Island, Bass Strait".

Ph. krebsii (Mörch)

Architectonica (Philippia) Krebsii Mörch, Malakoz. Bl., vol. 22, p. 155; 1875.

Type locality: "Porto Plata (Krebs) Curaçao (Riise)".

The author gives no figure. This *Philippia,* according to Mörch, is related to *Ph. layardi* A. Ad. var. *undata* Hanl. and to *Ph. oxytropis* (Hanl.), but is much smaller and thinner than the former and possesses a larger umbilicus than the latter.

Ph. layardi A. Adams

(non) *Trochus hybridus* Linné, Syst. nat., ed. 10, p. 757, No 504; 1758.
(non) *Trochus hybridus,* Linné, Mus. Ulricae, p. 646, No 330; 1764.
(non) *Trochus hybridus,* Linné, Syst. nat., ed. 12, p. 1228, No 582; 1767.
(?) *Trochus Perspectiviunculus* Meuschen, Gronovius, Zoophylac. Gronov., fasc. 3, p. 323, No 1486 & Index Vermium; 1781. (f. Reeve, Hanley, Tryon).
Solarium hybridum, Lamarck, Tableau encycl. et méth., vol. 21, Moll. testac., pl. 446, figs. 2a, 2b; 1816.
Solarium hybridum, Lamarck, Anim. s. Vert., vol. 7, p. 4, No 5; 1822.
Solarium hybridum, Deshayes, Encycl. méth., Vers, vol. 2, p. 158, No 3; 1830.
Solarium hybridum, Potiez & Michaud (pars), Galérie Moll. de Douai, vol. 1, p. 324; 1838.
Solarium hybridum, Kiener (pars una), Icon. coq. viv., Solarium, p. 7, No 5; 1838-1839.
Solarium hybridum, Deshayes (pars), Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 99, No 5; 1843.
Solarium hybridum (Trochus), Philippi (pars), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 14, No 10; 1853.
Philippia Layardi A. Adams, Proc. Zool. Soc. London, p. 317; 1854.
Solarium (Philippia) hybridum, Chenu, Man. de Conchyl., vol. 1, p. 233, fig. 1356; 1859.
Solarium hybridum, Deshayes, Catal. Moll. Ile de la Réunion, p. 68; 1863.
Solarium (Philippia) hybridum, Hanley (pars una), Sowerby, Thesaurus Conchyl., vol. 3, p. 236, pl. 4, figs. 40, 41, (non 39); 1863 (1866).
Solarium hybridum, Reeve, Conch. Icon., Solarium, sp. 21, pl. 3, fig. 21; 1864.
Philippia hybrida, Angas, Proc. Zool. Soc. London, p. 92; 1871.
Philippia layardi, Angas, Proc. Zool. Soc. London, p. 92; 1871.
Solarium (Philippia) hybridum, v. Martens, Beitr. Meeresfauna Mauritius u. Seychellen, p. 290; 1880.
Solarium (Philippia) hybridum, Marshall, Tryon, Manual of Conch., vol. 9, p. 14, pl. 5, figs. 59, 60; 1887.
Solarium hybridum, Smith, Proc. Zool. Soc. London, p. 282; 1890.
Solarium hybridum, Hidalgo, Catalogo mol. test. Filipinas, p. 187; 1904-1905.
Architectonica layardi, Hedley, Journ. Roy. Soc. New S. Wales, vol. 51, suppl., p. 101; (1917) 1918.
Heliacus hybridus, Tomlin, Ann. S. African Mus., vol. 25, p. 333; 1928.
Philippia (Solarium) hybrida, Odhner, Arkiv f. Zool., vol. 23A, No 14, p. 12, textfig. 1 & pl. 1, figs. 7, 8, 9; 1932.
Solarium hybridum, Turton, Mar. shells Port Alfred, p. 134, No 970; 1932.
Philippia hybrida, Kuroda, Catal. Moll. shells Taiwan, p. 86, No 204; 1941.

Type locality: "Ceylon".

Among the synonyms of *S. hybridum* (non L.) Lm., Reeve, Hanley and Marshall also mention: "*Trochus perspectiviunculus* Meuschen". Meuschen's (1781, p. 323) description of this "*Trochus*", however, is very concise and the characteristics indicated by him might also apply to other *Philippia*. It runs: "*Trochus* testa crenulato-umbilicata, subconvexa, obtusa, marginata, glabra, laevi: anfractuum marginibus infimis linea duplici elevata". In the figure mentioned by the author, viz., "Gualt. Ind. Test. tab. 65. fig. D", there is little to supply this diagnosis, it represents the shell viewed from the apical side and from the umbilicus. In this plain

picture the whorls of the specimen are of a greyish hue becoming lighter at the bottom, and with a row of dark, quadratic spots running along the suture. I cannot perceive the "linea duplex elevata", mentioned by Meuschen in his diagnosis. But at any rate it is a *Philippia,* which is all that can be deduced from the available data. That this description of Meuschen, just as the quoted figure, are far from clear is also proved by the fact that Chemnitz (1781, p. 134), a contemporary of Meuschen, uses the name *Trochus perspectiviunculus* for a *Torinia,* viz., *T. variegata* (Gm.). He is not quite certain, it is true, whether it is the same species as that of Meuschen, as appears from "an" in the following remark: "An *Trochus Perspectiviunculus* Meuschenii in Museo Gronoviano", but it appears from this that already from the very outset there was a great deal of confusion in connection with this name.

Lamarck (1822, p. 4, No 5) includes under the name *Solarium hybridum* not only *Ph. layardi*—as was remarked already when dealing with *Ph. hybrida* (non Lm.) (L.)—but also *Ph. radiata,* as appears from the following quotation: "Chemn. Conch. 5. t. 173. f. 1702. 1705."; and as we take into account the locality "Méditerranée", he has added also *Ph. hybrida* (non Lm.) (L.).

In his Encyclopédie (1830, p. 158, No 3) and in the Animaux sans Vertèbres (1843, p. 99, No 5) Deshayes completely follows Lamarck's view in his interpretation of *S. hybridum,* but in connection with the locality he rightly remarks (1830, p. 159): "Gmelin et M. Lamarck disent que cette coquille vient de la Méditerranée: nous ne l'avons jamais remarquée dans les collections qui en provenoient."

As Kiener (1838-1839, p. 7, No 5) has separated *Ph. cingulum* (= *Ph. radiata* [Roed.]) from *Ph. hybrida* (non L.) (Lm.), his description of the latter is more accurate and more distinct. It is, therefore, to be regretted that Philippi (1853, p. 14, No 10) again united the two species.

Adams (1854, p. 317) gives a clear diagnosis of *Ph. layardi* and Hanley (1863, p. 236) remarks concerning this species "The type of *Layardi* is only a young, and hence depressed form of this (viz., *Ph. hybrida* [non L.] [Lm.]) variable species".

Ph. hybrida (L.) being a quite different species from the Mediterranean, the name cannot be retained for the *Philippia* in question, viz., *Ph. layardi.* As it is not established with certainty what species is meant under the name *Ph. perspectiviunculus* (Meusch.), it is not advisable, therefore, to use this name for the species we deal with. To prevent all confusion the name *Ph. layardi* A. Ad. for *Ph. hybrida* (non L.) (Lm.) seems to me preferable.

This *Philippia* has a wide distribution, which extends westwards over the Cape (Tomlin, 1928, p. 333; Turton, 1932, p. 134) to the Canary Islands (Odhner, 1932, p. 12) and eastwards as far as the Cook's Islands, 159° long. W. (Schmeltz f. Hedley, 1899, p. 423). This seems to be its most eastward range, as it is not mentioned at least for the Marquesas, the Society Islands (Tahiti), the Paumotu or Gambier Islands in the extensive publications of Couturier (1907, p. 123) and of Dautzenberg and Bouge (1933, p. 41). Southward it occurs as far as New South Wales (Hedley, 1918, p. 101), it is not recorded for New Zealand (Powell, 1937). In the North it is found as far as Formosa (Kuroda, 1941, p. 86) and in the Red Sea at Suez (Odhner, 1932, p. 12).

There are more species of Mollusca, it is true, with a habitat extending over the greater part of the Indo-Pacific region and even occurring more eastward than *Ph. layardi,* viz., at the Society Islands, the Paumotu, the Marquesas and the Sandwich Islands, as appears from the list of Fischer (1887, p. 158), e.g., *Conus (Stephanoconus) lividus* Hwass and *Mitra (Strigatella) litterata* Lm., but in these cases their westward extension reaches not farther than Natal. It is not exceptional, on the other hand, that species from the Indian Ocean occur on the coast of West Africa, Odhner (1932, p. 13) mentions *Cypraea (Erosaria) gangranosa* Dillw. and *Laevicardium (Discors) lyratum* (Sow.), but both species reach not as far eastward as the *Philippia* in question.

Our specimens show more or less variation in the angle measured at the top of the shell and in the convexity of the whorls. The latter which are generally smooth, even seen under a lens, in some specimens (b. Port Jackson, New S. Wales [Australia], H. C. Fulton; d. Madoera, from E. F. Jochim's collection) present, besides the cingula on the carina or near the suture, a very faint spiral striation.

a. 2. Indian Ocean, ? — b. 2. Port Jackson, New S. Wales (Australia), H. C. Fulton. — c. 2. ?, from Hoogeveen's collection. — d. 2. Madoera, from E. F. Jochim's collection. — e. 1. Amboyna, Ch. Jellema. — f. 1. Denpasar (S. Bali), L. de Priester. — g. 1. ?, Geologisch Museum Wageningen.

var. **kowiensis** (Turton)

Solarium (Philippia) hybridum, Linn. Var. *australis* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 236; 1863 (1866).

Solarium (Philippia) hybridum, Linn. Var. *Australis,* Marshall, Tryon, Manual of Conch., vol. 9, p. 15; 1887.

Solarium (Philippia) hybridum L. Vr. *Australe,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Solarium kowiensis Turton, Mar. shells Port Alfred, p. 134, No 971, pl. 29, fig. 971; 1932.

Type locality: Port Alfred.

S. kowiensis Turt. is nearly identical with the var. *australis* Hanl., the only difference is that the brown pattern has increased at the expense of the white ground colour; only a series of spots on the ribs about the periphery and the umbilical crenulations are white.

S. hybridum L. var. *australis* Hanley 1866 being a homonym of *S. australe* Philippi 1848, the former name is invalid, under art. 35 and 36, even though Hanley's variety after many years is placed into another genus, viz., the genus *Philippia*. This variety should therefore be called: var. *kowiensis* (Turt.).

a. 2. Amboyna, Ch. Jellema.

var. **undata** Hanley

Solarium hybridum, Kiener (pars altera), Icon. coq. viv., Solarium, p. 7, No.5, pl. 3, fig. 5; 1838-1839.
Solarium (Philippia) hybridum, Linn. Var. *undata* Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 236, pl. 4, figs. 42, 43; 1863 (1866).
Solarium (Philippia) hybridum Var. *undatum,* Marshall, Tryon, Manual of Conch., vol. 9, p. 14, pl. 5, figs. 61, 62; 1887.
Solarium (Philippia) hybridum L. Vr. *undatum,* Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Solarium hybridum Linné Var. *undata,* Hidalgo, Catalogo mol. test. Filipinas, p. 187; 1904-1905.

Type locality: ?; ? (Tryon); "Austrl." (Paetel).

a. 2. Indian Ocean, ?—b. 1. Ternate (Moluccas), from E. F. Jochim's collection.

Ph. lepida nom. nov.

(non) *Trochus pseudo-perspectivus* Brocchi, Conch. foss. subapennina, vol. 2, p. 359, pl. 5, fig. 18; 1814.
(?) *Solarium pseudoperspectivum,* Philippi, Fauna Moll. utr. Siciliae, vol. 1, p. 174; 1836.
(juv.) *Solarium sulcatum* (non Lm.) Costa, Mem. Acad. Napoli; 1841. (f. Tiberi & Petit de la Saussaye).
(non) *Solarium stramineum* Gm. var. *mediterranea* Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 41, pl. 4, figs. 14a, b, c; 1853.
Solarium pseudoperspectivum, Weinkauff, Journ. de Conch., vol. 10, p. 349; 1862.
Solarium pseudo-perspectivum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 235, pl. 5, figs. 83, 84; 1863 (1866).
Solarium pulchellum (non Michelotti, non Orb.) Tiberi, Journ. de Conch., vol. 16, p. 179; 1868.
Solarium pseudoperspectivum, Weinkauff, Conchyl. des Mittelmeeres, vol. 2, p. 260; 1868.
Solarium Pseudoperspectivum?, Petit de la Saussaye, Catal. Moll. testac. Mers d'Europe, p. 120; 1869.
Solarium Mediterraneum (non Phil.) Monterosato, Notizie Conch. foss. Monte Pellegrino e Ficarazzi, p. 31; 1872.

Solarium Mediterraneum (non Phil.), Monterosato, Notizie Solarii Mediterraneo, p. 6, figs. 8, 9; 1873.
Solarium Mediterraneum (non Phil.), Monterosato, Giorn. Sci. Naturali Palermo, vol. 13, p. 97; 1878.
Solarium (Philippia) Mediterraneum, Marshall, Tryon, Manual of Conch., vol. 9, p. 15, pl. 5, figs. 69, 70; 1887.
Solarium (Philippia) mediterraneum, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Solarium (Philippia) pseudoperspectivum, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.
Solarium pulchellum, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "Rarissime occurrit in sinu neapolitano et tarentino" (Tiberi).

The sculpture of the upper side of this *Philippia* in some respects bears a resemblance to that of *S. pseudoperspectivum* Brocchi, which explains why it has been repeatedly confounded with the latter. On inspection of the base one sees, however, that here the sculpture is quite different. *S. pseudoperspectivum,* namely, is spirally ribbed near the carina and has a widely opened umbilicus surrounded by a crenulated cingulum. *Ph. lepida,* on the contrary, at the periphery of the base shows numerous concentric lines and is radiately ribbed towards the umbilicus, a sulcus separates these ribs from the umbilical crenulations.

From *Ph. discus* this *Philippia* differs, in connection with the sculpture, by its smooth whorls bearing merely 2 cingula above the suture (Tiberi writes in his diagnosis "cingulo unico", but on the figure of Di Monterosato 2 cingula are visible), whereas *Ph. discus* has 3 cingula alternating with faint spiral lines, scattered over the whole breadth of the whorl. On the base of *Ph. discus* one sees only the pars inferior of the cingulum peripherale, followed by some faint spiral lines and more inwards dichotomous folds arising from the sulcus internus.

S. sulcatum Costa 1841 is to be rejected as it is a homonym of *S. sulcatum* Borson 1821 and *S. sulcatum* Lamarck 1822. The next available name, *S. pulchellum* Tiberi 1868 is invalidated by *S. pulchellum* Michelotti 1841 and *S. pulchellum* Orbigny 1847 and the next again, *S. mediterraneum* Monterosato 1872, must be suppressed as a homonym of *S. mediterraneum* Philippi 1853 (= *Torinia sicula* [Cantr.]). I propose therefore to rename this species *Ph. lepida* [1]).

Ph. lutea (Lamarck) (fig. 1c, d)

Solarium luteum Lamarck, Anim. s. Vert., vol. 7, p.5, No 7; 1822.
Solarium luteum, Deshayes, Encycl. méth., Vers, vol. 2, p. 159, No 5; 1830.

1) At this place I wish to express my thanks to Dr. W. Adam at Brussels for sending me a copy of the parts dealing with *S. mediterraneum* in Di Monterosato's publications, which otherwise were not available to me.

Solarium luteum, Potiez & Michaud (pars altera), Galérie Moll. de Douai, vol. 1, p. 324; 1838.
Solarium luteum, Kiener (var. exclus.), Icon. coq. viv., Solarium, p. 9, No 6, pl. 4, fig. 9 (non 9a); 1838-1839.
Solarium luteum, Deshayes, Lamarck, Anim. s. Vert., 2nd ed., vol. 9, p. 100, No 7; 1843.
Solarium luteum, Mörch, Catal. conch. Yoldi, Cephalophora, p. 48; 1852.
Solarium luteum, Philippi (pars altera), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 31, No 35, pl. 1, figs. 10, 11 (tantum); 1853.
Solarium luteum Lamk. var. *Novae Hollandiae?* Philippi, Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 41, pl. 1, figs. 10, 11; 1853.
Philippia lutea, Adams, Genera rec. Moll., vol. 1, p. 243, pl. 25, figs. 8, 8a, 8b; 1858.
Solarium (Philippia) luteum, Chenu, Man. de Conchyl., vol. 1, p. 233, fig. 1355; 1859.
Solarium (Philippia) luteum, Hanley (pars altera), Sowerby, Thesaurus Conchyl., vol. 3, p. 237, pl. 4, figs. 53, 54, (non 52); 1863 (1866).
Solarium luteum, Reeve (pars altera), Conch. Icon., Solarium, sp. 14; 1864.
Solarium (Philippia) luteum, Marshall, Tryon, Manual of Conch., vol. 9, p. 16, pl. 5, figs. 71, 72; 1887.
Solarium (Philippia) luteum, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.
Heliacus luteus, Bartsch, Bull. U.S. Nation. Mus., No 91, p. 124; 1915.
Philippia lutea, Finlay, Trans. & Proc. N. Zealand Inst., vol. 57, p. 401; (1926) 1927.
Philippia lutea, Cotton & Godfrey, S. Austral. Natural., vol. 14, p. 72, pl. 1, fig. 1; 1933.
Philippia lutea, Powell, Shellfish of New Zealand, p. 75; 1937.

Type locality: "Habite les mers de la Nouvelle-Hollande".

Some authors, amongst others Kiener, Philippi, Reeve, Hanley, Hutton, have united *Ph. hybrida* (non Lm.) (L.), occurring in the Mediterranean, and *Ph. lutea* (Lm.), a species from Australia. In my opinion this is incorrect, as these species show a number of small but constant differences. *Ph. hybrida* is slightly higher, somewhat more solid, with a narrower umbilicus and has the cingula on the periphery a trifle broader, the spots on these cingula are smaller in number and not so sharply defined as in *Ph. lutea* (Lm.). The species from the Mediterranean shows rather obscure spots on a brownish-yellow ground; the Australian on the other hand has brown quadratic spots on a yellowish or whitish ground; the series of dots beneath the suture visible in *Ph. lutea,* moreover, in *Ph. hybrida* is absent. Weinkauff's (1868, p. 261) remark in relation to the characteristics of these two species seems to me quite true. "Diese Kennzeichen wären allerdings von nicht grossem Werth, wenn die Art eine häufige wäre und in benachbarten Meeren vorkäme, hier aber, wo zwischen beiden Fundorten eine halbe Welt und ein weiter Ocean liegt ohne jede Zwischenstation, muss die unbedeutendste Abweichung genügen, eine spezifische Scheidung zu rechtfertigen. Man kann eine Varietät doch nur von einer Art abstammend annehmen, dann muss auch die Möglichkeit dieser Abstammung gegeben sein, und diese fehlt hier gänzlich."

According to Kiener (1838-1839, pp. 8, 9) *Ph. lutea* ought to be considered as a variety of *Ph. hybrida* (non L.) (Lm.) (= *Ph. layardi* A. Ad.). "En comparant," writes this author on p. 8, "toute la série des divers développements, nous arrivons sans interruption à une petite coquille nommée par Lamarck *Solarium luteum,* qui se trouve dans la Méditerranée et la Nouvelle-Hollande, et qui, sans aucun doute, ne devra être envisagée, par la suite, que comme une variété du *Solarium hybridum*", and on p. 9 he observes: "L'examen attentif de cette jolie petite coquille (*Ph. lutea*) ne nous laisse aucun doute sur sa complète analogie avec la précédente (*Ph. hybrida* [non L.] [Lm.]). Elle n'en est qu'une variété..." *Ph. hybrida* (L.) (= *Ph. conulus* [Weink.]), according to Kiener, should form a transition between those two species. It seems superfluous to refute this hypothesis, as it is self-evident that *Ph. lutea* (Lm.) and *Ph. hybrida* (L.) with only 2 cingula at the periphery cannot be identical with *Ph. layardi* A. Ad. which possesses 3 cingula.

a. 1. Australia, Cuming.

Ph. manifesta Iredale

Philippia manifesta Iredale, Rec. Austral. Mus., vol. 18, p. 229, pl. 25, figs. 19, 20 (errore pro 9, 10); 1931.

Type locality not mentioned, probably New South Wales.

Ph. oxytropis (A. Adams)

Philippia oxytropis A. Adams, Proc. Zool. Soc. London, p. 317; 1854.
Solarium (Philippia) oxytropis, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 236, pl. 4, figs. 46, 47; 1863 (1866).
Solarium oxytropis, Reeve, Conch. Icon., Solarium, sp. 15, pl. 3, fig. 15; 1864.
Solarium (Philippia) oxytropis, Marshall, Tryon, Manual of Conch., vol. 9, p. 15, pl. 5, figs. 65, 66; 1887.
Solarium (Philippia) oxytrope, Paetel, Cat. Conch. Samml., vol. 1, p. 286; 1887.

Type locality: "New Caledonia".

Probably this species was described after a juvenile specimen. Hanley (1863, p. 237) regards it as a young *Ph. hybrida* (non L.) (Lm.) (= *Ph. layardi* A. Ad.) and Reeve (1864, sp. 15) writes in this connection: "Mr. Cuming's specimen of *S. oxytropis* is an immature shell, but it is the young of a very different species with that to which it has been assigned, *S. hybridum*". Marshall (1887, p. 15) too observes that it differs from *Ph. hybrida* (non L.) (Lm.): "in being quite depressed, in the widely open umbilicus, and in the absence of a rib below the periphery".

Ph. radiata (Roeding)

Geve, Monatl. Belustigungen, pl. 25, figs. 274 a, b; 1755.
Trochus hybridus Linnaei Chemnitz (pars una), Syst. Conch. Cab., vol. 5, p. 13, pl. 173. figs. 1704, 1705 (tantum); 1781.
Trochus hybridus, Chemnitz (pars una), Syst. Conch. Cab., vol. 5, p. 132, pl. 173, figs. 1704, 1705 (tantum); 1781.
Trochus hybridus, Gmelin (pars altera), Linné, Syst. nat., ed. 13, p. 3567, No 4; (1790) 1791.
Architectonica Radiata Roeding, Bolten, Mus. Boltenianum, p. 79, No 1027; 1798.
Trochus hybridus, Wood, Index testac., 2nd ed., p. 137, pl. 29, fig. 61; 1828. (loc. exclus.).
Solarium cingulum Kiener, Icon. coq. viv., Solarium, p. 6, No 4, pl. 3, fig. 6; 1838-1839.
Solarium hybridum, Mörch, Catal. conch. Yoldi, Cephalophora, p. 47; 1852.
Solarium hybridum (Trochus), Philippi (pars), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 14, No 10, pl. 2, figs. 16, 17 (tantum); 1853.
Solarium cingulum, Chenu, Man. de Conchyl., vol. 1, p. 232, fig. 1351; 1859.
Solarium (Philippia) cingulum, Hanley, Sowerby, Thesaurus Conchyl., vol. 3, p. 237, pl. 4, figs. 55, 56; 1863 (1866).
Solarium, cingulum, Reeve, Conch. Icon., Solarium, sp. 19, pl. 3, fig. 19; 1864.
Solarium (Philippia) cingulum, Martens, Beitr. Meeresfauna Mauritius u. Seychellen, p. 290; 1880.
Solarium (Philippia) cingulum, Marshall, Tryon, Manual of Conch., vol. 9, p. 15, pl. 5, figs. 63, 64; 1887.
Solarium (Philippia) cingulum, Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium cingulum, Sowerby, Mar. shells of S. Africa, p. 28; 1892.
Solarium cingulum, Hidalgo, Catalogo mol. test. Filipinas, p. 187; 1904-1905.
Philippia stipator Iredale, Rec. Austral. Mus. Sydney, vol. 18, p. 229, pl. 25, figs. 17, 18; 1931.
Philippia radiata, Kuroda, Catal. Moll. shells Taiwan, p. 86, No 205; 1941.

Type locality:?; "Habite la mer des Indes" (Kiener).

Formerly *Ph. radiata* and *Ph. layardi* A. Ad. (= *Ph. hybrida* [non L.] [Lm.]) were considered as specifically identical, till Kiener separated them on account of distinct differences. He refers, in this connection, to a characteristic figure of Chemnitz, namely, pl. 173, figs. 1704, 1705, illustrations quoted by Roeding in Museum Boltenianum (1798, p. 79, No 1027). Kiener adds to these drawings an excellent figure in his Iconographie (1838-1839, pl. 3, fig. 6).

I do not see why Philippi (1853, p. 14, No 10)—who separates *S. incisum* from *S. perspectivum* auct.—regards the characteristics of this *Philippia* as insufficient to constitute a separate species, and unites it again with *Ph. hybrida* (non L.) (Lm.) (= *Ph. layardi* A. Ad.). In reality, however, the characteristics are far more distinct than those of the above mentioned *Solarium.* Besides the pattern of colouring which in *Ph. radiata* is very typical, *Ph. layardi* differs from the species dealt with here by the more convex whorls, the more rounded carina and the convex basis.

Ph. stipator Ired. in my opinion is a not quite adult specimen of *Ph. radiata* with a slightly more convex profile.

a. 3. Indian Ocean, H. Boie. — b. 1. Doreh-baai (N.W. New Guinea), from E. F. Jochim's collection.

var. **subconcolor** Martens

Trochus hybridus Linnaei Chemnitz (pars altera), Syst. Conch. Cab., vol. 5, p. 13, pl. 173, figs. 1702, 1703 (tantum); 1781.
Trochus hybridus, Chemnitz (pars altera), Syst. Conch. Cab., vol. 5, p. 132, pl. 173, figs. 1702, 1703 (tantum); 1781.
Solarium hybridum var., Kiener, Icon. coq. viv., Solarium, p. 7, No 5, pl. 3, fig. 5a; 1838-1839. (f. Martens).
Solarium hybridum (Trochus), Philippi (pars), Martini & Chemnitz, Syst. Conch. Cab., vol. 2, part 7, p. 14, No 10, pl. 2, figs. 14, 15 (tantum); 1853.
Solarium (Philippia) hybridum, Hanley (pars altera), Sowerby, Thesaurus Conchyl., vol. 3, p. 236, pl. 4, fig. 39 (tantum); 1863 (1866).
Solarium (Philippia) cingulum var. *subconcolor* Martens, Meeresfauna Mauritius u. Seychellen, p. 290; 1880.
Solarium (Philippia) cingulum Kien. Vr. *subconcolor,* Paetel, Cat. Conch. Samml., vol. 1, p. 285; 1887.
Solarium subconcolor, Paetel, Cat. Conch. Samml., vol. 1, p. 287; 1887.

Type locality: "Mauritius".

a. 1. Larantoeka (E. Flores), J. Semmelink.

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