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TRILOBITES FROM THE *LEJOPYGE LAEVIGATA* ZONE (GUZHANGIAN; UPPER MIDDLE CAMBRIAN) OF THE SAN ISIDRO AREA, MENDOZA, ARGENTINA

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Palabras clave. Trilobites. Guzhangiano. Cámbrico medio. Precordillera. Mendoza. Argentina.

Agnostoid trilobites were highly diverse and abundant during the middle Cambrian and early late Cambrian, and displayed great value for biostratigraphy. Because of their wide geographic distribution and rapid evolution, these faunas have proved to be helpful for correlating Cambrian strata of different biogeographic provinces, especially in open-shelf and slope lithofacies (*e.g.*, Öpik, 1979; Shergold, 1981; Rowell *et al.*, 1982; Robison, 1984; Geyer and Shergold, 2000; Peng and Robison, 2000; Peng *et al.*, 2009a; Westrop *et al.*, 2011).

Middle and upper Cambrian deep water facies are well represented in the Precordillera of Mendoza, western Argentina, where isolated carbonate blocks occur chaotically within Middle to Late Ordovician shales of the Estancia San Isidro and Empozada Formations (Bordonaro *et al.*, 1993; Keller, 1999; Bordonaro, 2003a, b; Heredia and Beresi, 2004). Allochthonous Cambrian fossil localities include Cerro El Solitario, El Totoral and the San Isidro area. The El Solitario and El Totoral olistoliths are located in northern Mendoza (Fig. 1) and contain typical agnostoids of the *Lejopyge laevigata* Zone (Rusconi, 1950a, b, 1952a, 1955; Poulsen, 1960; Robison, 1988; Bordonaro and Liñán, 1994; Tortello and Bordonaro, 1997; Tortello, 2009, 2011), a unit that characterizes the uppermost middle Cambrian (Guzhangian Stage) in several paleocontinents.

On the other hand, the fossil record of San Isidro is much diverse. This area comprises a number of hills and creeks, about 15 km west of Mendoza city, containing numerous small- to large-sized olistoliths with different open marine shelly faunas (Rusconi, 1952b, fig. 1) (Fig. 1). The trilobites recognized to date come from various stratigraphic levels from the early middle Cambrian (*Glossopleura* and *Oryctocephalus* zones) and the late Cambrian (*Crepicephalus*, *Glyptagnostus reticulatus*, *Elvinia* and *Saukia* zones) ages (*e.g.*, Rusconi, 1956; Borrello, 1971; Bordonaro and Banchig, 1996; Bordonaro, 2003b, fig. 2; Bordonaro and Fojo, 2011; Tortello, 2014a).

Additionally, the *Lejopyge laevigata* Zone is herein reported from San Isidro for the first time. The studied material was collected by Dr. Ángel Borrello and Dr. Carlos Cingolani (Universidad Nacional de La Plata) during the 1960s and housed in the Museum of Natural Sciences of La Plata. The assemblage is predominantly composed of agnostoids of great value for intercontinental correlations in association with polymeroids which, although much rarer, provide supplementary biostratigraphic information.

GEOGRAPHIC AND STRATIGRAPHIC PROVENANCE

The Ángel Borrello collections in the La Plata Museum consist of several thousands of Cambrian-Ordovician invertebrates from classic fossil localities of northwestern and western Argentina, including numerous trilobites from the Cambrian of the southern Precordillera (Borrello, 1971 and references therein; Tortello, 2009, 2011, 2014a, b; Tortello

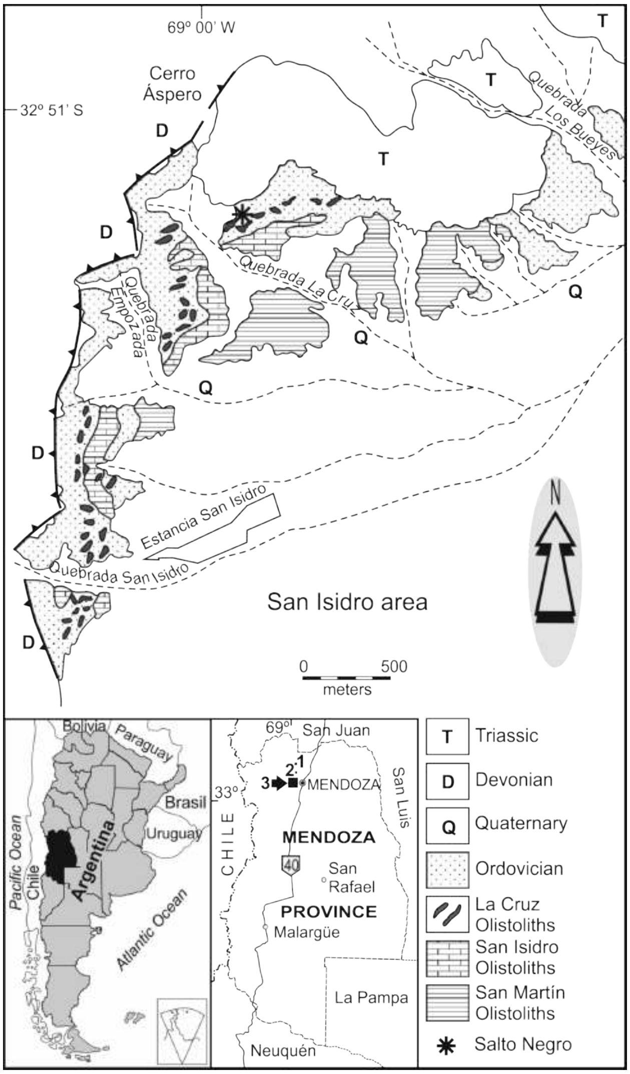

Figure 1. Location map and geologic framework of the San Isidro area, showing the position of the Salto Negro locality (asterisk) (after Rusconi, 1952b; Devizia, 1973; Bordonaro *et al.*, 1993; Tortello and Bordonaro, 1997). In the map of the Mendoza province, 1= Cerro El Solitario; 2= El Totoral; 3=San Isidro area.

and Cingolani, 2016). The material studied herein comes from a small black limestone olistolith that was collected from the fossil site of Salto Negro, immediately to the north of Cerro Martillo, which represents a promontory on the left margin of the Quebrada La Cruz and ~1850 meters above sea level, San Isidro, Mendoza (Rusconi, 1952b, p. 64; Devizia, 1973) (Fig. 1). Stratigraphically, this open-shelf limestone block belongs to the La Cruz olistolith (La Cruz Limestones *sensu* Keller, 1999) and is emplaced in Ordovician shales of the Estancia San Isidro Formation (Bordonaro, 1992; Bordonaro and Banchig, 1996; Heredia and Beresi, 2004).

BIOSTRATIGRAPHIC IMPLICATIONS OF THE FAUNA

The fauna contains the following agnostoid trilobites: *Agnostus microcephalus* (Rusconi, 1950b), *Ammagnostus beltensis* (Lochman in Lochman and Duncan, 1944), *Diplagnostus planicauda* (Angelin, 1851), *Clavagnostus repandus* (Westergård in Holm and Westergård, 1930), *C. calensis* Rusconi, 1950a, *Tomagnostella nepos* (Brøgger, 1878), *Lejopyge laevigata* (Dalman, 1828) and *L. armata* (Linnarsson, 1869), in association with the polymeroids *Cedaria cortesi* (Poulsen, 1960), *Talbotinella* sp. and *Pichunia* sp.

Lejopyge laevigata is a globally distributed species that has been recorded from open-marine lithofacies of all major Cambrian continents and has been used as a zonal guide fossil in deposits of Baltica, Gondwana, Kazakhstan, Siberia, eastern Avalonia and Laurentia (Peng and Robison, 2000; Axheimer *et al.*, 2006; Peng *et al.*, 2009a and references therein). In Siberia and China, it has a stratigraphical range extending from the base of the *L. laevigata* Zone (*sensu* Peng and Robison, 2000) to the upper *Proagnostus bulbus* Zone. *Lejopyge laevigata* has been frequently reported to co-occur with *L. armata*, which has a total stratigraphic range from the upper *Goniagnostus nathorsti* Zone to the middle *P. bulbus* Zone (*e.g.*, Peng and Robison, 2000; Hong *et al.*, 2003; Axheimer *et al.*, 2006; Høyberget and Bruton, 2008; Peng *et al.*, 2009b; Jago *et al.*, 2011 and references therein).

In addition, *Agnostus microcephalus* and *Ammagnostus beltensis* were also identified in the *L. laevigata* Zone and the partially coeval *Cedaria minor* Zone of North America, Greenland, Cerro El Solitario and El Totoral (Robison, 1988; Pratt, 1992; Bordonaro and Liñán, 1994; Tortello and Bordonaro, 1997; Tortello, 2009, 2011), and *Clavagnostus calensis* occurs in equivalent levels of China, Indian Himalaya, Tasmania, Antarctica, Cerro El Solitario and El Totoral (Jago and Daily, 1974; Jago and Webers, 1992; Bordonaro and Liñán, 1994; Tortello and Bordonaro, 1997; Peng and Robison, 2000 and references therein; Peng *et al.*, 2009b; Tortello, 2009, 2011).

Also, the cosmopolitan *Clavagnostus repandus*, *Tomagnostella nepos* and *Diplagnostus planicauda* are common elements of the *L. laevigata* Zone. However, the former two species already occur in the *Ptychagnostus punctuosus* Zone while the latter, in the *Ptychagnostus atavus* Zone (*e.g.*, Peng and Robison, 2000 and references therein; Høyberget and Bruton, 2008; Peng *et al.*, 2009b), so they have a more reduced value for correlation.

The above mentioned discussion points out that, collectively, the agnostoid assemblage is most characteristic of the *Lejopyge laevigata* Zone. Correlation charts of this biostratigraphic unit are available in Geyer and Shergold (2000), Axheimer *et al.* (2006, fig. 2) and Peng *et al.* (2009a, b). The polymeroids *Cedaria cortesi* (Poulsen, 1960), *Talbotinella* Poulsen, 1960 and *Pichunia* Rusconi, 1958 are known from the latest middle Cambrian of northern Mendoza (Poulsen, 1960; Tortello, 2009, 2011), so their occurrences in San Isidro also support that age.

Because Cambrian olistoliths from Mendoza derived from limestones most of which are not exposed, their comprehensive study provides insights into key issues regarding the stratigraphy of the Precordillera. The report of the *Lejopyge laevigata* Zone in the San Isidro area contributes to completing the biostratigraphic scheme of this classic fossil locality. Recently, the *International Subcommission on Cambrian Stratigraphy* regarded the FAD (first appearance datum) of *L. laevigata* as a suitable marker for the base of the upper stage of the third Cambrian series (Guzhangian Stage; Babcock *et al.*, 2005; Peng *et al.*, 2009a). This taxon and other typical species of the eponymous zone are now recognized throughout most of the southern Precordillera, providing a solid basis for intercontinental correlations.

SYSTEMATIC PALEONTOLOGY

Because most of the agnostoids from Salto Negro are widespread species that were described in detail by previous authors, they are only concisely treated herein. For brevity, synonymy lists only include the most comprehensive bibliographic references.

Photographs were taken with the aid of an optical binocular microscope. Before photography, the specimens were coated with magnesium oxide. Collection numbers are prefixed with **MLP**; slabs containing more than one specimen are labeled with both a collection number and additional letters.

Order Agnostida Salter, 1864
Superfamily Agnostoidea M'Coy, 1849
Family Agnostidae M'Coy, 1849
Subfamily Agnostinae M'Coy, 1849

Genus ***Agnostus*** Brongniart, 1822

Type species. *Entomostracites pisiformis* Wahlenberg, 1818; by monotypy. Furongian of Sweden.

Agnostus microcephalus (Rusconi, 1950b)
Figure 2.1–6, 9

1997 *Agnostus microcephalus* (Rusconi); Tortello and Bordonaro, p. 75, fig. 3.1 (*cum. syn.*).
2011 *Agnostus microcephalus* (Rusconi); Tortello, p. 118, fig. 2.A, E (*cum. syn.*).

Material. Nineteen cephala and seven pygidia [**MLP** 35519(d), 35523(l–o), 35526(j, k), 35529(h), 35530(a–c), 35531(a–e), 35532(b–g), 35533(k–m)].

Discussion. According to the diagnosis of Pratt (1992), *Agnostus microcephalus* (=*A. exsulatus* Poulsen,1960) represents a species of *Agnostus* with a moderately well-defined preglabellar median furrow which weakens anteriorly, a slightly pointed anteroglabella and a long, subparallel-sided pygidial axis having effaced ring furrows and a conspicuous terminal node. Small holaspides show a relatively small, tapering posteroaxis (Fig. 2.1, 2.6). *Agnostus microcephalus* is a common taxon from the Guzhangian of western Argentina, North Greenland and northwestern Canada.

Family Ammagnostidae Öpik, 1967

Genus ***Ammagnostus*** Öpik, 1967

Type species. *Ammagnostus psammius* Öpik, 1967; original designation. Furongian of Queensland, Australia.

Ammagnostus beltensis (Lochman in Lochman and Duncan, 1944)
Figure 2.7, 10?, 11, 12

1988 *Ammagnostus beltensis* (Lochman); Robison, p. 43, figs. 10.1–10.5, 19.12 (*cum. syn.*).
1992 *Kormagnostus*? *beltensis* (Lochman); Pratt, p. 33, pl. 3, figs. 4–13, text-fig. 26D (*cum. syn.*).
1997 *Kormagnostus*? *beltensis* (Lochman); Tortello and Bor-

donaro, p. 78, fig. 3.18, 3.19 (*cum. syn.*).
2011 *Ammagnostus beltensis* (Lochman); Tortello, p. 118, fig. 2.B, D(bottom), F (*cum. syn.*).

Material. Three cephala and eight pygidia [**MLP** 35523(k), 35526(l), 35528(a–c), 35529(a, b), 35531(j, k), 35533(i, j)].

Discussion. The pygidia examined exhibit a moderately constricted (Fig. 2.11) to unconstricted (Fig. 2.12) acrolobe with a long and weakly pyriform axis, effaced ring furrows, a small median tubercle, a terminal secondary node, a moderately wide border furrow and delicate posterolateral spines; features that are diagnostic of *Ammagnostus beltensis* (Robison, 1988; Pratt, 1992). This species has been previously described from the Guzhangian of North America, Greenland and western Argentina. Small specimens from Salto Negro have a proportionately wide pygidial border (Fig. 2.7) closely comparable with that of early holaspids from the Rabbitkettle Formation of Canada (Pratt, 1992, pl. 3, fig. 13).

A cephalon shows a bipartite glabella and, as it is common in *Ammagnostus*, very slight indications of a preglabellar median furrow (Fig. 2.10). Although this cephalon may be conspecific with *A. beltensis*, its affinity is tentative because it differs from typical specimens of this species in having a narrower border furrow.

Family Diplagnostidae Whitehouse, 1939

Genus ***Diplagnostus*** Jaekel, 1909

Type species. *Agnostus planicauda* Angelin, 1851; original designation. Middle Cambrian of Sweden, Norway, Denmark, Greenland, the western United States, Siberia, China, Australia and western Argentina.

Diplagnostus planicauda (Angelin, 1851)
Figure 2.8

2000 *Diplagnostus planicauda* (Angelin); Peng and Robison, p. 49, figs. 5.5, 35 (*cum. syn.*).
2008 *Diplagnostus planicauda* (Angelin); Høyberget and Bruton, p. 23, pl. 1, figs. R–X, pl. 2, figs. A–B (*cum. syn.*).
2009b *Diplagnostus planicauda* (Angelin); Peng, Hughes, Heim, Sell, Zhu, Myrow and Parcha, p. 18, fig. 10.1–10 (*cum. syn.*).

Material. Two pygidia [**MLP** 35524(e), 35525(b)].

Discussion. Although the studied pygidia are not well preserved, they clearly represent a diplagnostid taxon with a carinate median tubercle, an ogival posteroaxis, a zonate posterior border and a pair of marginal spines. Following the diagnosis of Peng and Robison (2000), the material is assignable to the cosmopolitan species *Diplagnostus planicauda* (see also Høyberget and Bruton, 2008; Peng *et al.*, 2009b and references therein).

Family Clavagnostidae Howell, 1937

Genus ***Clavagnostus*** Howell, 1937

Type species. *Agnostus repandus* Westergård in Holm and Westergård, 1930; original designation. Middle Cambrian of Sweden, Norway, North America, Siberia, China, Australia (Tasmania), western Argentina and, questionably, Antarctica.

Clavagnostus repandus (Westergård in Holm and Westergård, 1930)
Figure 2.14

2000 *Clavagnostus repandus* (Westergård); Peng and Robison, p. 38, fig. 26 (*cum. syn.*).
2008 *Clavagnostus repandus* (Westergård); Høyberget and Bruton, p. 21, pl. 1, figs. O–Q.

Material. One pygidium [**MLP** 35524(d)].

Discussion. The geographically widespread species *Clavagnostus repandus* is generally represented by a very small number of specimens in Guzhangian trilobite assemblages worldwide (Høyberget and Bruton, 2008, p. 21). In the collection studied herein, a single pygidium has a subquadrate outline, a lanceolate axis extending toward the posterior border, an elongate axial node, short and shallow clavagnostid fossae, smooth pleural fields and two marginal spines, and is therefore confidently assigned to this species (see diagnosis in Peng and Robison, 2000, p. 39).

Clavagnostus calensis Rusconi, 1950a
Figure 2.15–21

2000 *Clavagnostus calensis* Rusconi; Peng and Robison, p. 39, fig. 27 (*cum. syn.*).
2009b *Clavagnostus calensis* Rusconi; Peng, Hughes, Heim, Sell, Zhu, Myrow and Parcha, p. 15, fig. 9.1, 9.2 (*cum. syn.*).
2011 *Clavagnostus calensis* Rusconi; Tortello, p. 120, fig. 2I–K.

Material. Nine cephala and ten pygidia [**MLP** 35519(b, c), 35522f, 35523(a–d), 35526(a–f), 35532(a), 35533(a–e)].

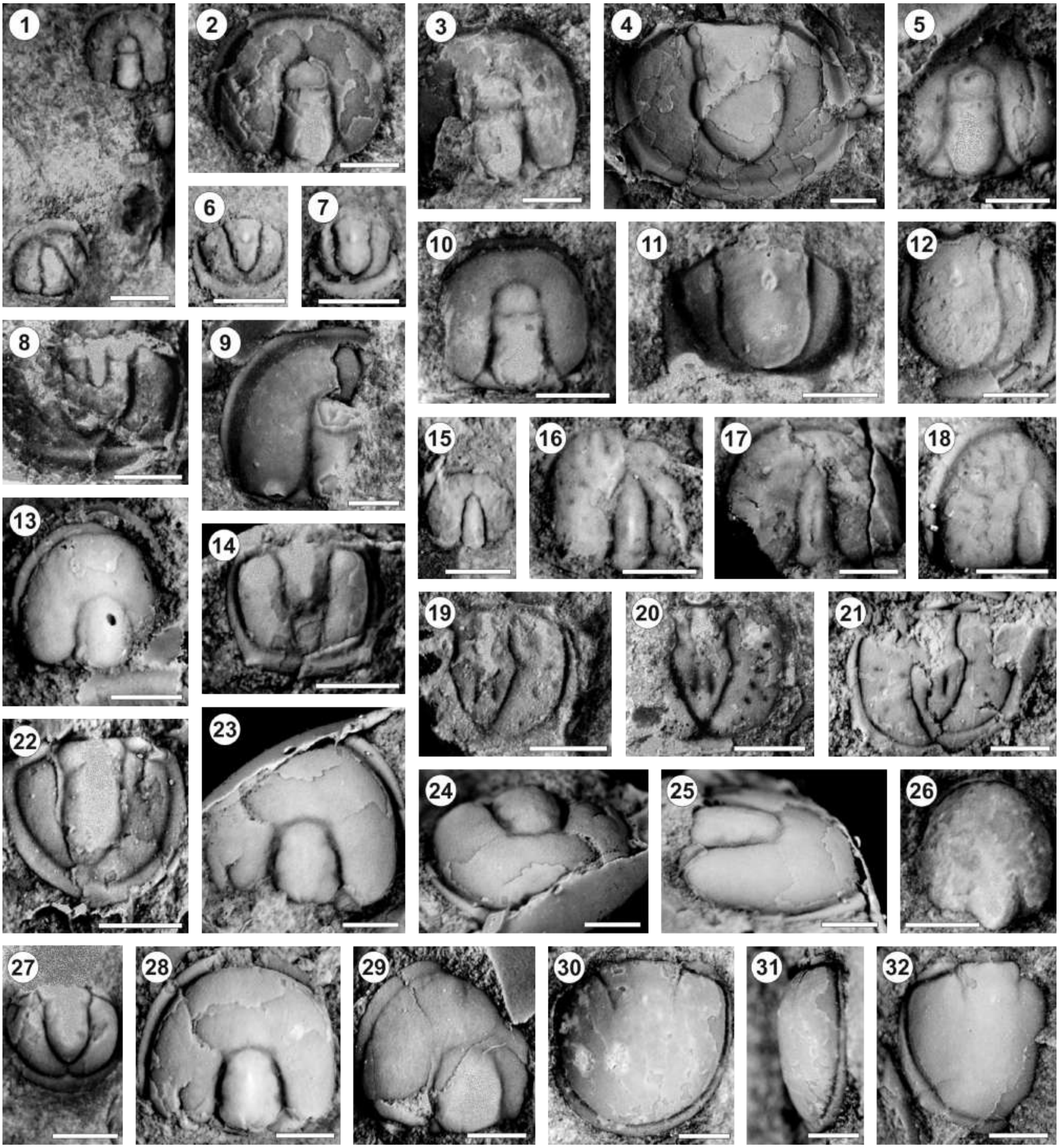

Figure 2. Agnostoids from Salto Negro, northern Cerro Martillo, San Isidro area, Mendoza. **1–6, 9,** ***Agnostus microcephalus*** (Rusconi, 1950b); **1,** small cephalon (top) and pygidium (bottom), **MLP** 35520(m, n); **2,** cephalon, **MLP** 35530(a); **3,** cephalon, **MLP** 35530(b); **4,** pygidium, **MLP** 35529(h); **5,** cephalon, latex cast, **MLP** 35533(k); **6,** small pygidium, **MLP** 35520(n); **9,** fragmentary cephalon, **MLP** 35531(a). **7, 10–12,** ***Ammagnostus beltensis*** (Lochman in Lochman and Duncan, 1944); **7,** small pygidium, **MLP** 35523(k); **10,** cephalon, **MLP** 35528(a); **11,** pygidium, **MLP** 35528(b); **12,** pygidium, **MLP** 35531(j). **8,** ***Diplagnostus planicauda*** (Angelin, 1851), pygidium, **MLP** 35524(e). **14,** ***Clavagnostus repandus*** (Westergård in Holm and Westergård, 1930), pygidium, **MLP** 35524(d). **15–21,** ***Clavagnostus calensis*** Rusconi, 1950a; **15,** small cephalon, **MLP** 35532(a); **16,** cephalon, latex cast, **MLP** 35526(a); **17,** cephalon, **MLP** 35522(f); **18,** cephalon, latex cast, **MLP** 35523(a); **19,** pygidium, **MLP** 35526(c); **20,** pygidium, **MLP** 35519(b); **21,** pygidium, **MLP** 35523(d). **13, 22–25, 27–29,** ***Tomagnostella nepos*** (Brøgger, 1878); **13,** cephalon, latex cast, **MLP** 35526(g); **22,** pygidium, **MLP** 35528(d); **23–25,** cephalon in dorsal, anterior and lateral views, latex cast, **MLP** 35519(a); **27,** small pygidium, **MLP** 35531(h); **28,** cephalon, **MLP** 35519(a); **29,** cephalon, latex cast, **MLP** 35529(d). **26, 30, 31,** ***Lejopyge laevigata*** (Dalman, 1828); **26,** cephalon, **MLP** 35522(a); **30, 31,** pygidium in dorsal and lateral views, **MLP** 35522(b). **32,** ***Lejopyge armata*** (Linnarsson, 1869), pygidium, latex cast, **MLP** 35522(c). Scale bars= 1 mm.

Discussion. *Clavagnostus calensis* was originally described by Rusconi (1950a) and reviewed by Tortello and Bordonaro (1997) on the basis of material from Cerro El Solitario. Subsequently, Peng and Robison (2000) provided information about the holaspid ontogeny of this species and emended its diagnosis and synonymy. Based on material from Hunan, China, these authors showed that the anteroglabella of early holaspides is proportionately less pointed than that of large specimens, a fact that is also evident in material studied herein (compare Fig. 2.15 and 2.17). On the other hand, although *C. calensis* typically shows variations in the degree of expression of genal scrobiculae during ontogenetic development, both early and late holaspids from San Isidro seem to lack appreciable differences with respect to that character (Fig. 2.15–18).

Family PTYCHAGNOSTIDAE Kobayashi, 1939

Genus ***Tomagnostella*** Kobayashi, 1939

Type species. *Agnostus exsculptus* Angelin, 1851; original designation. Middle Cambrian of Sweden and Norway.

Tomagnostella nepos (Brøgger, 1878)
Figure 2.13, 22–25, 27–29

2008 *Tomagnostella nepos* (Brøgger); Høyberget and Bruton, p. 45, pl. 6, figs. O–V (*cum. syn.*).
2011 *Tomagnostella nepos* (Brøgger); Tortello, p. 120, fig. 2L–T.

Material. Nine cephala and eleven pygidia [**MLP** 35519(a), 35522(c), 35523(e–g), 35526(g–i), 35528(d), 35529(d–g), 35531(f–i), 35533(f–h)].

Discussion. The presence of an effaced anteroglabella, smooth genae and a long, slender pygidial axis of the ptychagnostid type are characters of *Tomagnostella nepos* (Brøgger, 1878) (*sensu* Høyberget and Bruton, 2008). Higher in its stratigraphic range, this species may show slight indications of genal scrobiculae (Peng and Robison, 2000, fig. 69.1), a feature that is noticeable in the specimen of Fig. 2.13 as well as in material from El Totoral (Tortello, 2011, fig. 2N).

Genus ***Lejopyge*** Hawle and Corda, 1847

Type species. *Battus laevigatus* Dalman, 1828; by monotypy. Guzhangian of Sweden, Norway, Denmark, Poland, England, Germany (erratics), Siberia, Turkestan, Uzbekistan, Kazakhstan, India, China, Australia, Greenland, the United States and western Argentina.

Lejopyge laevigata (Dalman, 1828)
Figure 2.26, 30, 31

2000 *Lejopyge laevigata* (Dalman); Peng and Robison, p. 76, fig. 60 (*cum. syn.*).
2008 *Lejopyge laevigata* (Dalman); Høyberget and Bruton, pl. 10, figs. H, K–M, O.

Material. Three cephala and two pygidia [**MLP** 35522(a,b), 35529(c), 35530(d, e)].

Discussion. The examined specimens show a moderate proximal development of axial furrows on the cephalon and pygidium, simple basal lobes, faint indications of a preglabellar median furrow, smooth genae, unconstricted acrolobes and a pygidial border lacking marginal spines. Therefore, according to the diagnosis of Laurie (1989) (see also Peng and Robison, 2000), they are assignable to *L. laevigata*. As in material from China (Peng and Robison, 2000, fig. 60.3), the posteroglabella looks more inflated than usual for the species (Fig. 2.26).

Lejopyge armata (Linnarsson, 1869)
Figure 2.32

2000 *Lejopyge armata* (Linnarsson); Peng and Robison, p. 77, fig. 61.1–6 (*cum. syn.*).
2008 *Lejopyge armata* (Linnarsson); Høyberget and Bruton, p. 58, pl. 10, figs. D–G, I, J, N.
2011 *Lejopyge armata* (Linnarsson); Jago, Bentley and Cooper, p. 19, fig. 3.D.

Material. One pygidium [**MLP** 35522(c)].

Discussion. The only pygidium available is characterized by having vestiges of axial furrows along the anteroaxis, a faint but perceptible axial node, and minute posterolateral spines. In addition, the acrolobe shows slight indentations adjacent to the border spines; a character that is common in *Lejopyge armata* (Robison, 1984; Laurie, 1989; Peng and Robison, 2000).

Lejopyge armata exhibits pygidial marginal spines of variable length. Specimens having both vestigial posterolateral spines and a constricted pygidial acrolobe were also described from Sweden, Himalaya, China, Korea and Antarctica (Daily and Jago, 1975, pl. 62, fig. 12; Lu and Lin, 1989, pl. 10, fig. 14; Jell and Hughes, 1997, pl. 29, figs. 7–15; Hong *et al.*, 2003, fig. 4.20; Jago *et al.*, 2011, fig. 3D). This is the first report of *L. armata* in South America.

Order Ptychopariida Swinnerton, 1915
Suborder Ptychopariina Swinnerton, 1915
Family Cedariidae Raymond, 1937

Genus ***Cedaria*** Walcott, 1924

Type species. *Cedaria prolifica* Walcott, 1924; original designation. Guzhangian-lower Furongian of North America.

Cedaria cortesi (Poulsen, 1960)
Figure 3.1–3, 5, 6

1960 *Williamsina cortesi* Poulsen, p. 19, pl. 1, figs. 19–24.
2009 *Cedaria cortesi* (Poulsen); Tortello, p. 256, figs. 4G–N, P–Q, 6A.

Material. Seven cranidia and six pygidia [**MLP** 35523(h–j), 35524(a, b), 35531(m, n), 35532(h–j), 35533(n–p)].

Discussion. The studied material represents a cedariid species with a flat and wide (sag.) cephalic border, a shallow anterior border furrow, a subtrapezoidal glabella with a broadly rounded preglabellar furrow, a proportionately narrow pygidial axis slightly tapering backwards, and indications of a weakly defined anterior pleural furrow. These features are consistent with *Cedaria cortesi*, a polymeroid that dominates the trilobite assemblages from the *L. laevigata* Zone of Cerro El Solitario, southern Precordillera (Poulsen, 1960). On the basis of the material from Cerro El Solitario, Tortello (2009) discussed in detail the variability of *C. cortesi* and its affinities with other species of *Cedaria* from western Argentina, USA, Canada and Greenland.

Family Marjumiidae Kobayashi, 1935

Genus ***Talbotinella*** Poulsen, 1960

Type species. *Talbotinella communis* Poulsen, 1960; original designation. Guzhangian of western Argentina.

Talbotinella sp.
Figure 3.7

Material. One fragmentary cranidium (**MLP** 35520).

Discussion. The presence of a raised, tapered and granulose glabella with slight indications of lateral furrows as well as

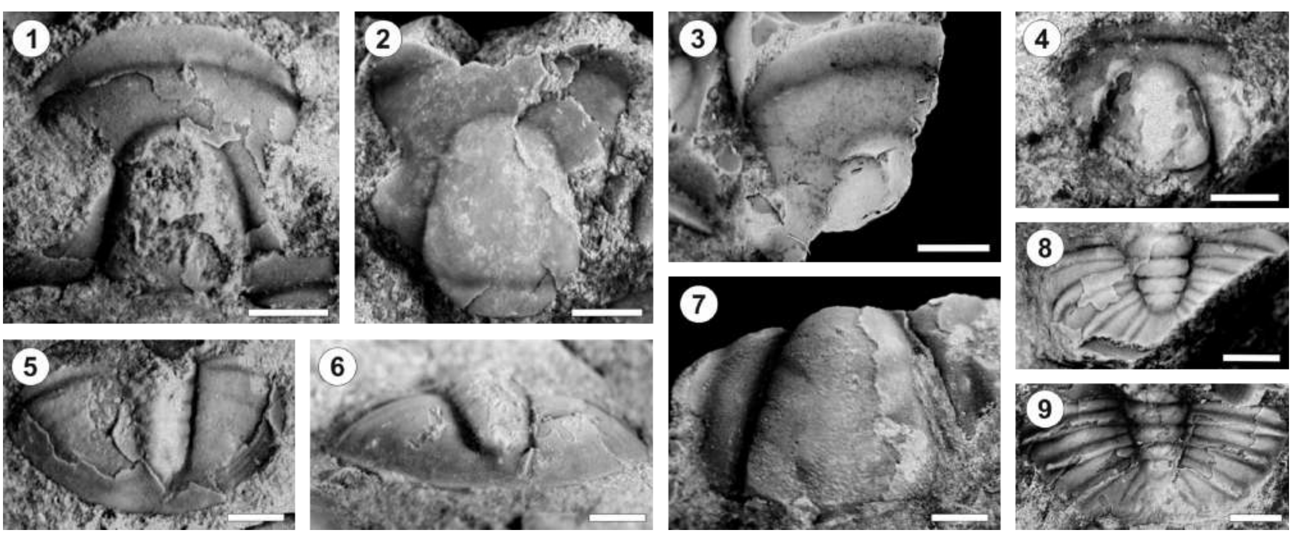

Figure 3. Polymeroid trilobites from Salto Negro, northern Cerro Martillo, San Isidro area, Mendoza. **1–3, 5, 6,** ***Cedaria cortesi*** (Poulsen, 1960); **1,** cranidium, **MLP** 35533(o); **2,** cranidium, **MLP** 35524(a); **3,** fragmentary cranidium, latex cast, **MLP** 35531(m); **5,** pygidium, **MLP** 35532(h); **6,** pygidium in posterior view, **MLP** 35523(i). **7,** ***Talbotinella*** sp., fragmentary cranidium, **MLP** 35520. **4, 8, 9,** ***Pichunia*** sp.; **4,** cranidium, **MLP** 35532(k); **8,** pygidium, **MLP** 35532(l); **9,** pygidium, latex cast, **MLP** 35529(l). Scale bars= 1 mm.

faint and oblique ocular ridges, and moderately wide palpebral areas of fixigenae, suggests close correspondence with *Talbotinella* Poulsen, 1960 (type species, *T. communis* Poulsen, 1960), which was previously reported from Cerro El Solitario and El Totoral, southern Precordillera (Poulsen, 1960, pl. 2, figs. 2–8, pl. 3, fig. 2; Tortello, 2009, fig. 7A, C, D, F, H, 9E; 2011, fig. 6A–J). Although this fragmentary cranidium may be conspecific with *T. communis*, it is provisionally left under open nomenclature pending the recovery of more complete specimens.

Family uncertain

Genus ***Pichunia*** Rusconi, 1958

Type species. *Pichunia indomita* Rusconi, 1958; original designation. Guzhangian of El Totoral, western Argentina.

Pichunia sp.

Figure 3.4, 8, 9

Material. One cranidium and five pygidia [**MLP** 35522(d), 35526(m), 35529(l), 35531(o), 35532(k, l)].

Description. Glabella large, conical, moderately convex, rounded anteriorly, with indications of weak lateral furrows; anterior border narrow (sag.), gently convex, somewhat straight, length (sag.) similar to that of preglabellar field; anterior sections of facial suture approximately parallel; eye ridge faint but visible, slightly oblique backward; palpebral area of fixigena moderately wide (tr.); occipital ring narrow (sag.), delimited by a deep and thin occipital furrow.

Pygidium semicircular in outline, width of about twice its length; axis short, tapering backward, well defined by discrete axial furrows, divided into three rings and a rounded, tiny terminal piece; pleural fields only slightly downsloping, with four sets of pleural and interpleural furrows; anterior pleural furrow conspicuous, transverse, reaching lateral margin; posterior three pleural furrows become progressively fainter and directed posterolaterally, terminating just short of the pygidial margin; posterior margin entire or with a delicate indentation. Test surface smooth.

Discussion. Rusconi (1958, p. 101, figs. 6, 7) erected the genus *Pichunia* on the basis of a few pygidia from El Totoral (*P. indomita* Rusconi, 1958–type species–, *P. quadricostata* Rusconi, 1958; see discussion in Tortello, 2011, p. 133, fig. 8.L, P, Q) which show similarities with the material described above. Tortello (2011) pointed out the resemblance of *Pichunia* with *Conopolus* Robison, 1988, from the Guzhangian of Greenland, Texas and Quebec (Robison, 1988 and references therein). The cranidium of the former, which is herein described for the first time, provides additional evidence for such affinity. *Pichunia* hardly differs from *Conopolus* in having a more uniformly tapering glabella, a little longer (sag.) preglabellar field, and pleural and interpleural furrows of slightly different depth and width.

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