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A new slug from the Canary Islands

(Pulmonata: Parmacellidae).

By

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With 22 figures.

Abstract: *Parmacella tenerifensis* n. sp. is described from La Laguna (Tenerife, Canary Islands). It is distinguishable from the three closest species of the genus by the "spade" shape of the shell, the umbrella-shaped disc at the piliform end of the spermatophore, which has 16-17 denticles, the arrangement of the atrial accessory appendices, perpendicular to each other, the long and thick penis, and by its larger size.

Kurzfassung: *Parmacella tenerifensis* n. sp. wird beschrieben von La Laguna (Teneriffa, Kanarische Inseln). Die Art unterscheidet sich von den drei nächstverwandten Arten durch die Form des Schälchens, die schirmförmige und mit 16-17 Zähnchen versehene Endscheibe der Spermatophore, die Anordnung der akzessorischen Anhänge des Atriums, den langen und dicken Penis und größere Körpermaße.

In March 1984, as part of research work being carried out on the terrestrial malacological fauna of the island of Tenerife, 64 specimens of a slug belonging to the family Parmacellidae were collected, immediately after several days of intense rain, on agricultural land in the surroundings of La Laguna (U.T.M.: 28RCS7050; altitude: 560 m), near the Faculty of Biology.

On the basis of anatomical characters, it appears to represent a new taxon.

Parmacella (Parmacella) tenerifensis n. sp.

Description:

Very large light yellowish brown animal (Fig. 1; actual dimensions given in Table 1) with 2 dark-chocolate bands, stripes and streaks on the mantle; pneumostoma large (length: 5 mm; height: 3·5 mm) situated on the right posterior part of the mantle.

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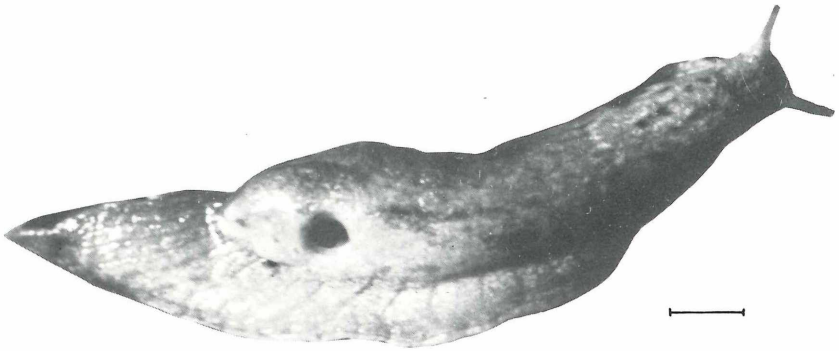


Fig. 1. An adult specimen of *Parmacella tenerifensis* n. sp. Scale line = 1 cm.

The shell (Fig. 2) in the adult is completely covered by the mantle and is very fragile, owing to it being very weakly calcified (the shells studied were removed prior to fixation); its dimensions are: length up to 18 mm, width up to 12·5 mm. The protoconch is relatively small (length up to 4·3 mm, height up to 2·3 mm), light yellowish ochre, smooth and without gloss. It is set at right angles to the spathula. The spathula attains its maximum width immediately next to the embryonic part. At the base of the shell, in the aperture, no denticles or folds. On the external ridge, between the protoconch and spathula, a triangular pit.

Jaw oxignate. Alimentary system (Fig. 7) long, with the intestinal loops situated posteriorly, owing to the large volume of the reproductive system.

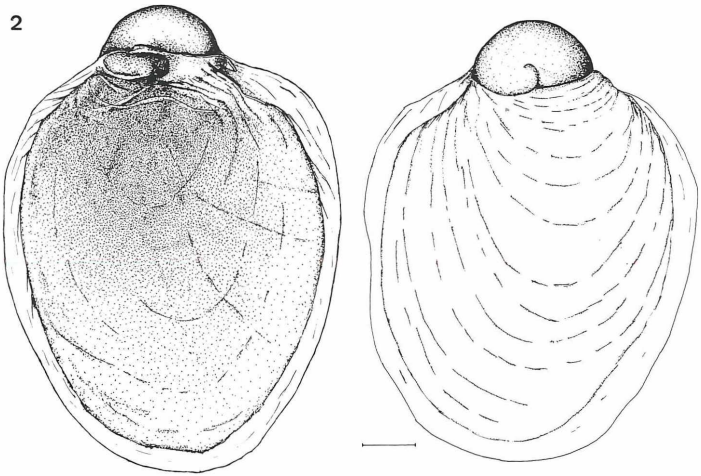
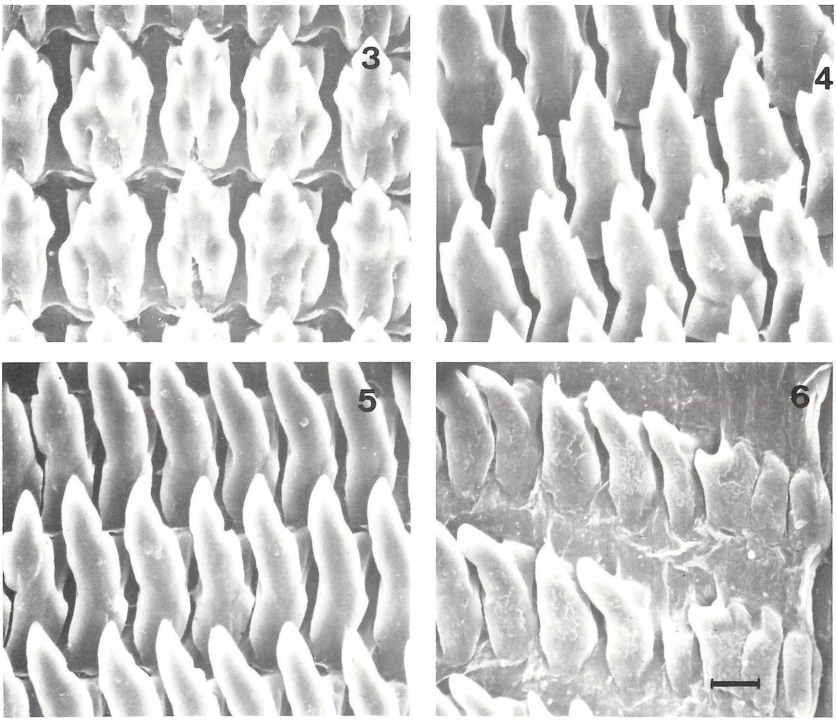


Fig. 2. Shell of *Parmacella tenerifensis* n. sp., ventral and dorsal views. Scale line = 2 mm.

Radula (Figs. 3-6) large (length: 8 mm, width: 4 mm) with approximately 130 rows of teeth and possessing the following radular formula:

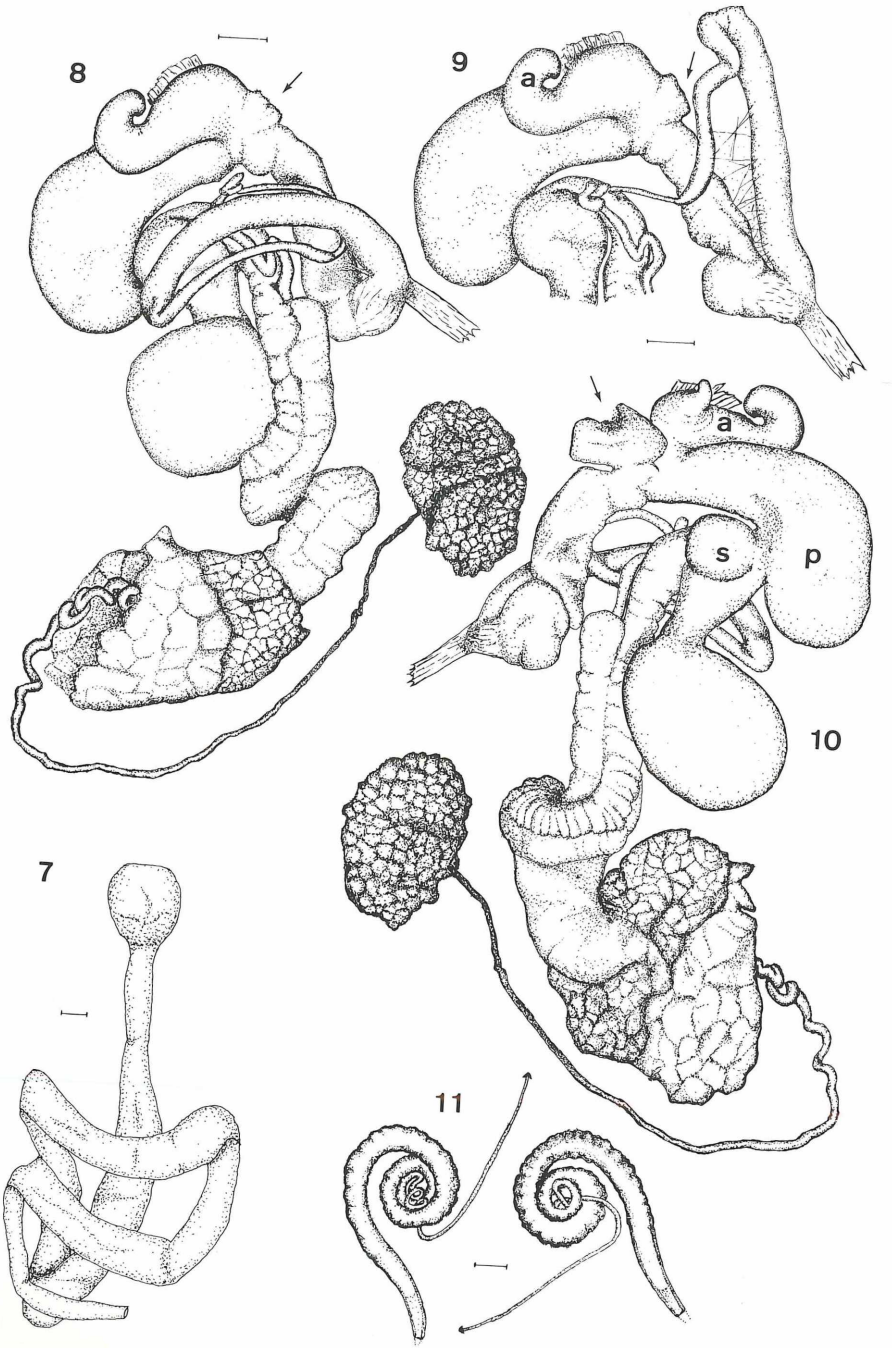
$$\frac{c}{3} + \frac{37}{3} + \frac{4}{2} + \frac{15}{1}$$

Reproductive system (Figs. 8-10): The ovotestis lies at the posterior end of the body cavity; the hermaphrodite duct is very long and introduces itself between the albumin gland (yellowish in live specimens) and the gland generally referred to as the prostate (white and much more follicular), which lies anteriorly to the intestinal loops. Just before the "carrefour", the hermaphrodite duct exhibits a small blind diverticulum, the fertilization chamber, with the same thickness and 1·5 mm in length. Sperm-oviduct long and folded.



Figs. 3-6. Radula of *Parmacella tenerifensis* n. sp. — 3) central tooth and first lateral teeth; 4) lateral teeth with 3 cusps; 5) lateral teeth with two and one cusps; 6) marginal teeth. Scale line = 25 μ.

Free oviduct short. Spermatheca large and oval, practically spherical. Spermatheca duct shorter than spermatheca, distinctly widened anteriorly, whilst basally it possesses a well defined spherical swelling (that probably represents the vestiges of the diverticulum on the spermatheca duct).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Perivaginal gland bean-shaped and highly developed. Atrium short. Accessory atrial appendices, one large and strongly bent, the other a lot shorter and straight or slightly bent, lying perpendicular to each other; interiorly, they possess a large fold inserted in the wall opposite to the genital atrium. These atrial appendices are able to evaginate to the exterior together with the penis, via the genital orifice, their internal fold dilating and stretching to form a type of near-circular cushion at the base of the evaginated penis.

Vas deferens long, widening slightly though sharply on passing into the gradually widening epiphallus, that is 1·5 times the length of the penis. The penis is long and thick, connected to the epiphallus via a delicate membrane; penis papillae imperforate and densely papillate.

In some specimens, we have found within the interior of the spermatheca and its duct, a very long elastic two-part spermatophore (Fig. 11): one thick and spirally coiled with a pleated surface lying within the spermatheca, and the other very thin and piliform that enters the spermatheca duct and terminates in a well developed umbrella shaped disc (Fig. 12-13), with a small central orifice through which the spermatozoids pass. 16 to 17 backwardly orientated small denticles cover the border of the disc and serve to anchor the internal folds of the spherical swelling of the spermatheca duct, in a fashion similar to that which occurs in *P. valencienni* (cf. ALONSO & IBAÑEZ 1981).

Table 1. Dimensions of *Parmacella tenerifensis* n. sp.

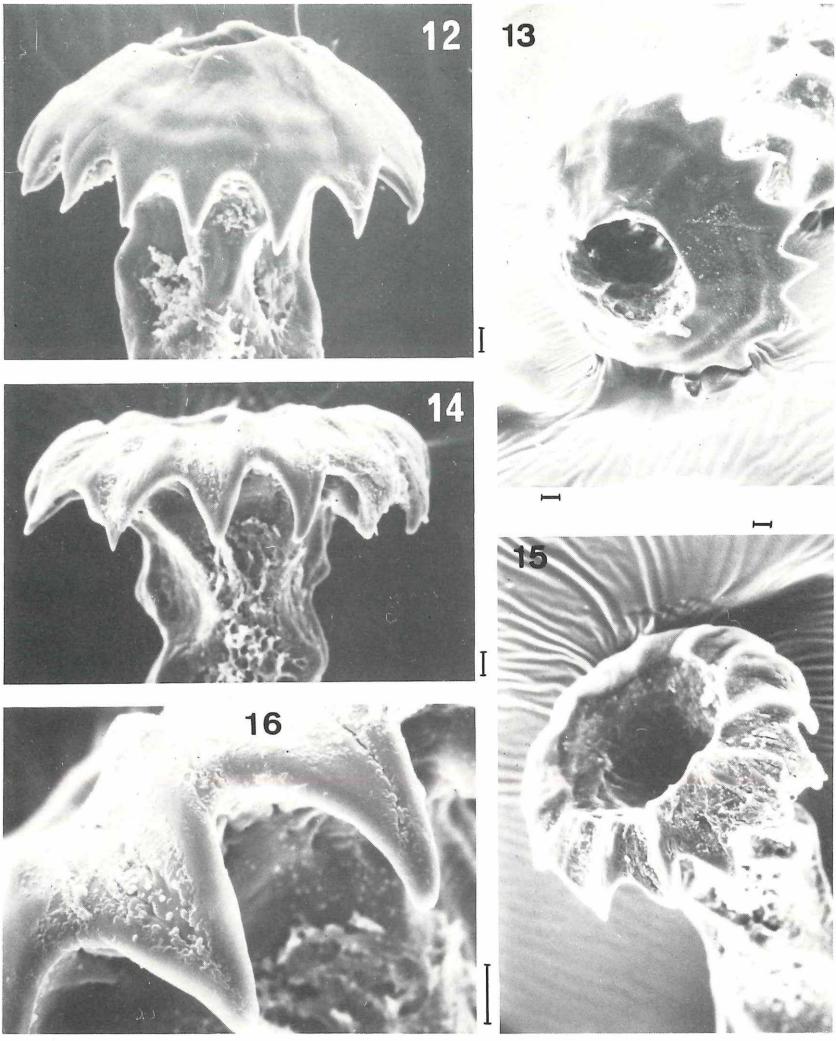
	body length (mm)	mantle lenght (mm)	keel lenght (mm)	body width (mm)	body weight (g)
live specimen (average size)	110	70	30	20	—
live specimen immersed in water	140	—	—	—	—
the largest preserved specimen	95	40	24	25·5	56·5

Holotype: E. CAVERO leg. 21. 3. 1984; in coll. ALONSO & IBAÑEZ, Department of Zoology, University of La Laguna.

Paratypes: E. CAVERO and J. A. DIAZ leg. 21-26. 3. 1984; in coll. ALONSO & IBAÑEZ; Museo Insular de Ciencias Naturales de Tenerife; British Museum (Natural History); Rijksmuseum van Natuurlijke Historie, Leiden (Alc. 9121); Museum of Natural History, Wroclaw University; Academy of Natural Sciences of Philadelphia (ANSP A 10396); Field Museum of Natural History, Chicago (FMNH 212665); Zoological Institute of Academy of Sciences, Leningrad; Museum National d'Histoire Naturelle, Paris; Senckenberg-Museum, Frankfurt a. M. (SMF 256446/3).

Derivatio nominis: the specific name derives from Tenerife (Canary Islands).

◀ Figs. 7-11. Internal anatomy of *P. tenerifensis* n. sp. — 7) alimentary system; 8) reproductive system, dorsal view; 9) detail showing the epiphallus and vas deferens partially extended; 10) reproductive system, ventral view; 11) spermatophore. — s spherical swelling, p perivaginal gland, a accessory atrial appendices, the arrow indicates the position of the genital orifice. Scale lines = 2 mm.



Figs. 12-16. Spermatophoral discs. — 12-13) *P. tenerifensis*; 14-16) *P. valencienni.* Scale lines = 25 μ.

Discussion.

The family Parmacellidae comprises 2 genera: *Parmacella* Cuvier 1804 and *Candaharia* Godwin-Austen 1888, with the presence of a "vagina of complex structure with laterally accrued bean-shaped perivaginal gland" (Wiktor 1983) being a characteristic of the genus *Parmacella.*

For its part, the genus *Parmacella* encompasses two subgenera: *Parmacella* s. str., diagnosis: Atrium with two[1]) accessory appendices; laterally on the spermatheca duct near the atrium a spherical swelling (here the spermatophore is anchored); and *Cryptella* WEBB & BERTHELOT 1833, diagnosis: Atrium with no accessory appendices. On spermatheca duct no spherical swelling.

On the basis of these diagnosis, it appears that *P. tenerifensis* belongs to the subgenus *Parmacella* s. str., which therefore includes the following species: *olivieri* CUVIER 1804, *festae* GAMBETTA 1925, *valencienni* WEBB & VANBENEDEN 1836, *deshayesi* MOQUIN TANDON 1848, *ibera* EICHWALD 1841, and *tenerifensis* n. sp. For the principal synonyms of these species see WIKTOR (1983) and LIKHAREV & WIKTOR (1980). Furthermore, we add (with doubt) to the list of synonyms of *deshayesi* the following names: *gervaisi* MOQUIN-TANDON 1855 and *moquini* BOURGUIGNAT 1860.

For the comparison of these species we have had available specimens of *tenerifensis* and *valencienni* and have utilized the data furnished by the publications of WIKTOR (1983), LIKHAREV & WIKTOR (1980) and AKRAMOWSKI (1976).

P. olivieri is clearly distinguishable from *festae* since the protoconch of the latter is covered with minute pits arranged regularly in spiral rows; whereas both species are clearly distinguishable from the other four by having the atrial accessory appendices almost of equal length and width (*olivieri*) or differing only slightly in size (*festae*); by having in the interior of these atrial appendices minute oblong folds (*olivieri*) or irregular oblong wrinkles (*festae*); and by having the spermatophoral surface smooth.

In the remaining 4 species, the atrial accessory appendices differ in size and possess in their interior a large fold that dilates remarkably on evaginating to the exterior together with the penis. In addition, the spermatophoral surface is folded.

These other 4 species are more difficult to separate. On comparing *P. deshayesi* with *ibera*, WIKTOR (1983) comments: "Evidently, similarities are numerous while differences are difficult to define and almost indistinct. I have not found any unequivocal distinctive features, though when the specimens are compared, the above mentioned subtle differences are discernible"[2]).

To this statement, we can add that *valencienni* is very similar to *deshayesi*, and thus these three species form a homogenous group.

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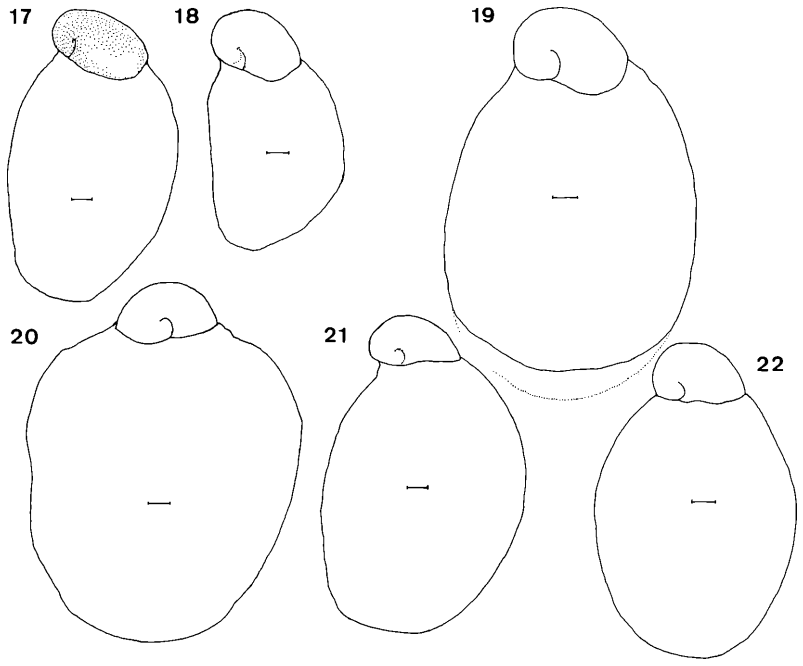
[1]) WIKTOR (1983) states: "Atrium with one or two accessory appendices" indicating that *P. valencienni*, on the basis of one sole young specimen from Huelva (Spain), possesses only one accessory appendix. Previously to his work, two of us (ALONSO & IBAÑEZ 1981) studied more than 200 specimens of *valencienni* from Huelva, Cádiz, Málaga and Granada (Spain) and substantiated that the atrium has 2 accessory appendices, as in the remaining species of the subgenus *Parmacella* s. str. Posteriorly to the publication of WIKTOR and in light of this discrepancy, we have re-examined our material, substantiating that in some specimens in which the evagination of the atrium had commenced during the fixation process (water immersion phase), the shorter of the atrial appendices had initiated this process, whilst in other specimens with the evagination of the atrium slightly more advanced, only the large atrial appendix was visible. We consider that this is what could have occurred in the specimen studied by WIKTOR.

[2]) *P. deshayesi* has: larger dimensions, less distinct or no streaks on the mantle, narrower shell spathula and less developed swelling at the base of the spermatheca duct (WIKTOR 1983).



Figs. 17-22. Shells of all the species of the subgenus *Parmacella* s. str. — 17) *P. festae*; 18) *P. olivieri*; 19) *P. ibera*; 20) *P. tenerifensis*; 21) *P. deshayesi*; 22) *P. valencienni*. — Figs. 17, 18 and 21 taken from WIKTOR (1983); fig. 19 taken from LIKHAREV & WIKTOR (1980): in this fig. the dotted line represents a possible outline of the shell, in agreement with the measurements given by the authors in the text. — Scale lines = 1 mm.

Although the similarities between *tenerifensis* and these 3 species are numerous, we have been able to establish a series of distinguishing characteristics:

P. tenerifensis is much larger than the other species (body length up to 95 mm in one preserved specimen, with 70-80 mm being the average length); atrial accessory appendices lying in perpendicular planes to each other; and penis long and thick.

However, the most important differences are to be found in the form of the disc located at the piliform end of the spermatophore and in the shell.

In *tenerifensis* the disc (Figs. 12, 13) is umbrella-shaped and on its rim it possesses 16 to 17 small denticles. In *valencienni* (Figs. 14-16) it is more flattened with 12 to 13 strong teeth curved towards the piliform part of the spermatophore.

We do not possess S.E.M. information concerning the disc of *deshayesi* and *ibera*, though WIKTOR (1983) provides a drawing of the disc of *deshayesi* which shows a strong similarity to that of *valencienni;* in addition, when comparing *deshayesi* with *ibera*, he does not indicate any differance between them with respect to the disc, and therefore we assume that the discs of both species are of the same type.

Finally, regarding the shell (Figs. 17-22), in *tenerifensis* the spathula attains its maximum width precisely next to the protoconch, having the form of a "spade", whilst in the remaining species, it widens gradually, and is oval in shape.

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