

ON *SOLENA GAUDICHAUDI* CHENU, 1843 AND
S. TEHUELCHA HANLEY, 1842
(Mollusca: Bivalvia)

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ABSTRACT

A new finding of *Solen gaudichaudi* Chenu, a Chilean species formerly questioned by some authors, provides further evidence of its validity. A comparison with *S. tehuelcha* of the Atlantic coast and a discussion of the latter's synonymy are also presented.

There are three species of the family Solenidae described for southern South America: *Ensis macha* molina, 1782, found from Hornitos, Antofagasta, Chile (the northernmost locality where I have found it on the west coast of South America) to Golfo San Matias in the Atlantic (Carcelles & Williamson, 1951), *Solen tehuelcha*, recorded from southern Brazil to Bahia Blanca and San Blas, Argentina (D'Orbigny, 1846; Carcelles, 1944) and *Solen gaudichaudi* Chenu, 1843, recorded from Valparaiso to Atacama, on the Chilean coast. The status of *E. macha* and in part that of *S. tehuelcha* are well established but the validity of *Solen gaudichaudi* has been questioned by

Soot-Ryen (1959) who suggested that Chenu's species might be one more synonym of *Ensis macha*.

This paper intends to clarify some of the uncertainties confronting the taxonomic position of *S. gaudichaudi* and *S. tehuelcha*.

a) On *Solen gaudichaudi*.—From the point of view of identification it has been very misleading that Chenu's original description of *S. gaudichaudi* failed to mention the presence of only one tooth on each valve although, in general, the shell was characterized and figured quite satisfactorily.

The species was redescribed later in very similar terms by d'Orbigny (1846) and Hupé (1854). Hupé's identification might be questioned since it is well known that many of his descriptions were mere compilations of others (mainly d'Orbigny's descriptions) but there is no doubt that d'Orbigny examined and described one or more valves from Coquimbo, identical to those of Chenu's species. He, furthermore, stressed the fact that the valves had only one tooth.

Few authors mentioned again this species. Dall (1909) following former records listed it from Coquimbo and Valparaiso and Gigoux (1934) recorded it from Atacama. This last determination might, however, correspond to *Ensis macha* and not to *S. gaudichaudi*.

The study of many well preserved shells collected at the bar of the Carampangue river (Province of Arauco, Chile) by Mr. E. Alarcón confirms beyond doubt that Chenu's species is valid and properly placed in the genus *Solen*. A redescription of the species based on that material follows:

Solen gaudichaudi Chenu, 1843

(Figs. 1, 2a; Plate 1, Figs. 1a, 2a)

Solen gaudichaudi Chenu, 1843, *Illustr. conchyliol., Solen*: pl. 2, Fig. 7; d'Orbigny, 1846, *Voy. Amér. Mérid.*, 5 *Moll.*: 505; Hupé, 1854, in Gay, *Hist. Fis. Polit. Chile, Zool.*, 8 : 369; Dall, 1909, *Proc. U. S. Nat. Mus.*, 37 (1704) : 274; Soot-Ryen, 1959, *Lunds Univ. Aarskr., N. F. Avd.* 2, 55 (6) : 67.

?*Solen gaudichaudi* Gigoux, 1934, *Rev. Chil. Hist. Nat.*, Año 38 : 284, 286.

Ensis gaudichaudi Chenu, 1851, *Man. Conch.* 2 : 20, Fig. 92; H. and A. Adams, 1858, *Gen. Rec. Moll.* 2 : 342.

Solen gaudichardi Sowerby, 1874, in Reeve, *Conch. Icon.* 19, *Solen*: species 7, pl. 3, Fig. 7 (as *S. rostrum anatis*; see Errata).

Solen rostrum-anatis Dunker, 1861, *Proc. Zool. Soc. London*: 420.

Solen tehuelcha Clessin, 1888, *Syst. Conch.-Cab.* 11 (Abb. 3) *Solenaecen*: 22, pl. 8, Fig. 2 (*non* p. 8, pl. 2, Figs. 3-5).

REDESCRIPTION:

Shell thin, fragile, equivalve, purple-reddish in color and almost rectangular in outline; anterior and obliquely truncate but rounded, posterior one elongated and rounded; dorsal and ventral margins slightly curved. Valves quite inequilateral with inconspicuous beaks at the anterior end; with only one cardinal tooth on each valve. Periostracum shiny, light brown to greenish-brown. Sculpture of smooth concentric lines and radiating striae, the latter observable only on the anterior half.

Internal part of the shell purple-whitish tinted. With strongly marked muscle scars. Anterior adductor scar as long as the ligament; separated from the dorsal mantle scar. Posterior adductor scar half-moon shaped. Pallial line fused to the adductors.

The largest shells measured about 105 mm. in length and from 29 to 31 mm. in height (depth).

DISTRIBUTION:

Coquimbo to Golfo de Arauco, Chile. Coast of Atacama?

MATERIAL STUDIED:

a) 30 valves and shell fragments collected at the bar of the Carampangue River (Province of Arauco), Chile, on the 17th of December, 1963 (Museo del Depto. de Zoología, U. de Concepción, N° 2389).

b) 1 valve collected at the "costa de Arauco". (Museo Nacional de Historia Natural, Santiago de Chile). This shell was labelled by Philippi as *Solen araucanus*, but the name is invalid since it was never published.

REMARKS:

Under the erroneous name of *S. rostrum-anatis* Dunker, Sowerby Jr. (1874; see Errata) described and figured a *S. gaudichardi* which seems to correspond to Chenu's species. Due probably to a typographical error the species is referred to Chemn. (Chemnitz?) instead of Chenu. Since both Sowerby's and Dunker's descriptions make reference to the shape and pinky-purple coloration of the shell (a feature typical of *gaudichaudi*) and Sowerby's figure closely resemble the shells examined by me, I include these author's references in the synonymy of *gaudichaudi*.

Sowerby also included the name *tehuelcha* "Orbigny" Hanley as a synonym of *gaudichaudi*, but as discussed below this is quite incorrect.

Clessin's reference (1880) to *S. tehuelcha* d'Orbigny based on Dunker's diagnosis for *S. rostrum-anatis* and Sowerby's figure falls also in the synonymy of *gaudichaudi*.

The Chilean species can be easily differentiated from *S. tehuelcha* from the Atlantic coast by its largest size, less oblique more rounded anterior borders and, particularly, by the purple-reddish coloration of the shell. According to Carcelles (1944:292-293), *S. tehuelcha* reaches a maximum size of 85 mm.; furthermore, the shell has only a whitish coloration lacking the conspicuous purple-red of *S. gaudichaudi*.

Plate 1 represents shells of both species and figure 1 an internal view of the shell of *S. gaudichaudi*. An examination of the internal side of the shell in both species showed additional differences in the shape and insertion of the right valve tooth (Figs. 2 a and b). I had only two medium sized specimens of *S. tehuelcha* (the largest measured 63 mm. in length) and the specimen figured by Philippi (see below) for study, but comparison with shells of *S. gaudichaudi* of similar size, showed that the dissimilarities observed between the two species seem to result from shape rather than age, as the character is constant in shells of *gaudichaudi* of different age.

In Figs. 2a and 2b the position of the right valve has been tilted to better show the size and shape of the tooth, the position of the socket corresponding to the tooth of the opposite valve and a muscular (umbonal?) insertion (of the mantle?), immediately below. It can be noticed that the tooth of the right valve in *S. gaudichaudi* is inserted on top of a wide base and the socket next to it is wide and shallow while in the case of *S. tehuelcha* the tooth appears displaced to the right leaving a deep socket underneath. Displacement and certain change in shape of the anterior adductor in *S. tehuelcha* seems to be correlated with an anteriormost displacement of the umbones.

No soft parts of *Solen gaudichaudi* were available for study and this has greatly limited the scope of this contribution, however, judging from the shape of the shell and coloration (a feature which might be of phylogenetic value within the genus) the Chilean species appears to be related to a group of species of the west coast (*sicarius*, *pazensis*, *pfeifferi* and *rosaceus*; see Hertlein and Strong, 1950) being particularly closer to *Solen sicarius* Gould with a similar warm-temperate distribution along the west coast of the U. S. A. and southern Canada. *S. tehuelcha*, on the other hand, seems closer to *Solen viridis*, the only other known species from the western Atlantic. Lange de Morretes (1949) cites also *S. rostriformi* Dunker from the southern coast of Brazil but this is a doubtful record since the species was originally described without locality.

The new finding of *S. gaudichaudi* extends its previously known range of distribution further south; however, the fact that there is no known valid record of a species of *Solen* from the south of Chile, Patagonia or Tierra del Fuego indicates that *S. gaudichaudi* might be restricted to the so-called "Peruvian zoogeographical province" or at least to the southern part of it. *Solen rudis* C. B. Adams, 1852, the only other species known from the northern part of Peru belongs to the subgenus *Solena* (Olsson, 1961; Keen, 1958).

As remarked by d'Orbigny (1846 : 505) *S. gaudichaudi* seems to be a rare species and its apparently scattered distribution might be due to a specialized habitat (sublittoral and estuarine areas?) but nothing is known of its ecology.

Designation of the type locality is delayed until the type-series (syntypes) can be reexamined.

On Solen tehuelcha (Fig. 2b; Plate 1, Figs. 1b, 2b).

The validity of *S. tehuelcha* from the western Atlantic as discussed above cannot be doubted; its synonymy, on the contrary, is in a state of great confusion. Different authors have referred this species to either d'Orbigny or to Philippi (Lange de Morretes, 1949; Carcelles, 1944; Barattini, 1951, etc., see synonymy) but it would appear that neither of them should be credited with it.

It is quite certain that d'Orbigny (1846 : 505) originally confused *S. tehuelcha* with *Solen scalprum* King and Broderip which Carcelles (1944 : 292) demonstrated later to have been based on young shells of *Ensis macha* Molina. It seems also certain that d'Orbigny never published any statement recognizing his mistake, although he distributed samples originally identified as *S. scalprum* under different new names.

Hanley (1842 : x) was the first to state that *S. tehuelcha* was one of d'Orbigny "MS names, . . . which the author recognized as new sent . . . to Sowerby". He figured the species in lateral view and gave a short (but unfortunately imprecise) description of it, misspelling the name as *thuelcha* and giving the locality of d'Orbigny's sample as "S. American" instead of Patagonia. However, he also stated that the name *tehuelcha* was proposed for *S. scalprum* d'Orbigny (not King and Broderip) of the "Voyage . . ." (op. cit.; x). Thus, Hanley was the first who described a *Solen tehuelcha* which seems to correspond to the *S. tehuelcha* of subsequent authors. The species name should, accordingly, be attributed to him and not to d'Orbigny, but this conclusion needs to be confirmed by a reexamination of Hanley's material as it appears enfeebled by statements given by two other authors.

Sowerby (1874) who apparently examined the shell described by Hanley, listed *tehuelcha* "d'Orbigny" as a synonym of *gaudichaudi* Chenu and stated: "The fine richly coloured specimen in Mr. Hanley's

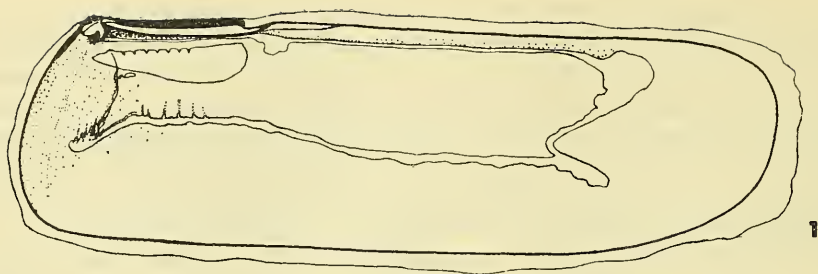


Fig. 1. Interior view of a right valve of *Solen gaudichaudi* measuring 99 mm. in length (Mus. Zool. Univ. Concep. N^o 2389).

Fig. 1. Vista interna de una valva derecha de *Solen gaudichaudi* de 99 mm. de largo (Mus. Zool. Univ. Concep. N^o 2389).

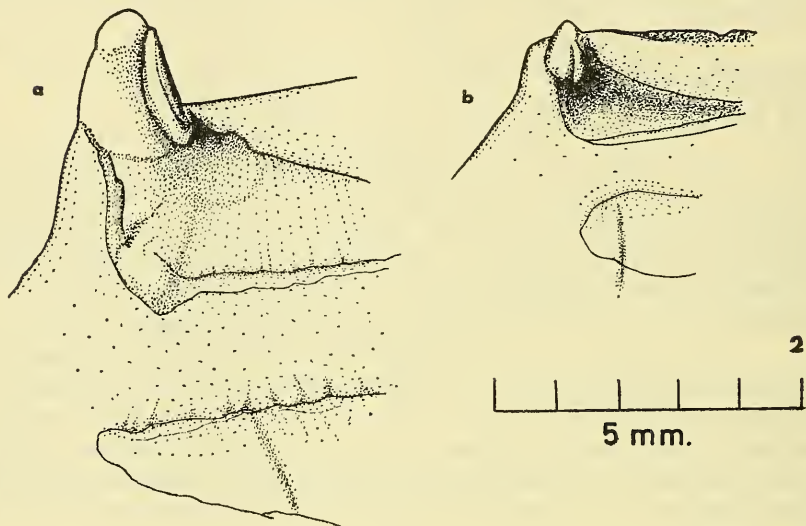


Fig. 2. Differences observed in the tooth of the right valve observed in *S. gaudichaudi* (a) and *S. tehuelcha* (b). For explanations see text.

Fig. 2. Diferencias observadas en el diente de la valva derecha en *S. gaudichaudi* (a) y *S. tehuelcha* (b). Para mayores explicaciones véase el texto.

collection too late for figuring, has been identified with Mr. Dunker's species [*rostrum-anatis*], the name of which must become a synonym . . ." [of *S. gaudichaudi*].

As shown above *S. gaudichaudi* and *tehuelcha* are too different to be confused. The only possibility left is that Hanley's *tehuelcha* could have been based on a different species but this is most unlikely as d'Orbigny's excellent figure was available to Hanley (and Sowerby) for comparison. It is more likely that Sowerby was as wrong in this statement as when attributing *gaudichaudi* to Chemnitz (see above).

Another conflicting statement is given by Philippi (1847). This author was the first to thoroughly describe and figure a *Solen tehuelcha* making reference to Hanley's remarks and listing *S. scalprum* d'Orbigny (not King and Broderip) as synonym of *S. tehuelcha* d'Orbigny. He based his description on a shell requested to d'Orbigny of which he says: "Das abgebildete exemplar habe ich von Herrn d'Orbigny selbst unter den Namen *S. patagonicus* erhalten". There is no doubt that Philippi's description corresponds to d'Orbigny's description and figure of *S. scalprum* and to the *S. tehuelcha* of subsequent authors but it is not evident to me why d'Orbigny identified it under the name of *S. patagonicus*.

Thanks to the kindness of Prof. Nibaldo Bahamonde I was able to examine one sample deposited by Philippi at the Museo Nacional de Historia Natural, Santiago, containing one specimen of this species measuring 79 mm. in length and 27 mm. in height. This is undoubtedly the sample sent to Philippi as the label reads: "*Solen patagonicus* d'Orb., . . . Patagonia . . . d'Orb."

This is also the shell figured and described by Philippi as *Solen tehuelcha* d'Orbigny.

In spite of this apparently discording information and pending reexamination of Hanley's material (if available) I feel justified to refer *Solen tehuelcha*'s name to Hanley. If, on the other hand, Hanley's sample (s) turns out to be a different species, *S. tehuelcha* must be attributed to Philippi and the specimen deposited at the Museo Nacional de Historia Natural, Santiago de Chile, should be selected as the lectotype.

The synonymy of *S. tehuelcha* as understood here is a follows:

Solen tehuelcha Hanley, 1842

Solen thuelcha "d'Orbigny" Hanley, 1842, Ill. Cat. Shells: 13; 1843, pl. 10, Fig. 30; 1856, Appendix: 336 (error for *tehuelcha*).

Solen tehuelcha "d'Orbigny" Philippi, 1847, Abb. u. Beschr., 3. *Solen*: 44, pl. 2, Fig. 4; Clessin, 1888, Syst. Conch.-Cab., N. S. 11 (Abth. 3). Solenaceen: 8, pl. 2, Figs. 3-5 (*non* p. 22, pl. 8, Fig. 2).

Solen tehuelchus Carcelles, 1944, Rev. Mus. La Plata, (N. S.) Zool. 3:

292, pl. 13, Fig. 106; Barattini, 1951, Publ. Cient. S.O.Y.P., N° 6: 255; Lange de Morretes, 1949, Arq. Mus. Paran. 7: 46. *Solen scalprum* d'Orbigny, 1846, Voy. Amér. Mérid. 5, Moll.: 505, pl. 77, Fig. 22 (non *S. scalprum* King and Broderip, 1832, a synonym of *Ensis macha* (Molina)).

DISTRIBUTION. Southern Brazil to Bahía Blanca and San Blas, Argentina.

ACKNOWLEDGEMENTS

I am grateful to Mr. Elias Alarcón (now at IFOP) whose interest in malacology caused him to collect these interesting shells. Mr. D. Rioseco took the photographs reproduced here, Mr. José Bustos inked my drawings and Mrs. Roxana Bustos (Dr. S. Bustos' wife) very kindly revised the English.

RESUMEN

Se discuten los problemas taxonómicos y de distribución de dos especies de Solenidae de la parte sur de Sudamérica.

En primer lugar se da a conocer una nueva localidad para la especie de "navajuela" *Solen gaudichaudi* Chenu, encontrada ahora en la barra del Río Carampangue, en la provincia de Arauco, Chile. Esta especie había sido considerada recientemente como un sinónimo más de *Ensis macha*, la única otra especie de la familia Solenidae conocida en Chile, pero la presencia de un sólo diente cardinal en cada valva y su menor tamaño permiten diferenciarla inmediatamente.

En base al material colectado se da la siguiente redescipción:

"Concha delgada, frágil, equivalva, de color púrpura rojizo y casi rectangular en forma; parte anterior oblicuamente truncada pero redondeada, posterior alargada, redondeada; márgenes dorsal y ventral ligeramente curvos. Valvas completamente inequilaterales con umbos inconspicuos en el extremo anterior; sólo con un diente cardinal en cada valva. Periostraco brillante de color café claro o café verdoso. Escultura formada por líneas concéntricas y estrías radiales que son visibles sólo en la mitad anterior.

Parte interna de la concha de un tinte púrpura-blanquecino. Con impresiones musculares muy marcadas. Impresiones del aductor anterior tan largas como el ligamento; separadas de las impresiones dorsales del manto. Impresiones del aductor posterior en forma de media luna. Línea paleal, fusionada a los aductores.

S. gaudichaudi fue descrita originalmente de Valparaíso y ha sido encontrada también en Coquimbo. La nueva localidad extiende su distribución hacia el sur casi hasta los límites de la Provincia Zoológica Peruana. Como no existen registros de ninguna especie de *Solen* al sur de esta localidad, es posible que *S. gaudichaudi* esté restringida en su distribución a dicha Provincia o a la parte sur de ella.

Se discuten diferencias de la concha observadas entre *S. gaudi-chaudi* y *S. tehuelcha* de la costa atlántica. La sinonimia de esta última especie se discute en la segunda parte del trabajo, sugiriéndose que el nombre *tehuelcha* debería asignarse a Hanley y no a d'Orbigny o Philippi como lo han hecho diversos autores.

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PLATE I

Plate 1. Differences in outline and in the external and internal parts of the shell of *S. gaudichaudi* and *S. tehuelcha*.

Fig. 1a. Left valve of a specimen of *S. gaudichaudi* from the Desembocadura del Río Carampangue, Arauco, Chile (Mus. Zool. Univ. Concep. Nº 2387).

Fig. 1b. Left valve of a specimen of *S. tehuelcha* from La Paloma Rocha, Uruguay (Mus. Zool. Univ. Concep. Nº 2609).

Lámina 1. Diferencias en la forma y en la cara interna y externa de la concha de *S. gaudichaudi* y *S. tehuelcha*.

Fig. 1a. Valva izquierda de un ejemplar de *S. gaudichaudi* de la Desembocadura del Río Carampangue, Arauco, Chile (Mus. Zool. Univ. Concep. Nº 2387).

Fig. 1b. Valva izquierda de un ejemplar de *S. tehuelcha* de La Paloma Rocha, Uruguay (Mus. Zool. Univ. Concep. Nº 2609).

Figs. 2a and b. Enlarged view of the internal side of the right valve of the specimens photographed in 1.

Figs. 2a y b. Vista aumentada de la parte interna de la valva derecha de los ejemplares fotografiados en 1.

PLATE I

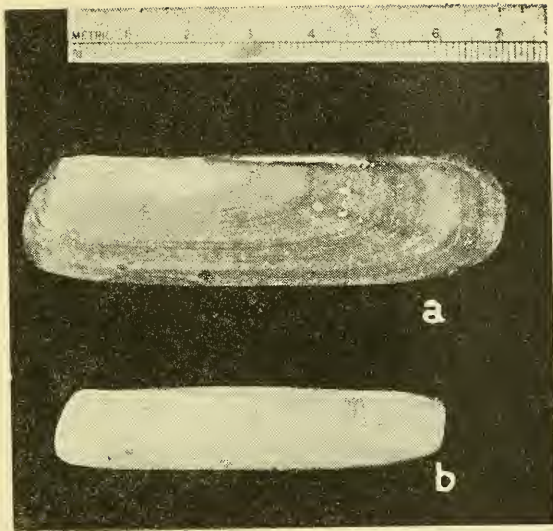


Fig. 1

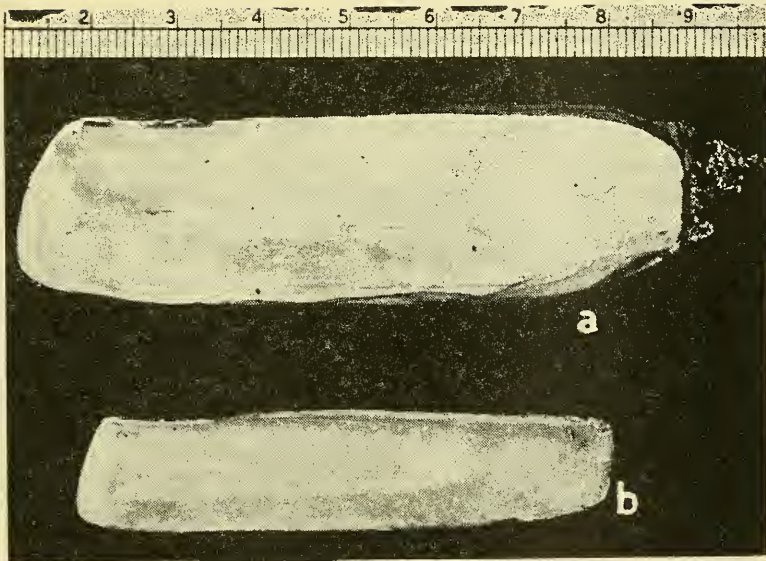


Fig. 2