

**On the identity of *Helix digna* Mousson, 1872, and
description of another extinct helioid
from La Gomera, Canary Islands¹**

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The enigmatic *Helix digna* Mousson, 1872, one of the largest and most ornamental snails of the Canary Islands, was known only by a single fossil shell collected 120 years ago on the island of La Gomera. We report on the recent discovery of a new fossil population and discuss its systematic status within the genus *Hemicycla*. During our search for this forgotten species we discovered another extinct helioid species which is named described as *Hemicycla migueli*. It is compared to conchologically similar species from the same and other islands, such as *H. gomerensis*, *H. consobrina* from Tenerife, and *H. granomalleata* from La Palma. Twelve other species were found at the type locality of the new species, including the genus *Leiostylis* which was not known from La Gomera before.

Key words: Gastropoda, Pulmonata, Helicidae, *Hemicycla*, taxonomy, extinction, Pleistocene-Holocene, Spain, Canary Islands.

In 1872 the Swiss malacologist Johann Rudolf Albert Mousson named some very large helioid snails based on subfossil shells collected by the German geologist Karl von Fritsch on his excursions across the island of La Gomera, Canary Island (Fritsch, 1867; Mousson, 1872). One of these, *Hemicycla efferata* (Mousson, 1872), was recently discovered alive and its wider former distribution could be established (Hutterer et al., in press). Another taxon, *Helix (Leptaxis) digna* Mousson, 1872, was based on a single fossil shell which, according to a cryptic note in Mousson (1872: 162) and the text scribbled onto the label of the holotype, had been taken near Agulo, a small village on the northern coast of the island. Our multiple attempts to find more of these very large, keeled and ribbed shells (fig. 1) have been unsuccessful for a long time, and there remains little reason to believe that this beautiful snail has survived. However, during a botanical excursion the junior author collected a few shells in a remote part of La Gomera which seem to represent Mousson's taxon, and which therefore are the first new examples besides the holotype collected 120 years ago. Moreover, the senior authors' unsuccessful attempts yielded shells of a smaller but superficially similar species in Pleistocene/Holocene deposits in a valley further west. We believe that these shells

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represent another extinct taxon. In this note we define both species and discuss their possible relationships.

Collection acronyms are as follows: AIT, collection of Alonso and Ibáñez, Universidad La Laguna, Tenerife, Canary Islands (Spain); BMNH, British Museum (Natural History), London (United Kingdom); CGH, private collection of Klaus Groh, Hackenheim (Germany); CHB, private collection of Rainer Hutterer, Bonn (Germany); CVB, private collection of Volker Voggenreiter, Bonn (Germany); MNHN, Museum National d'Histoire Naturelle, Paris (France); NMB, Naturhistorisches Museum, Bern (Switzerland); NNM, Nationaal Natuurhistorisch Museum, Leiden (The Netherlands); SMF, Senckenberg-Museum, Frankfurt/M. (Germany); TFMC, Museo de Ciencias Naturales de Tenerife, Santa Cruz, Canary Islands (Spain); ZMZ, Zoologisches Museum der Universität, Zürich (Switzerland). If not otherwise stated, all specimens of the new species represent paratypes.

Gastropoda: Helicidae

Hemicycla digna (Mousson, 1872)

figs. 1-2

Helix (Leptaxis) digna Mousson, 1872, Rév. faune malac. Canar.: 68-69, pl. 4 fig. 3 [p. 68: "Gomera", p. 162 "Agulo", = UTM 28RBS8420].

Helix digna - Pfeiffer, 1876, Mon. Hel. 7: 304.

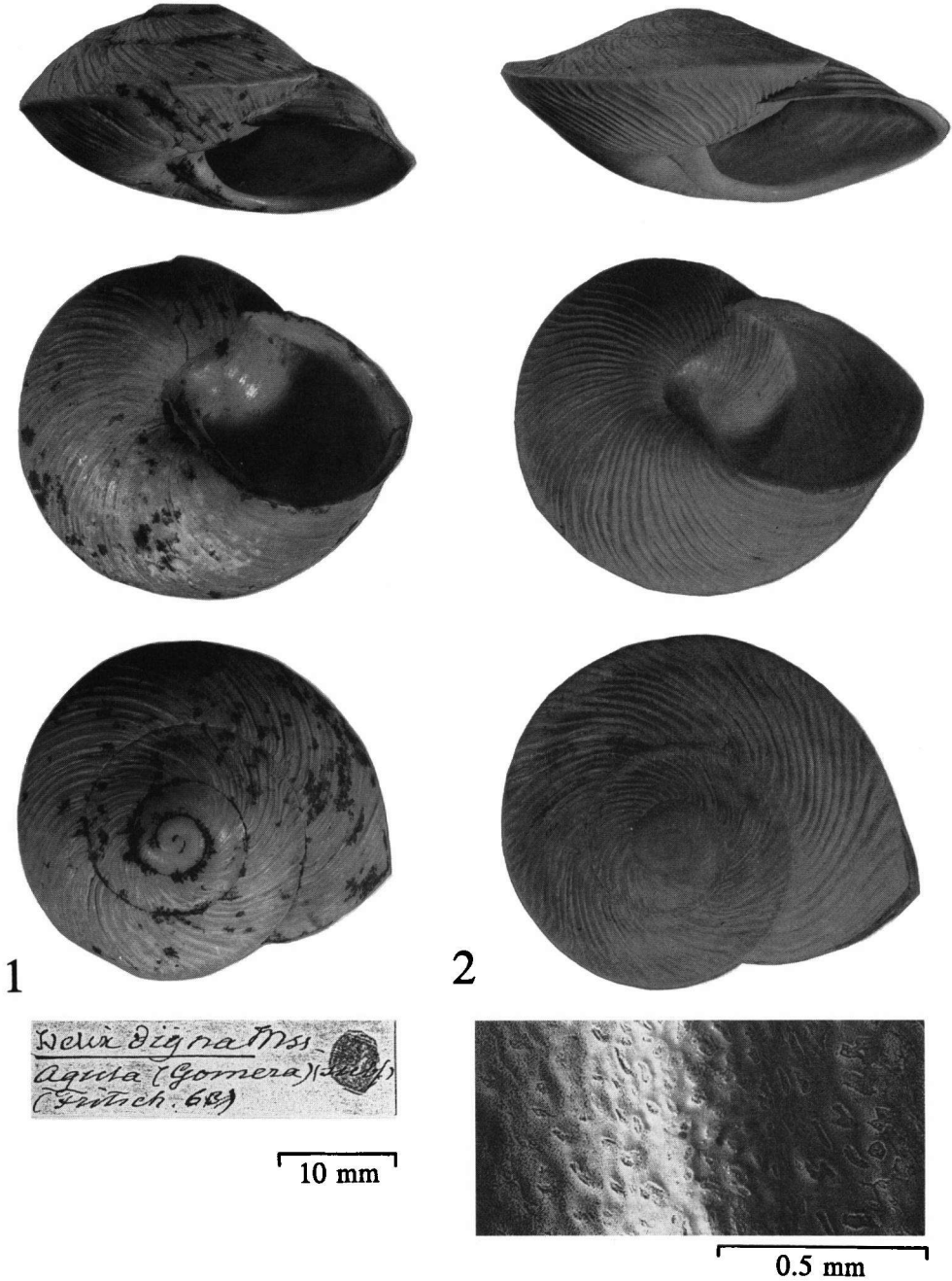
Helix (Iberus) digna - Wollaston, 1878, Test. Atl.: 334.

Hemicycla ? digna - Groh, 1985, Bonn. zool. Beitr. 36: 397.

Material. — 1 shell, Canary Islands, La Gomera, Agulo [UTM 28RBS8420], leg. K.v. Fritsch 1862 (ZMZ 506654/holotype); 2 shells, 4 fragments, La Gomera, Barranco N of Las Rosas [UTM 28RBS8221], leg. V. Voggenreiter 1995 (1 shell or fragment each deposited in TFMC, NNM, SMF, CHB, CGH, CVB).

Diagnosis. — Helicid from the Canary Islands, with a very large flattened shell, a keeled periphery, a suture with strong overlap and a strongly ribbed and granulated surface.

Description. — The narrow umbilicus of the moderately thick and opaque shell is almost completely covered by the columellar part of the peristome. The form of the shell is depressed conical, the number of regularly, rapidly increasing whorls varies between 4.1 and 4.3. The whorls are separated by a characteristic suture: the outer margin of the whorls forms a flat crest which slightly overlaps the next whorl. The periphery of the body whorl is therefore not only keeled, but forms a small crest in the upper third of the whorl (see Mousson, 1872: pl. 4 fig. 3, and figs. 1-2). The crested keel becomes more and more reduced towards the aperture. The body whorl descends significantly in its last tenth towards the peristome, resulting in an inclination of approximately 50 degrees between the plane of the aperture and the vertical axis of the holotype shell, but less so in the other shells. The sculpture of the teleoconch is dominated by numerous oblique-radial ribs (approximately 8 per cm in the periphery of the last whorl) which sometimes branch close to the periphery. Ribs and interspace are covered by fine granulations which are either round or oval (fig. 2). The protoconch (3.7 mm in diameter) embraces 1.4 whorls and is finely striate and granulate. The transverse-ovate aperture is angulate at its periphery. The slightly reflected peristome forms a narrow, little callous lip. The columellar-palatal region bears an inconspicuous callosity between the separated ends of the lip which is best developed over the umbilicus.



Figs. 1-2. *Hemicycla digna* (Mousson, 1872). 1 - Lateral, ventral and dorsal aspect of the holotype ZMZ 506654, La Gomera, Agulo, unknown fossil locality; the original label in Albert Mousson's handwriting is also shown. 2 - Shell from a valley N of Las Rosas (NNM 57138), unspecified fossil beds; a detail of the shell surface shows that ribs and interspace are finely granulate.

Measurement	holotype ZMZ506654	no. 1 NNM	no. 2 TFMC	no. 3 SMF	no. 4 CVB	no. 5 CGH	no. 6 CHB
Shell width	33.4	37.6	37.5	33.8	[34.5]	[32.9]	[31.2]
Shell height	19.1	16.7	17.7	17.2	17.1	[16.5]	[16.0]
Aperture width	20.6	23.7	24.5	21.3	-	-	-
Aperture height	17.0	18.9	19.1	16.8	-	-	-
Apex width	3.7	3.9	3.2	3.6	5.0	4.4	4.1
Whorls of apex	1.4	1.6	1.4	1.3	1.2	-	1.3
Whorls of shell	4.2	4.3	4.3	4.2	4.3	4.2	4.1

Table 1. Shell measurements in mm and whorls of the holotype of *Hemicycla digna* and of the six newly discovered specimens; no. 6 is a juvenile, values in parentheses were taken from incomplete shells.

Shells from the new locality, which is separated from the type locality Agulo by four steep valleys, are generally larger and flatter (table 1). The ribs are more pronounced, particularly on the underside of the shell. The shell of the holotype (fig. 1), although smaller, is also thicker and heavier; this is illustrated by the weight of the dry shell, which is 2.55 g in the holotype but only 1.22 and 1.78 in two complete shells from the new locality.

Measurements in mm. — Holotype: width 33.36, height 19.06, aperture width 20.65, aperture maximum height 16.95; number of whorls of the embryonic shell 1.4, number of whorls of the entire shell 4.2. For further measurements see table 1.

Remarks. — The new sample clearly shows that a species with the characters of Mousson's *Helix digna* once lived on La Gomera island. The species is only known from two localities (fig. 3). Compared to the holotype, the new shells are flatter with a sharper keel and stronger ribs. However, we do not know the temporal relationships between the two fossil localities, and we ascribe this difference to geographical or temporal variation. These shells, which represent the second largest helicid of the entire archipelago, are very similar to shells of the keeled ecotype of *Iberus gualterianus* (L., 1758) from south-eastern Spain. López-Alcantara et al. (1983, 1985) documented a complete set of intergrades between keeled and strongly ornamented shells and unkeeled and smooth shells. The keeled ecotype is only found in karstic areas with a hot and dry climate. If we apply this model to *H. digna*, then the flatter and strongly keeled morph may have lived in a dry period such as an interpluvial. However, this must remain speculative because we have no data on the age of both the old and new fossil localities. The new shells were accidentally found on a steep slope where they were washed out by erosion. Sediment in one of the shells contained a tiny shell of *Vitrea* sp., possibly *Vitrea subvitreola* (Bourguignat, 1880) which is known from North Africa (see Pinter, 1969). The report of Fritsch (1867) on his activities in La Gomera does not provide much information on the fossil site in the valley of Agulo. He only remarked (1867, p. 18) that, "In den reichlichen Ansammlungen von Gebirgsschutt und Thalgeröll der zum Theil an ihrem Ursprunge kesselartigen Thäler des Nordostens von Gomera liegen zahlreiche, zum Theil subfossile Gehäuse von grossen Helix-Arten und dergleichen." However, the smaller but heavier and stouter shell of the holotype, as well as the mineral dendrites covering it (fig. 1), indicate that the conditions of the Agulo deposit were different.

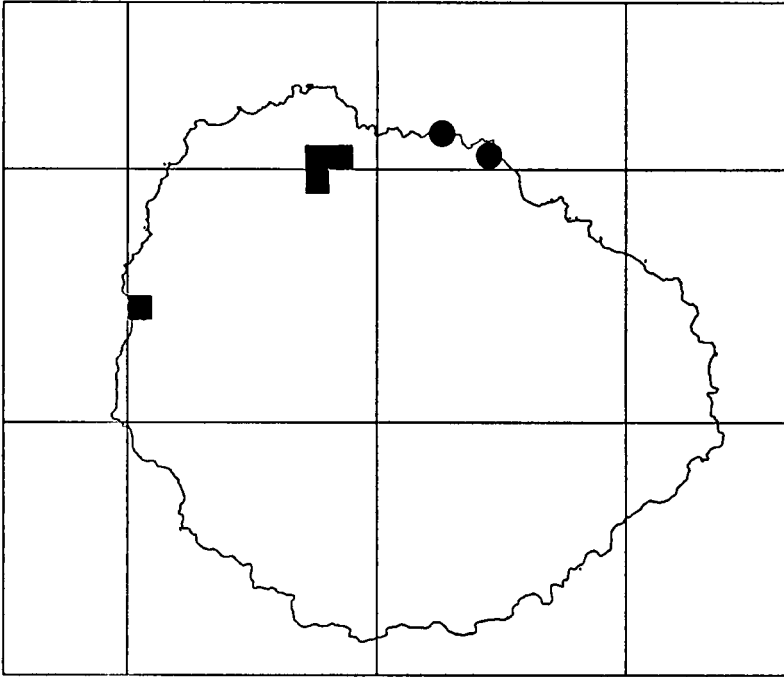


Fig. 3. Known localities of fossil *Hemicycla digna* (dots) and *H. migueli* sp. n. (circles) on the island of La Gomera.

Mousson (1872) regarded *H. digna* as a member of the subgenus *Leptaxis* and particularly as a relative of *Leptaxis wollastoni* (Lowe, 1852). As a second species of Canarian *Leptaxis* he listed *L. cuticula* (Shuttleworth, 1852) which is currently placed in the genus *Guerrina* (Valido et al., 1993). Wollaston (1878) commented on the same species: "Detected by Fritsch, in a subfossil state ... a species of peculiar interest geographically as belonging to much the same type as the Porto-Santana *H. Wollastoni* Lowe, and *forensis*, Woll., from the Madeiran Group, and the Mediterranean *H. scabriuscula*, Desh. It appears however to be considerably larger than the *H. Wollastoni*." Odhner (1931) recognized similarities in the internal anatomy and shell morphology between *Hemicycla* and *Levantina*, *Isaurica*, *Codringtonia*, and other genera, a hypothesis which has not yet been tested. Indeed, the shell of *H. digna* is rather similar to the shell of *Levantina tripolitana* (Wood, 1828) (figured by Subai, 1994: pl. 1 fig. 2). However, the dart of *Levantina* is curved, while it is straight in the *Hemicycla* species so far studied (see below).

The new shells show a strong granulation which is found in many *Hemicycla* species. We include *digna* in the genus because it contains a number of taxa with keeled and/or ribbed and granulate shells, such as *H. berkeleyi* (Lowe, 1861) and *H. planorbella* (Lamarck, 1822). The overlapping of the suture, which apparently led Mousson (1872) to place his new species in *Leptaxis*, is found in many other genera such as *Pomatias*, *Guerrina*, *Geomitra*, *Eremina*, *Sphincterochila* or *Theba*, and therefore certainly is a convergent character. However, this character is not common within the genus *Hemicycla* and is

unique among the species known from La Gomera. We therefore regard *H. digna* as a species with no close relationship to any of the living or fossil congeners from La Gomera. The following new species, which we discovered in search of *H. digna*, resembles it only superficially by its large size and a weak keel.

***Hemicycla migueli* Groh & Hutterer sp. n.**

figs. 4, 6

Material. — (74 shells, 3 dart fragments): La Gomera, Vallehermoso, road to playa c. 1 km below village (28RBS7820), fossil slope deposits at 100m, 31.12.1987, K. & C. Groh leg. (AIT/5, BMNH/2, CGH/17, CHB/5, TFMC/2, MNHN/2, SMF/2), same locality, R. Hutterer & M. Ibáñez leg. 04.02.1994 (holotype SMF 311142, ZMZ/2, NMB/2, NNM 57137/2, CVB/1, CHB/11 + 3 dart fragments); Vallehermoso village, old road at foot of Lomo San Pedro (28RBS7719), fossil beds, 07.02.1994, R. Hutterer & M. Ibáñez leg. (CHB/20); Vallehermoso, Lomo San Pedro, 200-500m (28RBS7720), 07.02.1994, R. Hutterer & M. Ibáñez leg. (CHB/2); Taguluche (28RBS7014), Holocene deposit in village, 150 m, 04.02.1994, R. Hutterer & M. Ibáñez leg. (CHB/1).

Diagnosis. — Shell resembling that of *H. granomalleata* (Wollaston, 1878) from La Palma but larger, more depressed, and surface less malleate.

Description. — Shell imperforate, solid and opaque, of a depressed-conical form with 4.1 (3.9 to 4.3) rapidly increasing whorls and with a linear, strongly marked suture (fig. 4). Traces of colour in a number of shells suggest that the shell was brownish with three darker spiral bands, a narrow and a broad one above and a narrow one below the significantly angled to keeled periphery. This angulation or keel is situated at the upper third of the whorls stretching towards the last third of the body-whorl where it becomes rounded or slightly acute. The last 6 to 8 mm of the ultimate whorl descend abruptly to the peristome, resulting in an inclination of about 70 degrees between the plane of the aperture and the vertical axis of the shell. The sculpture of the teleoconch is dominated by numerous fine oblique-radial riblets (approximately 3 per mm in the last whorl) which may become irregularly undulated towards the periphery, forming flat malleations. The large protoconch (approximately 3.7 mm in diameter) is little chagrinated, lighter than the teleoconch, and embraces 1.1 (0.9 to 1.3) whorls. The oblique pear-shaped aperture has a strong peristome which is thickened at the base to an up to 3 mm wide ridge. The outline is little angulated at the upper outer corner. The narrow lip (width c. 1.3 mm) is little reflected and interiorly thickened by a callosity. Also, the columellar and parietal parts of the aperture bear a callus, stretching between the insertions of the apertural margins and being most massive above the umbilicus and near the columella.

Fragments of three darts (fig. 6) resemble the dart of other *Hemicycla* species, such as *H. bidentalis* (Lamarck, 1822), *H. gaudryi* (Orbigny, 1839), *H. saulcyi* (Orbigny, 1839) (Groh, 1985; Groh et al. 1992), or *H. efferata* (Mousson, 1872) (Hutterer et al., in press), but are more similar to that of *Hemicycla 'moussoniana'* which also has a slightly asymmetrical blade (figured in Groh, 1985: 411). The length of the dart of *migueli* sp. n. without the proximal part of the crown is 5.5 mm, which is smaller than in '*moussoniana*' (= sp. n., Hutterer et al., in press).

Measurements in mm. — Holotype: width 28.9, height 16.0, aperture width 18.9, aperture maximum height 14.6, lip width 1.2; number of whorls of the embryonic shell



Figs. 4-5. *Hemicycla* shells. 4 - Lateral, ventral and dorsal aspect of the holotype of *H. migueli* Groh & Hutterer sp. n., SMF 311142, La Gomera, Vallehermoso, road to playa c. 1 km below village, fossil slope deposits. 5 - Probable syntype of *H. granomalleata* (Wollaston, 1878), BMNH 95.2.2.68-70, ex Wollaston?, La Palma, Los Sauces, Barranco Herradura.

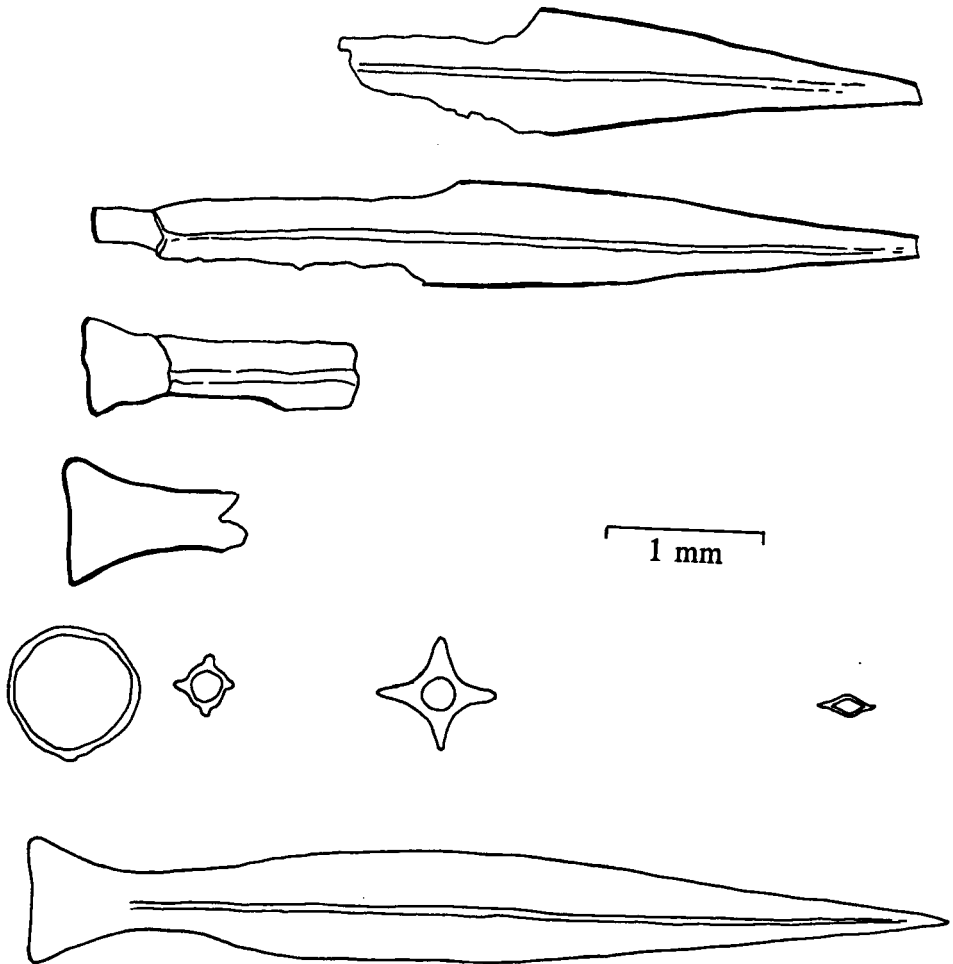


Fig. 6. A reconstruction of the dart of *Hemicycla migueli* sp. n. based on four fragments removed from sediment in shells of the type series. Cross-sections are also shown.

1.1, number of whorls of the entire shell 4.1. For further measurements, all taken from specimens from the type locality, see table 2 and fig. 7.

Comparisons. — None of the *Hemicycla* species known from the island of La Gomera is similar to the new species. In size and shape, only *Hemicycla gomerensis* (Morelet, 1864), known only by the type series in the Paris Museum, is somewhat similar. However, the shell of the lectotype (designated by K. Groh in 1985) is much smaller (width 20.9 mm) and more depressed (height 12.8 mm), and the number of whorls (3.4) is lower. Also, *Hemicycla granomalleata* (Wollaston, 1878) from La Palma (fig. 5) is only similar at first

Measurement	n	mean	minimum	maximum
Shell width	46	26.6	23.4	28.9
Shell height	46	16.1	14.2	17.5
Aperture width	46	16.6	14.4	18.9
Aperture height	46	13.6	11.2	15.4
Lip width	45	1.3	0.9	1.8
Whorls of apex	50	1.1	0.9	1.3
Whorls of shell	49	4.1	3.8	4.4

Table 2. Mean, maximum and minimum values of greatest width and height of the shell and of the aperture, the greatest width of the lip and the number of whorls of the embryonic and adult shell of *Hemicycla migueli* sp. n.

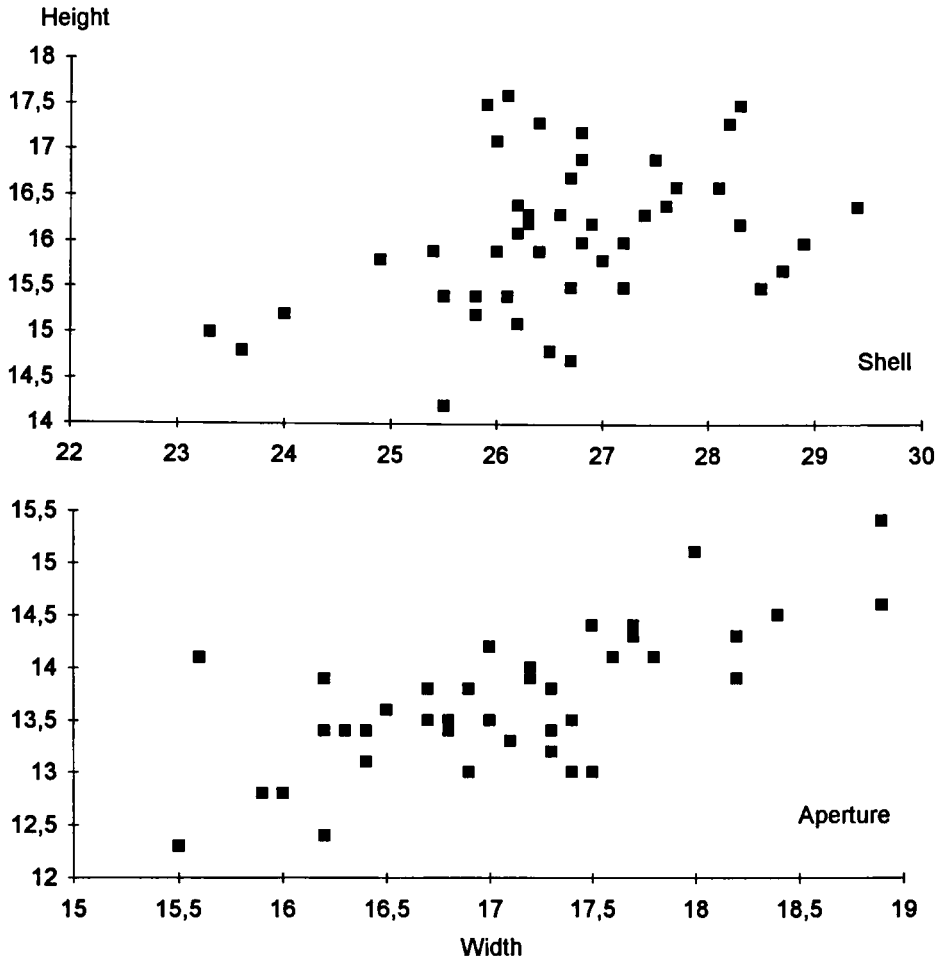


Fig. 7. *Hemicycla migueli* sp. n., size variability of shell and aperture in a series of 47 shells from the type locality.

sight because its shell is slightly keeled. However, it is distinguished by a strong malleation of the shell surface, by a broader lip and a much denser punctuation of the embryonic shell. The number of whorls is also lower (3.4) than in *H. migueli* sp. n., and the entire shell is more globose. Shells of an unnamed population of the yet unrevised group of *Hemicycla consobrina* (Férussac, 1821) from the Teno mountains, Tenerife, are also somewhat similar. In these, the last whorl is only angled, the shell surface exhibits a strong malleation and the embryonic shell is nearly smooth.

Discussion. — Our field work suggests that the new species had a very limited distribution in the north of La Gomera during the Quaternary (fig. 3) and that it is extinct. The age of the deposits is difficult to estimate and may also vary between the four localities. Shells at the type locality are well preserved, sometimes glossy and with traces of colour, and suggest that this slope deposit has a younger, probably Holocene age. The fossil beds at the foot of Lomo San Pedro may have an older age. We believe that Mousson (1872: 160) referred to these beds when writing that, "L'île de Gomera présente dans le Val hermosa des couches de débris et de galets très remarquables par leur fossiles. Les couches, que le ruisseau de la vallée a creusées sur 2 à 3 mètres de profondeur, semblent d'une époque relativement assez ancienne." In this place thick sediment packages are cut by the actual brook forming steep sections of a height of up to 10 m. A weak stratification can be observed; shells, however, occur in the entire sediment. We conclude that these deposits are remnants of the bottom of an ancient valley of an older age than the present barranco. If we assume that the present barranco was formed during the last pluvial, then the age of the fossil beds may be estimated as Pleistocene.

The mollusc fauna in the latter beds includes 13 species. Besides *Hemicycla migueli* sp. n. these are: *Pomatias* aff. *laevigatus* (Webb & Berthelot, 1833), *Truncatellina atomus* (Shuttleworth, 1852), *Leiostyla taeniata* (Shuttleworth, 1852), *Napaeus conseqoanus* (Mousson, 1872), *Napaeus* sp. n., *Vitrea* sp., *Gibbulinella dealbata* (Webb & Berthelot, 1833), *Canariella* sp. n., *Hemicycla efferata* (Mousson, 1872), *Hemicycla fritschi* (Mousson, 1872), *Hemicycla* sp. n., and *Caracollina lenticula* (Férussac, 1821). The genus *Leiostyla* is recorded for the first time from La Gomera. As far as we know, the habitat requirements of the living species (except for *H. migueli* sp. n., *Leiostyla*, *Truncatellina*, and *Vitrea* we have found all species alive in other places on the island), most require a microclimate with a high humidity. Some of them are restricted to laurel forest, a habitat which today exists at some 300 meters of altitude above the fossil beds. The extinction of *H. migueli* sp. n. was probably due to the decline of the forest after the last pluvial period.

Etymology. — We have pleasure to name this species for Miguel Ibáñez-Alonso, a young snail hunter and son of our friends and colleagues María R. Alonso and Miguel Ibáñez, professors at the Department of Zoology, University of La Laguna, Tenerife.

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