

Alwine Bertels

Facultad de Ciencias Exactas y Naturales
Universidad de Buenos Aires
Buenos Aires, Argentina
and
Consejo Nacional de Investigaciones
Científicas y Técnicas
Buenos Aires, Argentina

Upper Cretaceous (middle Maastrichtian) ostracodes of Argentina

ABSTRACT

The ostracode assemblage present in the Upper Jagüelian Substage, which consists of the upper beds of the upper member of the Jagüel Formation, is studied in the present paper. The strata crop out in the Fortín General Roca area, Río Negro Province, Argentine Republic. They were dated by means of planktonic foraminifera, especially by the species *Heterohelix globulosa* (Ehrenberg), *Guembelitra cretacea* Cushman, *Globigerinelloides multispina* (Lalicker), *Rugoglobigerina rugosa* (Plummer), *Rugotruncana subpennyi* (Gandolfi), and were correlated with the Middle Maastrichtian Substage of Europe. Thirty-seven ostracode species are described, of which thirty are new.

INTRODUCTION

The present paper describes the ostracodes of the Upper Jagüelian Substage (middle Maastrichtian). At the Fortín General Roca locality, Río Negro Province, Argentine Republic, this substage consists of the upper strata of the upper member of the Jagüel Formation.

The Jagüel Formation, in the region of Fortín General Roca, has a similar lithology to that of its type area, Barranca del Jagüel, Neuquén Province, distant approximately some 100 km. to the northeast of Fortín General Roca.

At the locality under consideration the ostracode fauna is larger and more diverse than that in the type area. For this reason it was thought convenient to describe it first.

NOMENCLATURE AND METHODS

The morphological nomenclature used is that of van Morkhoven (1962, 1963) except in the case of the hinge, for which the terminology proposed in the *Treatise on Invertebrate Paleontology* (Moore, Ed., 1961) is followed.

The systematics adopted are those proposed in the *Treatise on Invertebrate Paleontology* (Moore, Ed., 1961), excepting the taxa of the families Hemicytheridae Puri, 1953, and Trachyleberididae Sylvester-Bradley, 1948, for which those proposed by Hazel (1967) are followed.

The illustrated material was coated with a gold-palladium alloy, and micrographs were obtained with a Jeolco JSM-U3 scanning electron microscope. A few photographs of the duplicature were obtained with the aid of a Leitz Laborlux microscope and an Aristophot reflex camera. Some of them were retouched by the author.

The studied material is deposited in the Laboratory of Micropaleontology, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Argentina.

LOCATION

Fortín General Roca is a town located in Río Negro Province, Argentine Republic, approximately at longitude 67° 32' W and latitude 39° S. The sections in which the ostracodes were found are 5 km. north of Fortín General Roca.

A geologic map and the locations of the sampled sections were published previously by the author (Bertels, 1970).

SECTIONS STUDIED

In the Fortín General Roca area three sections were sampled, two of which provided the Upper Jagüelian ostracodes that are described in this report. They are:

1) NCW (Northern Cuchilla West) (Bertels, 1970, text-fig. 2). This section is located about 5 km. north of Fortin General Roca and comprises

TABLE 1

Vertical distribution of the ostracode fauna in the Upper Cretaceous (lower? and middle Maastrichtian), Section NCW of the Fortín General Roca area.

LEVEL	SPECIES																								
	<i>Cytherella araucana</i>	Bertels, 1975																							
	<i>Alatocythere ? racana</i>	Bertels, 1969																							
	<i>Jonesia ? sp.</i>																								
	<i>Trachyleberis princeps</i>	Bertels, 1969																							
	<i>Wichmannella cretacea</i>	Bertels, 1975																							
	<i>Cytherura argentinensis</i>	Bertels, 1975																							
	<i>Cytherura ? jaguelensis</i>	Bertels, 1975																							
	<i>Cytherura ? sp.</i>																								
	<i>Paracytheridea rionegrina</i>	Bertels, 1975																							
	<i>Wichmannella araucana</i>	Bertels, 1969																							
	<i>Platycythereis ? velata</i>	Bertels, 1975																							
	<i>Bythocypris ? sp.</i>																								
	<i>Veenia (Nigeria) inornata</i>	n.sp.																							
	<i>Sphaeroleberis ? abnormis</i>	n.sp.																							
	<i>Hemicytherura rionegrensis</i>	n.sp.																							
	<i>Paracypris</i>	n.sp.																							
	<i>Munseyella minima</i>	n.sp.																							
	<i>Veenia (Nigeria) argentinensis</i>	n.sp.																							
	<i>Mosaeleberis ? argentinensis</i>	Bertels, 1969																							
	<i>Cytherella utilis</i>	Bertels, 1968																							
	<i>Veenia (Nigeria) punctata</i>	Bertels, 1968																							
	<i>Bradleya ? affinis</i>	n.sp.																							
	<i>Wichmannella magna</i>	n.sp.																							
	<i>Cytheromorpha ? flexuosa</i>	n.sp.																							
	<i>Amphicytherura ? sp.</i>																								
	<i>Cythereis ? excellens</i>	Bertels, 1969																							
	<i>Tumidoleberis australis</i>	n.sp.																							
	<i>Bythocypris ? jaguelensis</i>	n.sp.																							
	<i>Cytherella terminopunctata</i>	Holden, 1964																							
	<i>Paracypris jaguelensis</i>	n.sp.																							
	<i>Actinocythereis tuberculata</i>	n.sp.																							
	<i>Veenia (Nigeria) tumida</i>	n.sp.																							
	<i>Acanthocythereis abundans</i>	(Bertels, 1969)																							
	<i>Tagolina cretacea</i>	n.sp.																							
	<i>Anticythereis venusta</i>	n.sp.																							
	<i>Cythereis ? rionegrensis</i>	n.sp.																							
	<i>Paracypris sp. aff. P. gracilis</i>	(Bosquet, 1954)																							
	<i>Paracypris sp. 2</i>																								
	<i>Trachyleberis noviprinceps</i>	n.sp.																							
	<i>Cythereis ? incerta</i>	n.sp.																							
	<i>Bradleya ? argentinensis</i>	n.sp.																							
	<i>Bradleya ? palagonica</i>	n.sp.																							

: RARE | SCARCE | COMMON | ABUNDANT

an apparently concordant sequence of Cretaceous-Tertiary strata (lower to middle Maastrichtian and lower Danian). The section is composed of clays, calcareous clays and limestones. The thickness of this section is about 18 m. From it 12 samples were taken, NCW-1 to NCW-12 from top to bottom. Samples NCW-1 (top) to NCW-5 are of Lower Tertiary age (lower Danian) and belong to the Roca Formation, whereas samples NCW-6 to NCW-12, attributed to the Jagüel Formation, are correlative with the lower? and middle Maastrichtian.

The NCW-12 level belongs to the lower beds of the upper member of the Jagüel Formation. They form the Lower Jagüelian Substage (lower Maastrichtian?). Its ostracode fauna was described by Bertels (1975). Samples NCW-9 to NCW-6 are from beds belonging to the upper strata of the upper member of the Jagüel Formation. They form the Upper Jagüelian Substage (middle Maastrichtian), the ostracode microfauna of which is described in this paper.

2) RS (Río Seco) (Bertels, 1970, text-fig. 3). This section is also located about 5 km. north of Fortín General Roca. It consists of thin outcrops (two meters thick approximately) which are located along the valley of an intermittent stream. These outcrops yielded the samples RS-1 to RS-12. The samples numbered from RS-9 to RS-12 were taken approximately at the same topographic level as those numbered RS-1 to RS-8, belonging to the Jagüelian Substage, but turned out to be early Tertiary. This situation was thought to be the result of the existence of a gentle relief carved in the Cretaceous beds before the deposition of the sediments of the Paleocene Roca

Formation, but it can alternatively be attributed to faults of little throw or to slumping.

RESULTS OBTAINED

The samples from these outcrops provided an abundant microfauna of foraminifera and ostracodes. The planktonic foraminifera were used for dating these Cretaceous strata as middle Maastrichtian.

The Upper Cretaceous (middle Maastrichtian) planktonic foraminiferal assemblage is characterized by the species *Heterohelix globulosa* (Ehrenberg), *Guembelitra cretacea* Cushman, *Globigerinelloides multispina* (Lalicker), *Rugoglobigerina rugosa* (Plummer), *Rugotruncana subpennyi* (Gandolfi), and others described by the writer (1970).

Table 1 shows the vertical distribution of the ostracodes present in the Cretaceous part of the NCW section, which extends from the NCW-12 level to the NCW-6 level inclusive. The NCW-12 level was considered to be lower Maastrichtian? (Bertels, 1975). The Tertiary (Paleocene) ostracode distribution in the stratotype of the Roca Formation and in the Tertiary of the NCW section (samples NCW-1 to NCW-5) was illustrated previously (Bertels, 1973). The ostracodes present in the samples RS-1 to RS-4, which are the only ones that bear microfossils in the RS section, are similar to those in the samples NCW-7 and NCW-6. They differ only in the presence of *Henryhowella splendida*, n. sp.; *Protocosta spinosa*, n. sp.; *Veenia (Nigeria) jaguelensis*, n.sp.; *Anticythereis ? arcana*, n. sp.; *Anticythereis ? attenuata*, n. sp.; and *Cytheropteron* sp.

TABLE 2
Vertical distribution of the ostracode fauna in the Upper Cretaceous (middle Maastrichtian), Section RS of the Fortín General Roca area.

LEVEL	SPECIES															
	<i>Cytherella utilis</i> Bertels, 1968															
	<i>Cytherella terminopunctata</i> Holden, 1964															
	<i>Bythocypris? jaguelensis</i> n.sp.														
	<i>Acanthocythereis abundans</i> (Bertels), 1969															
	<i>Cythereis? excellens</i> Bertels, 1969															
	<i>Veenia (Nigeria) punctata</i> Bertels, 1968															
	<i>Veenia (Nigeria) jaguelensis</i> n.sp.															
	<i>Veenia (Nigeria) tumida</i> n.sp.															
	<i>Wichmannella magna</i> n.sp.														
	<i>Bradleya? argentinensis</i> n.sp.														
	<i>Bradleya? patagonica</i> n.sp.															
	<i>Cytheromorpha? flexuosa</i> n.sp.														
	<i>Cythereis? rionegrensis</i> n.sp.															
	<i>Cythereis? incerta</i> n.sp.															
	<i>Bradleya? atillai</i> n.sp.														
	<i>Henryhowella splendida</i> n.sp.															
	<i>Anticythereis venusta</i> n.sp.															
	<i>Paracypris jaguelensis</i> n.sp.															
	<i>Protocosta spinosa</i> n.sp.															
	<i>Trachyleberis noviprinceps</i> n.sp.															
	<i>Paracypris</i> sp. 1														
	<i>Paracypris</i> sp. aff. <i>P. gracilis</i> (Bosquet), 1854														
	<i>Togonia cretacea</i> n.sp.															
	<i>Anticythereis arcana</i> n.sp.															
	<i>Anticythereis? attenuata</i> n.sp.															
	<i>Munseyella minima</i> n.sp.															
	<i>Cytheropteron</i> sp.														

: RARE

| SCARCE

■ COMMON

■ ABUNDANT

In tables 1 and 2 of Bertels (1973), as well as in table 1 of the present paper, a microfaunistic discontinuity appears evident between the levels correlated with the middle Maastrichtian and the lower Danian, that is, between the Upper Jagüelian Substage and the Rocanian Stage.

GEOLOGIC HISTORY

A brief description of the geologic history during the Upper Cretaceous and the Lower Tertiary of northern Patagonia has been provided previously (Bertels, 1970, 1973 and 1975). Nevertheless, it is worthy of remark that during the deposition of the upper beds of the upper member of the Jagüel Formation (the Upper Jagüelian Substage) the greatest deepening of the North Patagonian Basin was registered. This maximum was deduced on the basis of the quantitative presence of planktonic foraminifera in the sequences studied.

CORRELATION

The age of the ostracode fauna found in the above-mentioned sections is middle Maastrichtian on the basis of the associated planktonic foraminiferal species *Heterohelix globulosa* (Ehrenberg), *Guembelitra cretacea* Cushman, *Globigerinelloides multispina* (Lalicker), *Rugoglo-*

bigerina rugosa (Plummer), *Rugotruncana subpennyi* (Gandolfi) and others (Bertels, 1970). According to the Upper Cretaceous zonations made by Bandy (1967) and Pessagno (1967), this assemblage indicates that the Upper Jagüelian Substage is correlative with the European Middle Maastrichtian Substage.

In the Argentine Republic this fauna is correlative with that of the upper beds of the upper member of the Huantrai-co Formation—coincident with the levels CP-16 to CP-11 (Bertels, 1968, 1969b)—in the type locality.

ZONATION

From table 1 it can be observed that the species *Veenia (Nigeria) punctata* Bertels, 1968, ranges throughout the Upper Jagüelian levels, is abundant, and characterizes these strata. It is clear that the Range Zone of *Veenia (Nigeria) punctata* can be extended from its type locality in the Huantrai-co area, Neuquén Province, to the Fortín General Roca area, Río Negro Province.

PALEOECOLOGY

The ecologic conditions which prevailed during the deposition of the Upper Jagüelian Substage were those of an open sea, with rather deep waters (150–300 m.), prob-

ably belonging to an outer shelf to bathyal marine environment. These conditions were inferred from the large numbers of planktonic foraminifera, most of them heterohelids.

The water temperature was probably warm. This inference is based on Bandy's contribution (1967). He found that, in the present seas, carinate planktonic foraminifera are limited by the isotherm of 17°C, which is located between latitudes 20° and 40° in both Northern and Southern Hemispheres, depending upon local oceanographic conditions. In Argentina these local conditions were studied by Boltovskoy (1968), who assigned a great importance to the cold Antarctic and Malvinas Currents and the warm Brazil Current, which are responsible for restricting the carinate planktonic foraminifera to latitudes north of a boundary fluctuating between 30° and 36° S.

The presence of carinate planktonic foraminifera in our Upper Cretaceous microfauna—although they are scarce—suggests that in the past the region was within the isotherm of 17°C. Taking into account Boltovskoy's contribution (*op. cit.*) and considering that Fortín General Roca is located today at latitude 39° S, we can infer that the cold Antarctic and Malvinas Currents were absent or had no local influence.

MICROFAUNISTIC AFFINITIES

From the paleontological studies it is evident that the historical development of the Argentine ostracodes during the Upper Cretaceous and Lower Tertiary was similar to that of the rest of the Southern Hemisphere. The microfaunistic assemblages show features that differentiate them from those of the Northern Hemisphere.

From the contributions of Reymont (1960, 1963), Apostolescu (1961, 1963) and Dingle (1969), we are able to conclude that, for the Upper Jagüelian Substage and the Rocan Stage, there is an evident microfaunistic affinity between the ostracode assemblages of Argentina and those of West and South Africa.

TAXONOMIC CONSIDERATIONS

Although the foraminifera, both planktonic and benthonic, are well preserved, the Cretaceous Ostracoda are well preserved only externally; internally, some features are not clearly visible, such as muscle-scar pattern and normal or marginal pores.

For this reason, the writer wishes to emphasize some aspects of the systematic interpretations. In most of the species in which all of the features could not be clearly observed, the generic classification is expressed with uncertainty. The studied fauna will undoubtedly merit in the future a more detailed examination, and many of the species which constitute the present assemblage will probably be placed in new genera. However, as many of

their characters could not be clearly observed, some forms were included in known genera until better-preserved specimens may be found in the Upper Cretaceous beds.

One of the most difficult taxonomic problems at the specific level is posed by the Cytherellidae. The males differ markedly from the females in their posterior outline, and the latter present slight variations. Specimens were grouped, taking into account their outline and the degree of sculpture, which in the case at hand consists of pits.

The Paracypridinae are a relatively poorly represented group quantitatively, with the exception of a few species. Although individually they do not seem to be important, as a group they can be of use in determining age and environment.

Other problems arise with the *Costa* group. The author (Bertels, 1969b) proposed the name of *Protocosta* for forms in which the middle rib is only slightly developed or absent. However, conspecific specimens may have a low rib or none at all. The author uses the name *Protocosta* as it was defined above, *i. e.*, with the middle rib absent or only slightly insinuated.

In this work three species are questionably included in the genus *Cythereis*. However, it is necessary to point out that true *Cythereis* forms, with the paramphidont hinge typical of the genus, as described by Triebel (1940), do not occur in the known South American fauna. Two of the questioned species show only external similarities and have an antimerodont hingement. The other species, with a holamphidont hinge, here included with question in this genus, clearly belongs to a new genus. The three species assigned questionably to the genus *Bradleya* may also, on further study, warrant new generic names.

As regards the genus *Anticythereis*, the name is used to conserve some homogeneity with Apostolescu's works (1961, 1963), in which he described species from Africa similar to those found in Argentina. The paleontological evidence shows that they are Trachyleberididae, which, in the sense of Hazel (1967), might belong to transitional Campylocytherinae—in which they are here included—provided that the author's interpretation is correct.

Mosaeleberis, despite its clearly amphidont hinge, is here included in the Progonocytherinae.

Within the Trachyleberididae, *Veenia* (*Nigeria*) is one of the more commonly represented taxa, *Veenia* (*Veenia*) being absent. Its extinction is total at the end of the Cretaceous, as is also that of the forms included in *Cythereis*.

Special mention should be made of the genus *Wichmannella* in Argentina. It is one of the more abundant genera and is represented in all strata with a slight but constant evolution.

SYSTEMATIC PALEONTOLOGY

FCEN-LM=Facultad de Ciencias Exactas y Naturales—Laboratorio de Micropaleontología, the repository of the ostracodes described below.

Subclass OSTRACODA Latreille, 1806
Order PODOCOPIDA Müller, 1894
Suborder PLATYCOPINA Sars, 1866
Family CYTHERELLIDAE Sars, 1866
Genus CYTHERELLA Jones, 1849

***Cytherella utilis* Bertels**

Plate 1, figure 1a–b

Cytherella utilis BERTELS, 1968, p. 288, pl. 1, fig. 1a–b.

Material: 8 carapaces, 3 valves (NCW-8).

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: Upper beds of the upper member of the Jagüel Formation.

Description: Carapace of females in lateral view subelliptical; greatest height behind middle of carapace. In dorsal view carapace ovoid; greatest width situated posteriorly. Ornamentation consisting of small pits located in anterior region. Right valve larger than left, overlapping it along periphery; overlap less at posteroventral margin. Other features typical of genus.

Sexual dimorphism evident. Beside the internal differences, externally the males are lower and narrower posteriorly.

Remarks: Specimens of *Cytherella utilis* from this locality differ somewhat in size and proportions from those of the type locality, Huantrai-co, Neuquén Province, Argentina, especially as regards the length/height ratio. It is thought that these differences may be the results of facies differences. Otherwise, this Upper Cretaceous species shows marked similarities to *Cytherella* sp. aff. *C. utilis* from the Lower Tertiary Roca Formation of Argentina (Bertels, 1973, p. 312, pl. 1, figs. 1–3), from which it differs in size and in height, which are greater in the Lower Tertiary species. Comments on specific differences were made previously (Bertels, *op. cit.*).

The present species resembles closely *Cytherella terminopunctata* Holden, 1964, occurring in the Rosario Formation of California (Holden, 1964, p. 396, text-fig. 3a–d) and recorded also here from the Jagüel Formation, from which it differs in the posteroventral overlap, in the more angular posteroventral margin in the Californian species, and in the near absence of pits in the posterior region in *Cytherella utilis* Bertels, 1968.

On the other hand, both species, *Cytherella utilis* Bertels and *Cytherella terminopunctata* Holden, show similarities to the *Cytherella bullata* Alexander group (see Howe and

Laurencich, 1958), from which they differ in slight details in outline and in having a more or less punctate surface.

Dimensions: Length 0.77 mm., height 0.47 mm., width 0.34 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Huantrai-co Formation, Huantrai-co, Neuquén Province, and upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM nos. 708–712.

***Cytherella terminopunctata* Holden**

Plate 1, figures 2a–b, 3a–b

Cytherella terminopunctata HOLDEN, 1964, p. 396, text-figs. 3a–d.

Material: 4 carapaces, 4 valves.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-7.

Description: Carapace of females in lateral view subelliptical; greatest height somewhat behind middle of carapace. In dorsal view carapace ovoid; greatest width in posterior one-quarter; right valve larger than left, overlapping it all along periphery; overlap somewhat more pronounced along mid-dorsal and mid-ventral margins. Ornamentation consisting of small pits disposed in anterior and posterior regions of carapace. Other characters typical of genus.

Sexual dimorphism evident; females show in posterior part typical internal depression; males lower and narrower posteriorly.

Remarks: The Argentine specimens are practically identical with *Cytherella terminopunctata* Holden, as described and illustrated by Holden (1964, p. 396, text-fig. 3) from California. They show only slight differences in the ventral outline and in the size.

Dimensions: Length 0.74 mm., height 0.44 mm., width 0.34 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM nos. 713–715.

Suborder PODOCOPINA Sars, 1866
Superfamily BAIRDIACEA Sars, 1888
Family BAIRDIIDAE Sars, 1888
Genus BYTHOCYPRIS Brady, 1880

***Bythocypris* ? sp.**

Plate 1, figure 4a–b

Material: 1 carapace.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-9.

Description: Carapace small, in lateral view subsemi-circular with obliquely rounded anterior and posterior extremities; dorsal margin convex; ventral margin straight to slightly concave; greatest height at middle of carapace. In dorsal view carapace subelliptical; greatest width at middle of carapace; extremities acuminate. Other features not observed.

Remarks: *Bythocypris*? sp. shows some affinities to *Bythocypris goodlandensis* Alexander, 1929, from the Albian Goodland Formation of Texas (Howe and Laurencich, 1958, p. 97), from which it apparently differs in some slight outline details, especially at the anterior end, where *Bythocypris goodlandensis* is lower.

Also, *Bythocypris*? sp. may be phylogenetically related to *Bythocypris* sp. from the Lower Tertiary (lower Danian) Roca Formation of the Huantrai-co area (Bertels, 1968, p. 290, pl. 1, fig. 8a–b), from which it differs in the length/height ratio, the Lower Tertiary species being somewhat lower.

Dimensions: Length 0.84 mm., height 0.35 mm., width 0.27 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM no. 716.

***Bythocypris* ? *jaguelensis* Bertels, n. sp.**

Plate 1, figure 5a–b

Etymology: From the Jagüel Formation, latinized.

Holotype: Carapace.

Paratypes: 5 carapaces.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-4.

Diagnosis: Small carapace with subsemielliptical lateral outline; greatest height in front of middle of carapace; anterior extremity obliquely rounded; posterior extremity obliquely rounded, pointed somewhat above postero-ventral margin.

Description: Carapace small, in lateral view subsemielliptical; anterior extremity obliquely rounded; posterior extremity obliquely rounded, pointed somewhat above

posteroventral margin; greatest height in front of middle of carapace. In dorsal view carapace subelliptical, with greatest width somewhat behind middle of carapace. Right valve larger than left, overlapping it all around periphery. Surface of valves smooth. Other features not observed.

Remarks: *Bythocypris*? *jaguelensis* shows some affinities to *Bythocypris*? sp. from the Lower Tertiary (lower Danian) Roca Formation of Argentina (Bertels, 1973, p. 313, pl. 1, fig. 6a–b). It differs from it especially in the outline of the anterior and posterior extremities.

The overlap of the described form does not agree with that typical of the genus *Bythocypris*, a feature which suggests that it could be included in *Antibythocypris* Jennings, 1936. Nevertheless, our specimens do not show the typical sculpture of Jennings' genus and may actually belong in a new genus. Since all of the specimens were found with the carapace complete, it was not possible to study the internal characters. For this reason it is preferable to include our questionable forms in a known genus.

Dimensions: Length 0.54 mm., height 0.24 mm., width 0.20 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 717, paratypes FCEN-LM no. 718.

Superfamily CYPRIDACEA Baird, 1845

Family PARACYPRIDIDAE Sars, 1923

Genus PARACYPRIS Sars, 1866

***Paracypris* sp. 1**

Plate 1, figure 6a–b

Material: 2 carapaces.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-7.

Description: Carapace in lateral view elongate subfabiform; anterior margin rounded; posterior margin obliquely rounded; posteroventral extremity rounded and subacuminate; dorsal margin unevenly convex, formed of almost straight segments; ventral margin concave; greatest height located somewhat in front of middle of carapace. In dorsal view carapace elliptical; greatest width at its middle. Left valve larger than right, overlapping it along periphery. Surface of valves smooth. Other features not observed.

Remarks: *Paracypris* sp. 1 resembles somewhat *Paracypris siliqua* Jones and Hinde from the Senonian? Chalk of Antrim, Ireland (in Howe and Laurencich, 1958, p. 450), from which it differs especially in the posterior margin, which is less pointed in the Argentine species. *Paracypris* sp. 1 also shows similarities to *Paracypris goodlandensis* Howe and Laurencich, 1958, of the upper Albian Goodland Formation of Texas (Howe and Laurencich, 1958, p. 448), from which it differs in the posterior segment of the right valve, which, in the Argentine species, tends to be slightly convex instead of concave as in the North American species.

Dimensions: Length 0.92 mm., height 0.40 mm., width 0.36 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM nos. 719–720.

***Paracypris* sp. 2**
Plate 1, figure 7a–b

Material: 2 carapaces, 3 valves.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-6.

Description: Carapace in lateral view elongate subtriangular; anterior margin rounded; posterior margin rounded and pointed posteroventrally; dorsal margin convex; ventral margin slightly concave; greatest height approximately at middle of carapace. In dorsal view carapace elliptical with acuminate extremities; greatest width somewhat in front of middle of carapace; left valve larger than right, overlapping it along entire margin, particularly ventrally; surface smooth. Hinge adont. Inner calcified lamellae wide anteriorly, somewhat narrower posteriorly, at both extremities with a wide vestibule; marginal zone narrow. Other features not observed.

Remarks: *Paracypris* sp. 2 shows marked affinities to *Paracypris? umzambaensis* Dingle, 1969, from the Upper Senonian of Pondoland, South Africa (Dingle, 1969, p. 354, text-fig. 5), from which it differs in slight details of the outline, especially the less pointed posteroventral extremity.

Paracypris sp. 2 also presents affinities to *Paracypris strecca* Schmidt, recorded also by Hazel from the Brightseat Formation (Danian) of Maryland (1968, p. 138, pl. 26, fig. 16). It differs especially in the anterior region, which is higher in the North American species.

It also shows similarities to *Paracypris* sp. from the Lower Tertiary (lower Danian) Roca Formation of Argentina (Bertels, 1973, p. 315, pl. 1, fig. 8a–b), from which it differs in its lesser height.

Dimensions: Length 0.90 mm., height 0.40 mm., width 0.55 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM nos. 721–722.

***Paracypris jaguelensis* Bertels, n. sp.**
Plate 1, figure 8a–b

Etymology: From the Jagüel Formation, latinized.

Holotype: Carapace.

Paratypes: 5 carapaces, 5 valves (NCW-8).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-3.

Diagnosis: *Paracypris* with low length/height ratio and greatest height located at about middle of carapace.

Description: Carapace in lateral view triangularly elongate; anterior margin obliquely rounded; margin acuminate posteroventrally but rounded; dorsal margin convex; ventral margin slightly concave; greatest height located at about middle of carapace. In dorsal view carapace elliptical; greatest width at middle of carapace; right valve larger than left, overlapping it peripherally, most markedly along ventral margin; valve surface smooth. Hinge adont. Inner lamellae wide with a small marginal zone; vestibules well developed both anteriorly and posteriorly. Other characters not observed.

Remarks: *Paracypris jaguelensis* shows marked affinities to *Paracypris? sp.* from the Lower Tertiary (lower Danian) Roca Formation of Argentina (Bertels, 1973, p. 314, pl. 1, fig. 7a–b). However, it differs from this form, especially in the length/height ratio, the ratio being larger in *Paracypris jaguelensis*.

Dimensions: Length 0.92 mm., height 0.47 mm., width 0.40 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 723, paratypes FCEN-LM no. 724.

***Paracypris* sp. aff. *P. gracilis* (Bosquet)**

Plate 1, figure 9a–b

Aff. *Bairdia arcuata* var. *gracilis* BOSQUET, 1854, p. 68, pl. 5, fig. 4a–d.

Aff. *Paracypris gracilis* (Bosquet). — HOWE and LAURENCICH, p. 448.

Material: 1 carapace (RS-1).

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: RS-1.

Description: Carapace in lateral view elongate; anterior margin rounded; posterior margin obliquely rounded, acuminate posteroventrally; dorsal margin convex; ventral margin concave; greatest height situated somewhat in front of middle of carapace. In dorsal view carapace subelliptical with somewhat acuminate extremities; left valve larger than right, overlapping it peripherally except at posteroventral extremity; surface of valves smooth. Other features not observed.

Remarks: The specimen from Fortín General Roca presents marked similarities to the specimen of *Paracypris gracilis* (Bosquet), illustrated by Howe and Laurencich (1958, p. 448). This illustration was drawn on the basis of photomicrographs from Van Veen (1934). The specimen illustrated by Van Veen comes from the Maastrichtian of Limburg, and the description agrees with the specimen here illustrated and described. Nevertheless, it is thought advisable to leave the specific determination in abeyance until the opportunity arises to compare the material.

Dimensions: Length 0.92 mm., height 0.35 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM no. 725.

Superfamily CYTHERACEA Baird, 1850
Family TRACHYLEBERIDIDAE Sylvester-Bradley, 1948
Subfamily BUNTONIINAE Apostolescu, 1961
Genus TOGOINA Apostolescu, 1961

***Togoina cretacea* Bertels, n. sp.**

Plate 1, figures 10a–b, 11a–b

Etymology: From the Cretaceous System.

Holotype: Female carapace.

Paratypes: 5 carapaces.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-6.

Diagnosis: *Togoina* with a marked ventral rib in the right valve and small punctations.

Description: Carapace of medium size; female carapace in lateral view subpyriform; dorsal margin sinuous; ventral margin slightly convex; anterior margin obliquely rounded; posterior margin angular in right valve and subrounded in left; maximum height at anterior cardinal angle. In dorsal view carapace subrhomboidal with extremities somewhat compressed; maximum width somewhat behind middle of carapace. Left valve larger than right, overlapping it around free margin.

Valves with two rounded ribs, one dorsal and one ventral in position, the latter more marked in right valve; surface covered by small pits which have a parallel arrangement around periphery, near which pits are also smaller than on rest of surface, where they are randomly distributed; some slight thickenings of posteromedian to anterodorsal direction present in valves.

Eye tubercle present, although not prominent; ocular sinus present. Subcentral node absent. Duplicature of normal width without vestibule; marginal pore canals numerous, somewhat curved. Hinge holamphidont. Other characters not observed.

Sexual dimorphism marked; males longer and narrower than females.

Remarks: *Togoina cretacea* differs from the Lower Tertiary (lower Danian) *Togoina australis* Bertels, 1968, from the Roca Formation of Huantrai-co, Neuquén Province, and the Fortín General Roca area, Río Negro Province, Argentina (Bertels, 1968, 1973), in its smaller size, as well as in the pits, which are smaller and have a different arrangement.

Dimensions: Length 0.71 mm., height 0.45 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 610, paratypes nos. 726–730.

Subfamily TRACHYLEBERIDINAE Sylvester-Bradley, 1948
Genus TRACHYLEBERIS Brady, 1898

***Trachyleberis noviprinceps* Bertels, n. sp.**

Plate 2, figures 1a–b, 2–6

Etymology: Latin, compound of *novus*=new and *princeps*=prince.

Holotype: Female carapace.

Paratypes: 17 carapaces, 6 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Trachyleberis* with small tubercles, some of which are more developed than others, and small pits.

Description: Carapace of median size; female carapace in lateral view subtrapezoidal; dorsal outline sinuous to almost straight; ventral margin slightly concave; anterior margin broadly rounded; posterior margin subangular; maximum height at anterior cardinal angle. In dorsal view carapace subrectangular with compressed extremities; maximum width posterior to middle. Surface covered with small tubercles, randomly distributed, which are more numerous in posterodorsal, posteromedian, posteroventral and anteromedian regions, where there are groups of larger tubercles; remainder of surface with small pits. Marginal rib developed, bearing small tubercles; marginally the valves have two rows of tubercles which are more pronounced ventrally and are developed into short spines.

Eye tubercle present; eye sinus small. Well-developed subcentral node on which are located 5–6 small tubercles. Inner lamellae of medium to narrow width; vestibules absent; marginal pore canals not accurately observed; selvage peripheral. Hinge holamphidont with an anterior stepped tooth in right valve and a posterior tooth widened posteriorly. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar.

Sexual dimorphism marked; males longer, lower and narrower than females; also having more strongly marked pits.

Remarks: *Trachyleberis noviprinceps* presents similarities to *Trachyleberis princeps* Bertels, 1969, described from the Huantrai-co area, Neuquén Province (Bertels, 1969b, p. 260, pl. 1, figs. 2a–b, 3a–b) and from the lower beds of the upper member of the Jagüel Formation (Bertels, 1975, p. 389, pl. 1, figs. 7–10), from which it differs in the fact that in *Trachyleberis princeps* the surface is ornamented with a reticulation instead of small pits. The two species are very probably phylogenetically related.

Dimensions: Length 0.82 mm., height 0.49 mm., width 0.41 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 731, paratypes FCEN-LM nos. 732–736.

Genus ACTINOCYHEREIS Puri, 1953

Actinocythereis tuberculata Bertels, n. sp.

Plate 2, figures 7–10

Etymology: For the tubercles which in part constitute the ornamentation. Latin *tuberculata* = tuberculate.

Holotype: Female carapace.

Paratypes: 4 carapaces, 2 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-6.

Diagnosis: A species of the genus *Actinocythereis* with carapace in lateral view subtrapezoidal, its surface traversed by elongate tubercles which have the aspect of longitudinal ribs.

Description: Carapace of the female in lateral view subtrapezoidal; anterior margin rounded; posterior margin acuminate; dorsal outline sinuous; ventral margin slightly convex; greatest height at anterior cardinal angle. In dorsal view carapace ovoid with compressed extremities; greatest width at one-fourth of length from posterior end. Left valve larger than right, overlapping it at anterior and posterior cardinal angles and at ventral margin.

Valves covered with primary elongate tubercles arranged in three longitudinal rows, which impart to them the aspect of ribs, and an anteroventral swelling; secondarily, a very weak reticulation, especially in the anterior, posterior and dorsal regions; extremities showing small denticles, 15–17 along the anterior margin and 9–11 along the posteroventral margin.

Eye tubercle pronounced; eye sinus present. Subcentral node prominent. Hinge holamphidont; right valve with a slightly stepped anterior tooth; median element with an anteromedian socket and a posteromedian groove; posterior tooth smooth; left valve with complementary elements. Marginal zone moderately wide; 25–30 marginal pore canals, simple, most of them straight. Muscle-scar pattern in a subcentral depression, but not distinguishable.

Sexual dimorphism present; males lower and more elongate than females, and also having a more concave ventral margin.

Remarks: *Actinocythereis tuberculata* presents affinities to *Cythereis dioguensis* Apostolescu, 1963, from the Coniacian of Senegal, West Africa (Apostolescu, 1963, p. 1687, pl. 5, figs. 110–115), differing in details of the arrangement of the tubercles, in the presence of a slight reticulation, in the dorsal view of the carapace, which is much wider in *Cythereis dioguensis*, and in the hinge, which in the Argentine species is clearly holamphidont.

It also shows similarities to *Cythereis communis* Israel-sky, 1929 (in Howe and Laurencich, 1958, p. 189;

Skinner, 1956, p. 196, pl. 3, fig. 7) from the Campanian of Arkansas, differing in details of the ornamentation. *Cythereis communis* Israelsky is a senior synonym of *Trachyleberis? communis* (Israelsky), described from the Campanian Marlbrook Marl of Arkansas by Benson and Tatro (1964, p. 22, pl. 5, figs. 13–15; text-fig. 10).

Deroo (1962) proposed the subfamily Mauritsinae with *Mauritsina hieroglyphica* (Bosquet) as the type species of *Mauritsina*. This form also presents similarities to the Argentine species *Actinocythereis tuberculata*, but they differ in the external aspect, in the disposition of the ribs, and in internal characters such as the hinge, in which the posterior tooth of the right valve is lobulate in *Mauritsina*, and the muscle-scar pattern typical of the subfamily, which is not visible in *Actinocythereis tuberculata*.

Dimensions: Length 0.65 mm., height 0.41 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 737, paratypes FCEN-LM nos. 606–607, 738–742.

Genus ACANTHOCYHEREIS Howe, 1963

Acanthocythereis abundans (Bertels)

Plate 2, figures 11a–b, 12

Cythereis? abundans BERTELS, 1969, p. 263, pl. 1, figs. 3a–5b; pl. 6, fig. 1a–d.

Material: 4 carapaces (RS-1), 4 valves (RS-1 and NCW-6).

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Levels: RS-1 and NCW-6.

Description: Carapace of medium size; female carapace in lateral view subtrapezoidal; dorsal margin almost straight; ventral margin slightly convex; anterior margin rounded; posterior margin triangularly rounded with an upper concave portion and a lower convex portion which forms the continuation of the ventral margin; maximum height at anterior cardinal angle. In dorsal view carapace subovoid with compressed anterior and posterior extremities; maximum width along middle third of carapace.

The ornamentation consists of a primary reticulation arranged in the middle anterior concentrically around and before the subcentral node, and posteriorly arranged randomly to radially. At the intersections of the reticulum there are tubercles which are more pronounced and numerous in the ventral, dorsal and posterior median

regions. The anterior margin bears two rows of denticles, the outer row being formed of smaller and more numerous (15–16) denticles than the inner (7–8); the posterior margin has 9–11 small denticles.

Eye tubercle developed; internal ocular sinus present. Subcentral node prominent and covered by a group of 9–10 small tubercles. Inner lamella wide; no vestibules; selvage located a short distance from the periphery in the right valve. Hinge holamphidont with an anterior stepped tooth in right valve and a wide posterior tooth. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar. Sexual dimorphism present.

Remarks: The specimens from the Fortín General Roca area are markedly larger than those from Huantrai-co, the type locality of the species, but they do not differ in any other character.

Acanthocythereis abundans (Bertels) resembles *Acanthocythereis washingtonensis* Hazel (1968, p. 120, pl. 24, figs. 17–19, 23–24), recorded from the Danian of Maryland, from which it mainly differs externally in the posterior end, less pointed in the Argentine species, and in the arrangement of the reticulum and tubercles.

Dimensions: Length 0.65 mm., height 0.37 mm., width 0.35 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, and Huantrai-co Formation, Neuquén Province, Argentina.

Repository: Figured material FCEN-LM nos. 743–744, other material FCEN-LM nos. 745–748.

Genus CYHEREIS Jones, 1849

Cythereis? rionegrensis Bertels, n. sp.

Plate 2, figures 13a–b, 14–17

Etymology: From Río Negro Province, Argentina, latinized.

Holotype: Female carapace.

Paratypes: 9 carapaces, 22 valves (RS-1, NCW-6 and NCW-7).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-7.

Diagnosis: *Cythereis?* with tubercles disposed principally in three rows and a slightly developed reticulation on the rest of the surface.

Description: Carapace of females in lateral view subtrapezoidal; anterior margin obliquely rounded; pos-

terior margin obliquely rounded in right valve, angular in left; dorsal and ventral margins almost straight; greatest height at anterior cardinal angle. In dorsal view carapace elongate hexagonal; greatest width at approximately one-third of length from posterior end; left valve larger than right and overlapping it, especially at the cardinal angles.

Surface ornamented with tubercles, most of them aligned in three principal longitudinal rows; reticulation very fine, arranged parallel to periphery in anterior and posterior extremities and randomly on rest of surface; flange provided with 15–16 denticles along anterior margin and 8–9 spinelike projections along posterior margin.

Eye tubercle present, although not very prominent; eye sinus present. Subcentral node prominent. Hinge antimerodont with an anterior quadrilobate tooth, a posterior slightly trilobate tooth, and a median crenulate groove in right valve; complementary elements present in left valve, including a crenulate bar enlarged at both extremities. Inner calcified lamellae moderately wide, traversed by 32–35 marginal pore canals which proximally begin as clusters of four or five that distally spread out fanlike toward periphery; inner border and concrescence line coincident except anteriorly, where a small vestibule is developed; selvage slightly removed from periphery in right valve. Muscle-scar pattern composed of a row of four adductor-muscle scar and one V-shaped frontal scar situated in a marked subcentral depression.

Sexual dimorphism present; males lower, more elongate and narrower than females, and reticulation on carapace not as strongly marked.

Remarks: *Cythereis? rionegrensis* presents only slight external affinities to "*Cythereis*" *nodulosa* (Bosquet), described by Deroo (1966) from the upper Maastrichtian of Holland (Calcaire de Kunrade). They differ in details of the position of the tubercles, and in the posterior margin, which is somewhat more rounded in *Cythereis? rionegrensis*.

With regard to the internal features, it seems likely that the present species might be assignable to a new genus on account of its distinctive hingement and marginal zone, which differ from those of typical *Cythereis*. Further studies may confirm this suggestion.

Dimensions: Length 0.79 mm., height 0.47 mm., width 0.40 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 749, paratypes FCEN-LM nos. 750–757.

***Cythereis? incerta* Bertels, n. sp.**

Plate 3, figures 1a–b, 2–5

Etymology: Latin *incerta* = uncertain.

Holotype: Female carapace.

Paratypes: 17 carapaces, 21 valves (RS-1).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Cythereis?* of small size, with three longitudinal inflations and reticulate surface.

Description: Carapace small; female carapace in lateral view subovoid; dorsal outline sinuous; ventral margin convex; anterior and posterior margins rounded; greatest height at anterior cardinal angle. In dorsal view carapace subovoid with compressed extremities; greatest width posterior to middle.

Valves covered with a reticulation which is concentric and parallel to periphery in anterior region and randomly arranged posteriorly; some elongate longitudinal nodes (inflations), most of them external, present along middle region and along dorsal and ventral margins and conferring a tumid aspect to carapace. Along the anterior margin are 15–16 denticles.

Eye tubercle and internal eye sinus present. Subcentral node strongly marked. Inner lamellae of moderate width, without vestibules; selvage peripheral. Hinge antimerodont with an elongate crenulate anterior tooth, an almost smooth posterior tooth, and a median crenulate groove, enlarged terminally, in the right valve; left valve with complementary elements. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar.

Sexual dimorphism strong; carapaces of males lower, longer and narrower than those of females, also somewhat more tumid.

Remarks: *Cythereis? incerta* shows some similarities to *Cythereis? indocilis* Bertels, 1969, from the Lower Tertiary (lower Danian) Roca Formation of Huantrai-co (Bertels, 1969b, p. 264, pl. 6, fig. 2a–d), but differs externally from it mainly in the outline and in the pattern of the reticulum; internally, it differs in the hinge, which in *Cythereis? indocilis* is modified hemiamphidont, but in the present species is antimerodont.

Dimensions: Length 0.58 mm., height 0.37 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 758, paratypes FCEN-LM nos. 759–767.

Cythereis ? excellens Bertels
Plate 3, figures 6–7, 8a–b, 9–10

Cythereis ? excellens BERTELS, 1969, p. 263, pl. 5, fig. 2a–d.

Material: 20 carapaces, 1 valve.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: RS-1.

Description: Carapace of medium size; female carapace in lateral view subrectangular; dorsal margin almost straight; ventral margin slightly concave; anterior margin somewhat obliquely rounded; posterior margin angular; greatest height at anterior cardinal angle. In dorsal view carapace subelliptical with slightly compressed extremities; maximum width posterior to middle.

Valves ornamented by a reticulation which is concentrically arranged anteriorly and more or less obliquely arranged posteriorly; marginal spines present anteriorly (13–14) and posteriorly (6–7).

Small eye tubercle and eye sinus present. Subcentral node marked only by the concentrically arranged reticulation. Inner lamellae of medium width, without vestibules; selvage located a short distance from periphery in right valve. Hinge holamphidont with a small stepped anterior tooth in right valve. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar.

Sexual dimorphism strong; male carapaces lower, longer and narrower than those of females.

Remarks: The arrangement of the ornamentation differs slightly from that of the holotype described from Huantrai-co at an equivalent stratigraphic horizon (Bertels, 1969b). Nevertheless, since the genus is not accurately known, and since the differences are not very significant, it seems preferable to include the form from the Fortín General Roca area in this species.

Dimensions: Length 0.65 mm., height 0.35 mm., width 0.26 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, and upper beds of upper member of Huantrai-co Formation, Neuquén Province, Argentina.

Repository: Figured material FCEN-LM 600–601, 768–769, 772; other material FCEN-LM 770–771.

Genus HENRYHOWELLA Puri, 1957

Henryhowella splendida Bertels, n. sp.
Plate 3, figures 11–12, 13a–b, 14–15

Etymology: Latin *splendida* = splendid.

Holotype: Female left valve.

Paratypes: 3 carapaces, 7 valves (RS-1, RS-2 and RS-3).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Henryhowella* with three primary longitudinal foldings and a reticulate surface. At intersections of muri are tubercles, usually small.

Description: Carapace of medium to large size, in lateral view subquadrangular; dorsal outline almost straight to sinuous; ventral outline slightly convex; anterior margin somewhat obliquely rounded; posterior margin with an upper concave part and a lower rounded part which is the continuation of the ventral margin; maximum height at anterior cardinal angle. In dorsal view carapace sub-ovoid; maximum width at one-third of length from posterior end.

The surface has three longitudinal folds located in dorsal, median and ventral positions respectively, and it is also covered by a reticulum. At the intersections of the muri there are usually small tubercles, sometimes double or multiple, which are more prominent and numerous on the three folds. Marginal denticles are present anteriorly (20) and posteriorly (8–9).

Eye tubercle small; internal ocular sinus present. Subcentral node marked by many small tubercles. Inner lamella moderately wide; marginal zone traversed by 25–28 pore canals, simple, curved, some of them forming pairs; selvage peripheral. Hinge holamphidont with an anterior high, stepped tooth, and a wide posterior tooth in right valve; left valve with complementary elements and a smooth bar. Muscle-scar pattern composed of a row of four adductor-muscle scars, of which the upper one is divergent as regards the other three and the median superior one is enlarged; frontal scar V-shaped.

Sexual dimorphism strong; males longer, lower and narrower than females.

Remarks: *Henryhowella splendida* does not show strong affinities to any of the described species of this genus occurring in the Upper Cretaceous.

Dimensions: Length 0.99 mm., height 0.61 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 773, paratypes FCEN-LM nos. 774–780.

Genus *PROTOSTA* Bertels, 1969

Protocosta spinosa Bertels, n. sp.

Plate 3, figures 16–17

Etymology: Named for the posteroventral spinous projection. Latin *spinosa* = spinous.

Holotype: Female carapace.

Paratypes: 17 carapaces, 1 valve.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Protocosta* with a spinelike projection situated at the posterior end of the ventral rib.

Description: Carapace of medium size; female carapace in lateral view subtrapezoidal; dorsal margin concave; ventral margin almost straight; anterior margin somewhat obliquely rounded; posterior end angular with an upper concave part and a lower convex part which is the continuation of the ventral margin; maximum height at anterior cardinal angle. In dorsal view carapace subrhomboidal with compressed extremities; maximum width at one-fourth of length from posterior end.

The valves have three longitudinal ribs in dorsal, middle and ventral positions respectively. Of these ribs, the middle one extends from the anteromedian area to the posterodorsal region and is lightly marked to barely visible. The ventral one ends posteriorly in a spinelike projection. In addition, the surface is covered by a reticulation which is concentrically disposed anteriorly and longitudinally to randomly in the posterior half. Marginal rib present anteriorly; flange with 11–12 anterior marginal spines and 6 to 7 spines on the posteroventral margin.

Eye tubercle developed; ocular sinus present. Subcentral node absent. Inner lamella of medium to small width; no vestibules; selvage peripheral. Hinge holamphidont. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar.

Sexual dimorphism marked; males typically longer, lower and narrower than females.

Remarks: *Protocosta spinosa* shows some similarities to *Protocosta struveae* Bertels (1969b, p. 268, pl. 7, figs. 1a–e, 2a–c) from the Lower Tertiary (lower Danian) Roca Formation of the Huantrai-co area, Neuquén Province, Argentina, from which it differs in outline details and in the disposition of the reticulum.

Dimensions: Length 0.77 mm., height 0.40 mm., width 0.32 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 604, paratypes FCEN-LM nos. 781–782.

Genus *VEENIA* Butler and Jones, 1957

Subgenus *NIGERIA* Reymont, 1963

Veenia (Nigeria) punctata Bertels

Plate 4, figures 1a–b, 2

Veenia (Nigeria) punctata BERTELS, 1968, p. 294, pl. 3, fig. 2a–f.

Material: 13 carapaces, 27 valves.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-6.

Description: Carapace of female in lateral view subpyriform; dorsal and ventral margins sinuous to convex; anterior margin somewhat obliquely rounded; posterior margin subrounded in left valve and angulate in right; greatest height at anterior cardinal angle. In dorsal view carapace subrectangular with compressed extremities; greatest width somewhat behind middle of carapace. Left valve larger than right, overlapping latter along free margin.

Surface ornamented by weak riblets, especially in median region of carapace; between riblets, aligned pits of medium size. Rest of surface with randomly disposed smaller punctae or pits than those in median area. Marginal rim developed; anterior margin bearing two rows of denticles more developed in right valve.

Eye tubercle slightly developed but present; eye sinus present. Subcentral node faint. Duplication of moderate width; confluence line and inner margin coincident; 30–35 marginal pore canals, simple, somewhat curved, some of them running in pairs; selvage peripheral. Hinge holamphidont. Muscle-scar pattern composed of one U-shaped frontal scar and four adductor-muscle scars.

Sexual dimorphism strong; males lower, longer and narrower than females.

Remarks: *Veenia (Nigeria) punctata* Bertels from this locality shows some small differences from the conspecific form from the Huantrai-co area, such as slightly smaller size. This difference in size is not considered of taxonomic importance, since facies differences may have influenced this parameter.

The present species shows marked similarities to *Veenia nigeriensis* Reyment, 1960 (p. 169, pl. 11, figs. 1a–c, 2; pl. 16, figs. 1–3; pl. 17, figs. 1–3, text-fig. 56) from the Maastrichtian of Nigeria, being different in its dorsal outline, the orientation of the sculpture and the markedly smaller size. It also presents affinities to *Veenia? ughelli* Reyment, 1960 (p. 204, pl. 12, figs. 1a–c, 4), also from Nigeria, from which it differs by finer sculpture, greater length and somewhat more compressed extremities.

Dimensions: Length 0.90 mm., height 0.59 mm., width 0.44 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, and upper beds of upper member of Huantrai-co Formation, Neuquén Province, Argentina.

Repository: Figured material FCEN-LM nos. 609, 783; other material FCEN-LM nos. 784–786.

***Veenia (Nigeria) inornata* Bertels, n. sp.**

Plate 4, figure 3

Etymology: Latin *inornata* = unornamented, because of the comparative lack of ornamentation of the carapace.

Holotype: Female carapace.

Paratypes: 5 carapaces.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-9.

Diagnosis: A species of the subgenus *Veenia (Nigeria)* with scattered small pits over the surface, which is almost smooth.

Description: Carapace of medium size; female carapace in lateral view subpyriform and tumid; dorsal margin sinuous; ventral margin convex; anterior margin somewhat obliquely rounded; posterior margin subrounded; maximum height at anterior cardinal angle. In dorsal view carapace subrectangular with compressed extremities; maximum width posterior to middle. Left valve larger than right, overlapping latter at both cardinal angles and at free margin. Surface covered by scattered and scarce shallow pits of small size or apparently smooth. Anterior marginal rim developed; marginal denticles present at both anterior and posterior extremities. Two more or less prominent inflations present, one posterodorsal and the other posteroventral in position. Eye tubercle slightly developed; subcentral node absent. Other features not observed.

Remarks: *Veenia (Nigeria) inornata* is easily distinguished from other species by its almost smooth surface.

Dimensions: Length 0.82 mm., height 0.50 mm., width 0.37 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 787, paratypes FCEN-LM no. 788.

***Veenia (Nigeria) jaguelensis* Bertels, n. sp.**

Plate 4, figures 4a–c, 5a–b, 6

Etymology: *jaguelensis*, from the Jagüel Formation.

Holotype: Female carapace.

Paratypes: 11 carapaces, 4 valves (RS-1).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: Species of *Veenia (Nigeria)* with surface ornamented by small pits, which reach extremities of valves, where they are smaller and in rows parallel to periphery.

Description: Carapace of medium size; female carapace in lateral view pyriform; dorsal and ventral margins sinuous to convex; anterior extremity rounded; posterior extremity subrounded in left valve, angulate in right valve with an upper concave part and a lower convex part, which is the continuation of the ventral margin; greatest height at anterior cardinal angle; in dorsal view carapace subovoid with compressed extremities; greatest width somewhat behind middle of carapace. Left valve larger than right, overlapping it along free margin.

Surface ornamented by pits; those of median region larger and somewhat aligned in several directions; those of marginal areas smaller, mostly in rows parallel to periphery and reaching extremities. Marginal rim developed; anterior margin bearing two rows of denticles; posteroventral margin with 4–5 denticles; pore conuli well developed in posterior region.

Eye tubercle slightly developed; eye sinus present. Subcentral node practically absent. Duplicature of moderate width; concrescence line and inner margin coincident; 30–35 marginal pore canals, simple, somewhat curved, some of them running in pairs; selva peripheral. Hinge holamphidont. Muscle-scar pattern composed of one U-shaped frontal scar and four adductor-muscle scars.

Sexual dimorphism strong; males lower, longer and narrower than females; males showing a stronger development of pits, which are of larger size than those of females.

Remarks: *Veenia (Nigeria) jaguelensis* differs from *Veenia (Nigeria) punctata* in the finer, smaller pits, which reach

the extremities of the valves and, in these regions, occur in rows parallel to the periphery.

This species, as well as *Veenia (Nigeria) punctata*, seems to be closely related to *Veenia nigeriensis* Reymont, 1960, and *Veenia ? ughelli* Reymont, 1960, described from the upper Maastrichtian of Nigeria (Reymont, 1960).

Dimensions: Length 0.80 mm., height 0.50 mm., width 0.37 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 789, paratypes FCEN-LM nos. 790–793.

***Veenia (Nigeria) tumida* Bertels, n. sp.**

Plate 4, figures 7–8, 9a–b

Etymology: Latin *tumida* = tumid.

Holotype: Female carapace.

Paratypes: 1 carapace, 3 valves (NCW-6 and RS-4).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-4.

Diagnosis: Species of *Veenia (Nigeria)* with a postero-median, longitudinal low rib or folding, and swellings present on dorsal, ventral and anteroventral regions; subcentral node slightly marked; posterior pore conuli developed.

Description: Carapace of female of medium size, in lateral view subpyriform and tumid; dorsal margin sinuous; ventral margin convex; anterior extremity somewhat obliquely rounded; posterior extremity subrounded in left valve and subangular in right valve; maximum height at anterior cardinal angle; in dorsal view carapace subrectangular with compressed extremities; maximum width in middle of carapace. Left valve larger than right, overlapping it at both cardinal angles and along free margin.

Surface ornamented by a posteromedian slight rib or folding, and posterodorsal and posteroventral swellings; surface also covered by more or less large pits with an almost radial pattern, which do not reach extremities of valves. Anterior marginal rim developed; two rows of denticles along anterior margin; posteroventral margin possessing 5–6 denticles. Anteroventral inflation present. Posterior pore conuli well developed.

Eye tubercle slightly developed; eye sinus present. Sub-central node slightly developed. Duplicature of moderate width; confluence line and inner margin coincident;

30–35 marginal pore canals, simple, somewhat curved, some of them running in pairs; selvage peripheral. Hinge holamphidont. Muscle-scar pattern composed of one U-shaped frontal scar and four adductor-muscle scars.

Sexual dimorphism strong; males lower, longer and narrower than females.

Remarks: *Veenia (Nigeria) tumida* differs from *Veenia (Nigeria) punctata* in having a median longitudinal rounded rib, stronger dorsal and ventral swellings, a more marked subcentral node, and larger pits aligned in the posterior middle in an almost radial pattern.

Dimensions: Length 0.90 mm., height 0.58 mm., width 0.45 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 794, paratypes FCEN-LM nos. 795–798.

***Veenia (Nigeria) argentinensis* Bertels, n. sp.**

Plate 4, figures 10–13

Etymology: From the Argentine Republic, latinized.

Holotype: Female carapace.

Paratypes: 7 carapaces, 5 valves (NCW-7 and NCW-8).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-8.

Diagnosis: Species of *Veenia (Nigeria)* with aligned pits in a reticulate pattern.

Description: Carapace of female of medium size, in lateral view subpyriform; dorsal and ventral margins almost straight to slightly concave; anterior extremity somewhat obliquely rounded; posterior end subrounded; maximum height at anterior cardinal angle; in dorsal view carapace subrectangular with compressed extremities; maximum width posterior to middle.

Surface ornamented by pits, most of them aligned, which have a reticulate pattern disposed longitudinally in the dorsal and posteromedian regions and somewhat randomly over rest of surface; at a large part of intersections of muri, small pore tubercles superimposed. Anterior marginal rim present; two rows of marginal denticles developed anteriorly; one row of 4–5 denticles along posteroventral margin. Posterior pore conuli well developed.

Eye tubercle slightly developed; eye sinus present. Sub-central node present. Duplicature of moderate width; confluence line and inner margin coincident; 30–35

marginal pore canals, simple, somewhat curved, some of them running in pairs; selvage peripheral. Hinge holamphidont. Muscle-scar pattern composed of one U-shaped frontal scar and four adductor-muscle scars.

Sexual dimorphism strong; males lower, longer and narrower than females.

Remarks: *Veenia (Nigeria) argentinensis* differs from *Veenia (Nigeria) punctata* Bertels, 1968, in having a more aligned ornamentation, which in some regions constitutes a reticulation.

Veenia (Nigeria) argentinensis shows marked affinities to the species described by Reyment (1960, p. 199, pl. 12, fig. 6a-c) from the upper Maastrichtian of Nigeria as *Veenia arachoides* (Berry), from which it differs in some details of the pattern of the reticulation and in the less pointed posterior extremity.

Dimensions: Length 0.87 mm., height 0.50 mm., width 0.42 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM No. 799, paratypes FCEN-LM Nos. 800-803.

Subfamily ROCALEBERIDINAE Bertels, 1969
Genus WICHMANNELLA Bertels, 1969

***Wichmannella magna* Bertels, n. sp.**
Plate 4, figures 14a-b, 15-17

Etymology: Latin *magna* = large, great, illustrious.

Holotype: Female left valve.

Paratypes: 1 carapace, 8 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-8.

Diagnosis: *Wichmannella* with a mainly randomly reticulate pattern and small tubercles at intersections of muri.

Description: Carapace of medium size; female carapace in lateral view subrectangular; dorsal margin almost straight; ventral margin slightly convex; anterior and posterior margins rounded; maximum height at anterior cardinal angle. In dorsal view carapace subovoid; maximum width posterior.

Surface covered by a primary reticulation which has a pattern parallel to and along periphery and random arrangement on remainder of surface; in reticulum, mostly at intersections of muri, small tubercles evident. Marginal denticles present anteriorly (16-17) and posteriorly (9-10).

Eye tubercles well developed; internal ocular sinus clearly marked. Subcentral node marked by small tubercles, which are grouped in the area. Inner lamella moderately wide, with vestibules; marginal pore canals moderate in number, some of them branched; selvage peripheral in left valve. Hinge holamphidont with an anterior stepped tooth in right valve; hinge elements of left valve complementary to those of right valve. Muscle-scar pattern composed of four adductor-muscle scars and one frontal V-shaped scar all located in a slight subcentral depression.

Sexual dimorphism strong; males lower, longer and narrower than females; also, males more obliquely rounded posteroventrally and having a somewhat different arrangement of reticulum.

Remarks: *Wichmannella magna* shows marked similarities to *Wichmannella meridionalis* Bertels (1969a, p. 166, pl. 2, figs. 1a-e, 2a-c; pl. 5, fig. 2a-c), from the Lower Tertiary (lower Danian) Roca Formation of Argentina, from which it differs mainly in the pattern of the reticulum.

Dimensions: Length 0.75 mm., height 0.45 mm., width 0.25 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 804, paratypes FCEN-LM nos. 805-811.

Family HEMICYTHERIDAE Puri, 1953
Subfamily THAEROCYTHERINAE Hazel, 1967
Genus BRADLEYA Hornibrook, 1952

***Bradleya? argentinensis* Bertels, n. sp.**
Plate 5, figures 1a-b, 2

Etymology: From the Argentine Republic, latinized.

Holotype: Carapace.

Paratypes: 1 carapace and 1 valve (NCW-6).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Bradleya?* with a subrectangular carapace ornamented by two ribs of dorsal and ventral position; ventral one broadening posteriorly, ending in the postero-ventral region with a spinelike projection.

Description: Carapace of medium size, in lateral view subrectangular; dorsal margin almost straight; ventral margin slightly concave; anterior margin rounded; posterior margin subrounded with an upper somewhat concave part and a lower convex part; greatest height at

anterior cardinal angle. In dorsal view carapace ovoid with compressed extremities; greatest width at one-third of length from posterior end; left valve slightly larger than right and overlapping it at both cardinal angles.

Ornamentation consisting of two ribs of dorsal and ventral position respectively; ventral one more developed, beginning at one-fifth of length from anterior extremity and ending in a spinelike projection at one-third of length from posterior extremity; remainder of surface covered by a reticulum concentrically disposed anteriorly, parallel to margins peripherally and at random in posterior middle. Marginal rib clearly developed along anterior and posterior margins; marginal denticles present along anterior (18–20) and posterior (6) margins, larger along posterior margin.

Eye tubercle clearly developed; ocular sinus present. Subcentral node present but not prominent; concentric reticulation disposed around it. Hinge holamphidont. Marginal zone moderately wide with 25–30 simple, straight marginal pore canals; selvage peripheral. Muscle scars not observed but located in a subcentral depression. Sexual dimorphism not observed.

Remarks: The present species is one of the few ostracodes which can be related with the New Zealand ostracodes known to the author, although its generic position is uncertain due to the fact that the internal features can not be completely observed.

The hingement of *Bradleya argentinensis*, though amphidont, does not show the typical crenulations of the median bar of the genus *Bradleya*, and the muscle-scar pattern has not been observed.

In external features the Argentine species resembles *Bradleya semivera* Hornibrook (1952, p. 43, pl. 8, figs. 103–104, 109) from the Mangaorapan-Duntroonian Stages (Eocene-Oligocene), from which it differs somewhat in the length/height ratio and in the pattern of the reticulum, beside the internal features mentioned above.

Dimensions: Length 0.81 mm., height 0.45 mm., width 0.40 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 812, paratypes FCEN-LM nos. 813–814.

***Bradleya? patagonica* Bertels, n. sp.**

Plate 5, figures 3, 4a–b, 5

Etymology: From Patagonia, the southern region of Argentina, latinized.

Holotype: Carapace.

Paratypes: 4 carapaces, 9 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-6.

Diagnosis: *Bradleya?* with three longitudinal elevations and a very slight reticulation.

Description: Carapace of medium to small size, in lateral view subquadrangular; dorsal outline sinuous; ventral margin convex; anterior margin obliquely rounded; posterior margin rounded; maximum height at anterior cardinal angle. In dorsal view carapace ovoid with somewhat compressed extremities; maximum width at one-third of length from posterior extremity. Left valve larger than right, overlapping it at both cardinal angles, as well as along ventral margin.

Valves with three longitudinal ribs, dorsal one forming dorsal outline, middle one developed posteriorly, ventral one located parallel to ventral margin and slightly convex; rest of surface covered by a very slight reticulation. Marginal denticles present, 15 located anteriorly and 3 on the posteroventral margin.

Eye tubercle poorly developed; eye sinus present. Subcentral node developed. Hinge holamphidont; right valve having a high, anterior stepped tooth, a posterior enlarged one, higher posteriorly, and a median smooth element; left valve with complementary elements. Inner calcified lamella wide; concrescence line and inner margin coincident; marginal zone somewhat obscured by the outer reticulation. Muscle-scar pattern composed of four adductor-muscle scars and one V-shaped frontal scar, all located in a deep subcentral depression. Sexual dimorphism not observed.

Remarks: *Bradleya? patagonica* resembles *Bradleya? atilai* from the same locality and age, and described below. It differs from that species in having a more weakly developed reticulation, and in some other features, such as smaller size.

Bradleya? patagonica and *Bradleya? atilai* should perhaps be assigned to a new genus erected especially to accommodate them.

In the available literature it was not possible to find a genus with the morphologic features of this species. Since some internal features, like the marginal pore canals, could not be completely observed, both species are included questionably in *Bradleya*, although they differ in external features, such as the presence of a median rib, and internal features, such as muscle-scar pattern (one frontal scar instead of two) and hinge (smooth, not denticulate, median and posterior elements).

Dimensions: Length 0.64 mm., height 0.44 mm., width 0.31 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 815, paratypes FCEN-LM nos. 816–820.

***Bradleya? attilai* Bertels, n. sp.**
Plate 5, figures 6–9

Etymology: From Attila, King of the Huns.

Holotype: Carapace.

Paratypes: 9 carapaces, 7 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-7.

Diagnosis: *Bradleya?* with three longitudinal elevations and a reticulation in between.

Description: Carapace of medium to small size, in lateral view subrectangular; dorsal margin sinuous; ventral margin convex; anterior margin obliquely rounded; posterior margin rounded; maximum height at anterior cardinal angle; in dorsal view carapace ovoid with somewhat compressed extremities; maximum width at one-third of length from posterior end. Left valve larger than right, overlapping it at both cardinal angles as well as along ventral margin.

Valves ornamented by three longitudinally disposed ribs; upper rib forming dorsal margin; middle rib developed posteriorly; ventral rib located parallel to ventral margin, slightly convex; rest of surface covered by pits having a reticulate pattern; pits in posterior area mostly in longitudinal rows, anteriorly in rows concentric with subcentral node. Marginal denticles present anteriorly (15–17) and posteroventrally (4–5).

Eye tubercle poorly developed; eye sinus present. Subcentral node developed. Hinge holamphidont; right valve possessing a high anterior stepped tooth, a posterior enlarged tooth, higher posteriorly, and a median smooth element; left valve with complementary elements. Inner calcified lamella wide; concrescence line and inner margin coincident; marginal zone obscured by outer reticulation. Muscle-scar pattern composed of four adductor-muscle scars and one frontal V-shaped scar, all located in a deep subcentral depression. Sexual dimorphism not observed.

Remarks: Differs from *Bradleya? patagonica*, n. sp., mainly in having a stronger reticulation, and in its slightly larger size.

Dimensions: Length 0.71 mm., height 0.46 mm., width 0.40 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 821, paratypes FCEN-LM nos. 822–827.

Subfamily CAMPYLOCYOTHERINAE Puri, 1960
Genus ANTICYTHEREIS van den Bold, 1946

***Anticythereis venusta* Bertels, n. sp.**
Plate 5, figures 10–15, 16a–b

Etymology: Latin *venusta* = lovely, charming, graceful.

Holotype: Female carapace.

Paratypes: 29 carapaces, 31 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Anticythereis* with a subovoid carapace ornamented by deep pits which are partially covered by small triangular plates.

Description: Carapace of female in lateral view ovoid; anterior margin obliquely rounded; posterior margin obliquely rounded ventrally; dorsal margin sinuous; ventral margin convex; greatest height at anterior cardinal angle. In dorsal view carapace ovoid; greatest width at one-fourth of length from posterior end.

Ornamentation consisting of small, deep, circular pits, partly covered by five small subtriangular plates of radial arrangement; flange provided with 16–18 denticles along anterior and anteroventral margins and 7–8 along posterior margin.

Eye tubercle poorly developed; internal ocular sinus present. Subcentral node absent. Hinge holamphidont. Inner calcified lamellae of moderate width, without vestibules; marginal pore canals not clearly observed, possibly due to strong calcification and ornamentation of valves, but, in general, moderate in number (25–27), most of them straight, a few curved and in general grouped in pairs. Muscle-scar pattern composed of four adductor-muscle scars and one heart-shaped frontal scar; insertion surface even with inner surface of valve.

Sexual dimorphism marked; males longer, lower and narrower posteriorly than females.

Remarks: This Argentine Cretaceous species has marked affinities to the Lower Tertiary (lower Danian) species from the Fortín General Roca area, *Anticythereis schilleri* Bertels, 1973 (p. 326, pl. 4, figs. 5a–d; 6a–b), from which

it differs in its smaller size, and in details of the outline. *Anticythereis venusta* is probably an ancestral form of the Danian *A. schilleri*.

Dimensions: Length 0.71 mm., height 0.45 mm., width 0.34 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 608, paratypes FCEN-LM nos. 828–837.

***Anticythereis arcana* Bertels, n. sp.**
Plate 5, figures 17–18

Etymology: Latin *arcana* = arcane, hidden, secret.

Holotype: Female carapace.

Paratypes: 10 carapaces.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Anticythereis* with a subtrapezoidal carapace, a subacuminate posterior margin and a reticulate surface.

Description: Carapace of female in lateral view subtrapezoidal; anterior margin rounded; posterior margin acuminate; dorsal outline sinuous; ventral margin almost straight, becoming convex posteroventrally; greatest height at anterior cardinal angle. In dorsal view carapace ovoid with compressed extremities; maximum width approximately at one-fourth of length from posterior end.

Surface covered by a reticulation except in posterior region, where it is absent or only slightly developed; reticulation arranged parallel to periphery at margins and anteriorly, having a random pattern in posterior middle; marginal rib present anteriorly and posteriorly; flange with 10–12 denticles along anterior border and 3–4 along posteroventral border.

Eye tubercle very slightly developed. Subcentral node indicated by a slight annular depression around subcentral area. Other features not observed.

Sexual dimorphism evident; males more elongate and narrower than females.

Remarks: *Anticythereis arcana* differs from *Anticythereis venusta* in the presence of a marginal rib and in details of ornamentation.

Dimensions: Length 0.69 mm., height 0.41 mm., width 0.34 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 838, paratypes FCEN-LM nos. 839–841.

***Anticythereis? attenuata* Bertels, n. sp.**
Plate 5, figures 19a–b, 20–21

Etymology: Latin *attenuata* = attenuate, thinned.

Holotype: Female carapace.

Paratypes: 12 carapaces (RS-1).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Anticythereis?* with two ribs and reticulate surface.

Description: Carapace of medium size; female carapace in lateral view elongate subtriangular; dorsal and ventral margins sinuous; anterior margin somewhat obliquely rounded; posterior margin angular; greatest height at anterior cardinal angle. In dorsal view carapace elongate hexagonal with compressed extremities; greatest width at one-fourth of length from posterior end.

Carapace ornamented by a reticulum arranged concentrically anteriorly around a poorly developed subcentral node and randomly in posterior part. Along dorsal, ventral and posteromedian regions, tubercles developed which together form slight elevations or ribs.

Eye tubercle present but not conspicuous. Subcentral node poorly developed. Other features not observed.

Sexual dimorphism strong; males longer, lower and narrower than females.

Remarks: *Anticythereis? attenuata* shows some external similarities to the Lower Tertiary (lower Danian) species *Anticythereis? inconnexa* Bertels, 1973 (p. 326, pl. 4, figs. 3a–c, 4a–b), from which it differs especially in the pattern of the reticulum. Since internal features could not be observed, it is difficult to assign this species to a genus.

The present species may represent, together with the lower Danian *Anticythereis? inconnexa*, another new genus, but, since the internal features could not be completely observed in either, especially in the Cretaceous species, it seems preferable to include both of them in the closest related genus, in the author's opinion.

Dimensions: Length 0.65 mm., height 0.37 mm., width 0.29 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 842, paratypes FCEN-LM nos. 843-846.

Family PECTOCYOTHERIDAE Hanai, 1957
Genus MUNSEYELLA van den Bold, 1957

***Munseyella minima* Bertels, n. sp.**

Plate 6, figure 1a-b

Etymology: Latin *minima* = least, smallest.

Holotype: Female carapace.

Paratypes: 3 carapaces, 2 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Munseyella* with irregular, sinuous ribs.

Description: Carapace of small size, subquadrangular in lateral view; dorsal margin slightly convex to almost straight; greatest height at anterior cardinal angle. In dorsal view carapace subrectangular; greatest width posterior to middle.

Valves ornamented by ribs of an irregular, sinuous character and a prominent marginal rib which continues dorsally and curves down before reaching posterior cardinal angle. Other features not accurately observed.

Remarks: *Munseyella minima* is distinguished from the Lower Tertiary *Munseyella huantraicoensis* Bertels, 1969b, p. 259, pl. 4, figs. 1a-b, 2a-b) by its less punctate intercostal surface.

Dimensions: Length 0.45 mm., height 0.24 mm., width 0.19 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 847, paratypes FCEN-LM nos. 848-849.

Family PROGONOCYOTHERIDAE Sylvester-Bradley, 1948
Subfamily PROTOCYTHERINAE Lubimová, 1955
Genus MOSAELEBERIS Deroo, 1966

***Mosaeleberis? argentinensis* Bertels**

Plate 6, figures 2-3

Mosaeleberis? argentinensis BERTELS, 1969, p. 272, pl. 2, fig. 3a-b.

Material: 9 carapaces, 7 valves.

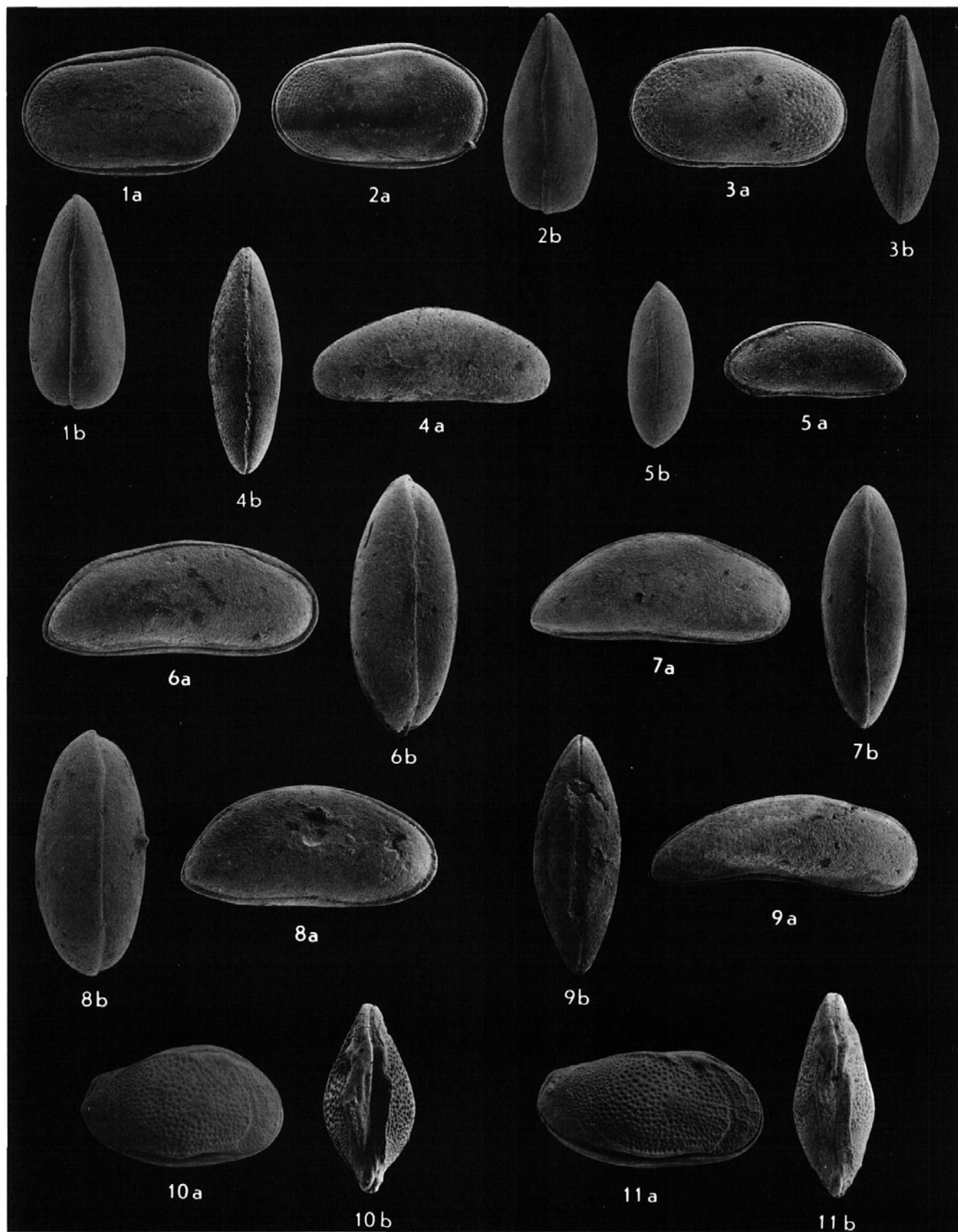
Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Levels: NCW-8 and NCW-9.

Description: Carapace of medium to large size, thick; female carapace in lateral view subquadrangular; dorsal

PLATE 1

- 1 *Cytherella utilis* Bertels
FCEN-LM no. 708, x 50; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 2 *Cytherella terminopunctata* Holden
FCEN-LM no. 713, x 50; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 3 *Cytherella terminopunctata* Holden
FCEN-LM no. 714, x 50; a, male carapace, left lateral view; b, male carapace, dorsal view.
- 4 *Bythocypris?* sp. 1
FCEN-LM no. 716, x 50; a, carapace, lateral view; b, carapace, dorsal view.
- 5 *Bythocypris? jaguelensis* Bertels, n. sp.
Holotype, FCEN-LM no. 717, x 60; a, carapace, left lateral view; b, carapace, dorsal view.
- 6 *Paracypris* sp. 1
FCEN-LM no. 719, x 50; a, carapace, right lateral view; b, carapace, dorsal view.
- 7 *Paracypris* sp. 2
FCEN-LM no. 721, x 50; a, carapace, right lateral view; b, carapace, dorsal view.
- 8 *Paracypris jaguelensis* Bertels, n. sp.
Holotype, FCEN-LM no. 723, x 50; a, carapace, right lateral view; b, carapace, dorsal view.
- 9 *Paracypris* sp. aff. *P. gracilis* (Bosquet)
FCEN-LM no. 725, x 50; a, carapace, right lateral view; b, carapace, dorsal view.
- 10 *Togoina cretacea* Bertels, n. sp.
Holotype, FCEN-LM no. 610, x 50; a, female carapace, right lateral view; b, female carapace, dorsal view.
- 11 *Togoina cretacea* Bertels, n. sp.
Paratype, FCEN-LM no. 726, x 50; a, male carapace, right lateral view; b, male carapace, dorsal view.



margin slightly convex; ventral margin almost straight; anterior margin slightly obliquely rounded; posterior margin with an upper slightly concave part and a lower obliquely rounded part which is continuation of ventral margin; greatest height at anterior cardinal angle. In dorsal view carapace ovoid with maximum width at approximately one-third of length from posterior end; left valve larger than right which it overlaps at cardinal angles and along ventral margin. Surface of valves having three longitudinal thickenings or slight elevations which are located along dorsal margin, in middle posterior region and parallel to ventral margin; surface also covered by a reticulation with a concentric pattern around sub-central node and parallel to periphery in posterior region. Marginal denticles present anteriorly and posteriorly.

Eye tubercle small; eye sinus present. Subcentral node present, although not prominent. Duplicature moderately wide; vestibules absent; marginal zone with 32–35 pore

canals that are somewhat curved; selvage peripheral. Hinge holamphidont, with an anterior triangular element and anteromedian element of left valve sharply directed toward anterior region. Muscle-scar pattern composed of four adductor-muscle scars in a vertical row and one cordiform frontal scar.

Sexual dimorphism present.

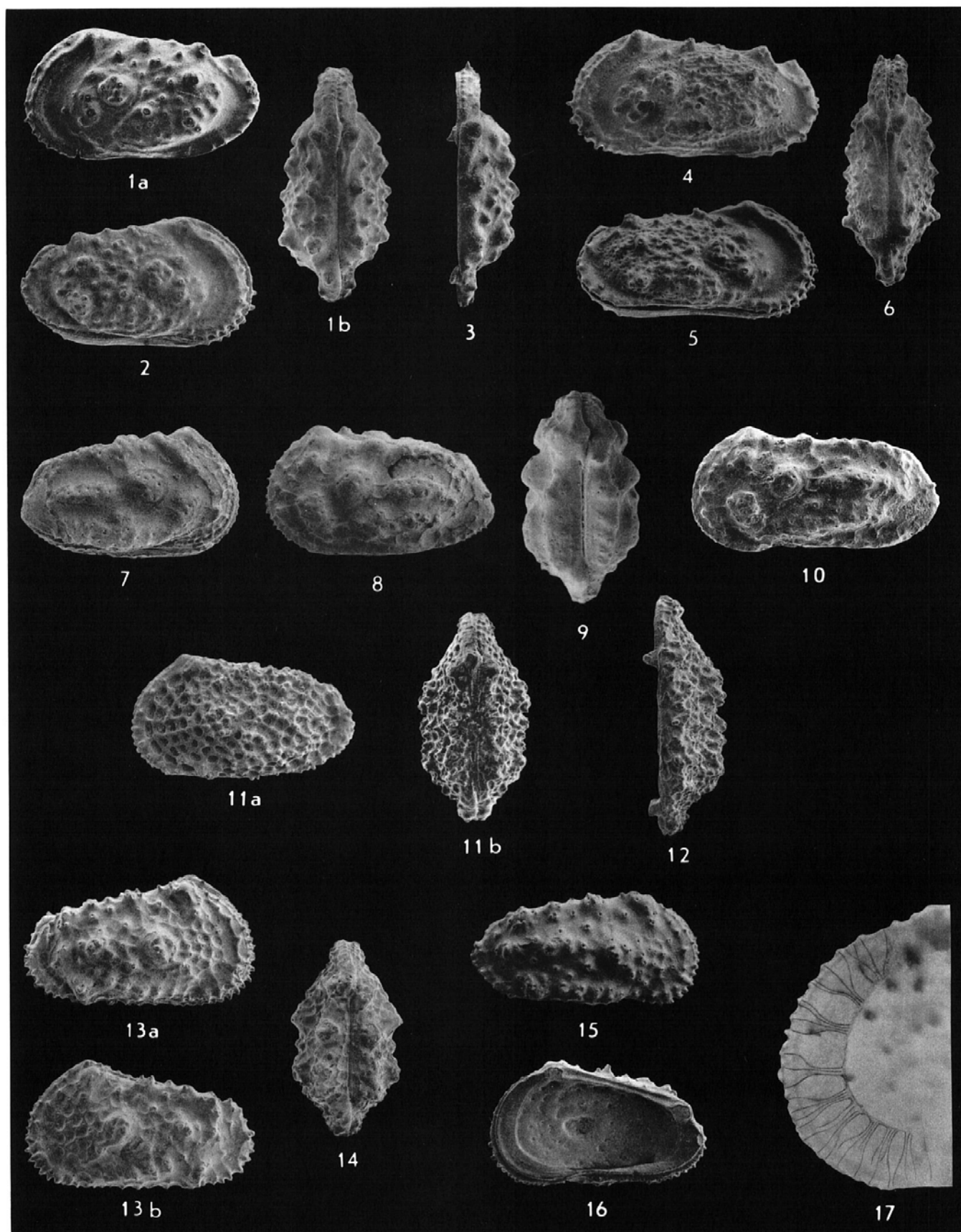
Remarks: *Mosaeleberis? argentinensis* presents only external affinities to *Mosaeleberis interrupta* (Bosquet), described by Deroo (1966, p. 128, pl. 18, figs. 488–498) from the type Maastrichtian of Holland. They differ in outline details and in the hinge, which in *M. interrupta* is paramphidont.

This species is only questionably included in *Mosaeleberis*, since it can not be placed in any other known genus.

Dimensions: Length 0.91 mm., height 0.56 mm., width 0.44 mm.

PLATE 2

- 1 *Trachyleberis noviprinceps* Bertels, n. sp.
Holotype, FCEN-LM no. 731, x 50; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 2 *Trachyleberis noviprinceps* Bertels, n. sp.
Paratype, FCEN-LM no. 732, x 50; female carapace, right lateral view.
- 3 *Trachyleberis noviprinceps* Bertels, n. sp.
Paratype, FCEN-LM no. 733, x 50; female right valve in dorsal view showing hinge structure.
- 4 *Trachyleberis noviprinceps* Bertels, n. sp.
Paratype, FCEN-LM no. 605, x 50; male carapace, left lateral view.
- 5 *Trachyleberis noviprinceps* Bertels, n. sp.
Paratype, FCEN-LM no. 734, x 50; male carapace, right lateral view.
- 6 *Trachyleberis noviprinceps* Bertels, n. sp.
Paratype, FCEN-LM no. 735, x 50; male carapace, dorsal view.
- 7 *Actinocythereis tuberculata* Bertels, n. sp.
Holotype, FCEN-LM no. 737, x 60; female carapace, right lateral view.
- 8 *Actinocythereis tuberculata* Bertels, n. sp.
Paratype, FCEN-LM no. 606, x 60; female carapace, left lateral view.
- 9 *Actinocythereis tuberculata* Bertels, n. sp.
Paratype, FCEN-LM no. 607, x 60; female carapace, dorsal view.
- 10 *Actinocythereis tuberculata* Bertels, n. sp.
Paratype, FCEN-LM no. 738, x 60; male carapace, left lateral view.
- 11 *Acanthocythereis abundans* (Bertels)
FCEN-LM no. 743, x 60; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 12 *Acanthocythereis abundans* (Bertels)
FCEN-LM no. 744, x 70; right valve in dorsal view showing hinge structure.
- 13 *Cythereis? rionegrensis* Bertels, n. sp.
Holotype, FCEN-LM no. 749, x 50; a, female carapace, right lateral view; b, female carapace, left lateral view.
- 14 *Cythereis? rionegrensis* Bertels, n. sp.
Paratype, FCEN-LM no. 750, x 50; female carapace, dorsal view.
- 15 *Cythereis? rionegrensis* Bertels, n. sp.
Paratype, FCEN-LM no. 751, x 50; male right valve, lateral view.
- 16 *Cythereis? rionegrensis* Bertels, n. sp.
Paratype, FCEN-LM no. 752, x 50; female right valve, internal view.
- 17 *Cythereis? rionegrensis* Bertels, n. sp.
Paratype, FCEN-LM no. 753, x 115; anterior portion of calcified inner lamella of right valve.



Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, and upper beds of upper member of Huantrai-co Formation, Huantrai-co, Neuquén Province, Argentina.

Repository: Figured material FCEN-LM nos. 850–851, other material FCEN-LM nos. 852–853.

Subfamily PROGONOCYTHERINAE Sylvester-Bradley, 1948
Genus TUMIDOLEBERIS Deroo, 1966

***Tumidoleberis australis* Bertels, n. sp.**
Plate 6, figures 4–5, 6a–b

Etymology: Latin *australis* = austral, southern.

Holotype: Female carapace.

Paratypes: 3 carapaces, 2 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-7.

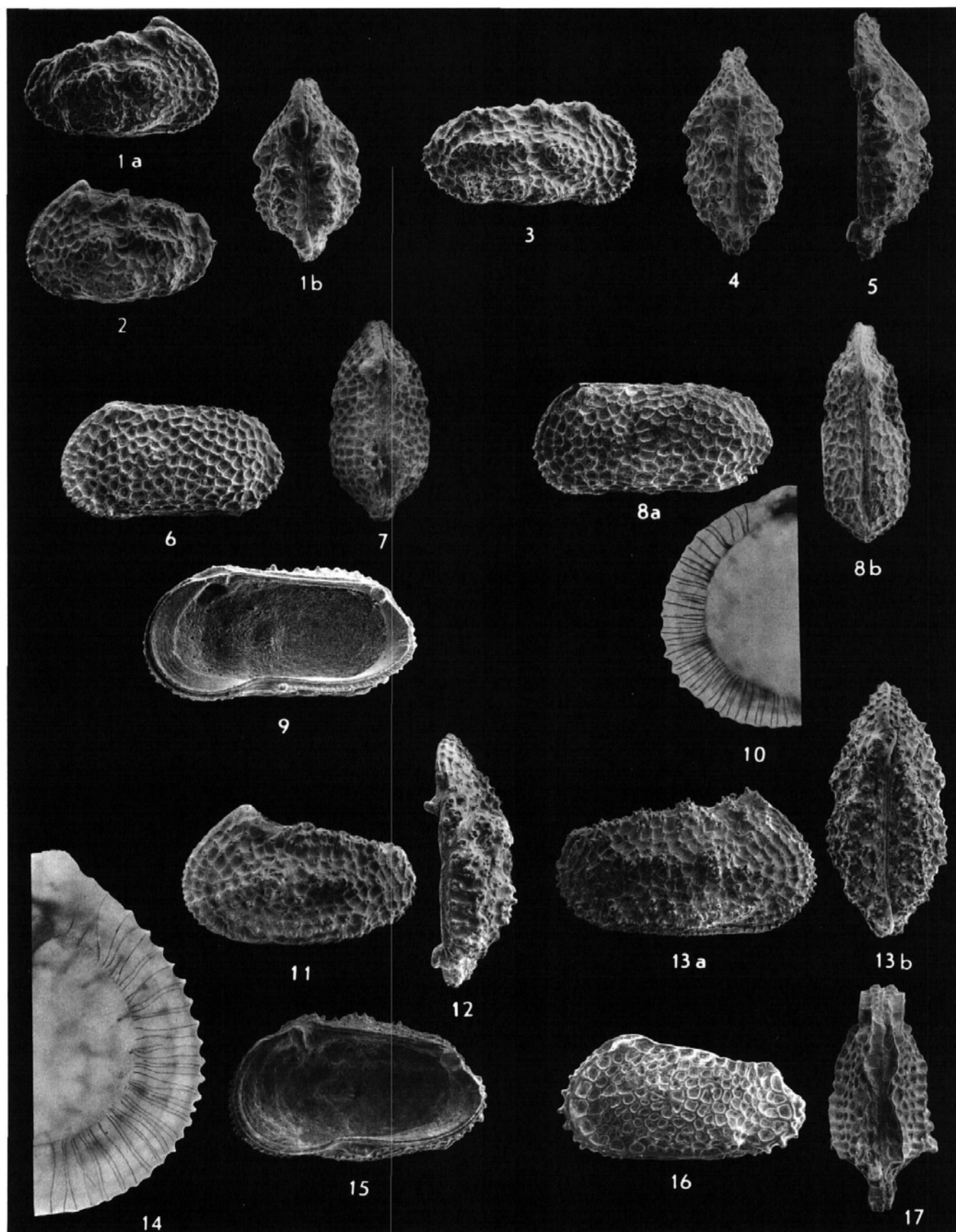
Diagnosis: *Tumidoleberis* with rows of pits radiating from near anterior cardinal angle, and becoming subconcentric and subparallel to free border.

Description: Carapace in lateral view subtrapezoidal; anterior border obliquely rounded; posterior extremity rounded; greatest height at anterior cardinal angle; dorsal margin almost straight; ventral margin convex. In dorsal view carapace subelliptical; greatest width somewhat behind middle of carapace; valves broadening markedly toward ventral region, which in this view is wide and concave.

Ornamentation consisting of rows of very deep pits arranged subconcentrically and subparallel to the periphery around the free margin, and radiating mostly from a point near the anterior cardinal angle. Flange of right valve provided with 18–20 small denticles, more developed in right valve, almost absent in left valve.

PLATE 3

- 1 *Cythereis? incerta* Bertels, n. sp.
Holotype, FCEN-LM no. 758, x 60; a, female carapace, right lateral view; b, female carapace, dorsal view.
- 2 *Cythereis? incerta* Bertels, n. sp.
Paratype, FCEN-LM no. 759, x 60; female carapace, left lateral view.
- 3 *Cythereis? incerta* Bertels, n. sp.
Paratype, FCEN-LM no. 760, x 60; male right valve, lateral view.
- 4 *Cythereis? incerta* Bertels, n. sp.
Paratype, FCEN-LM no. 761, x 60; male carapace, dorsal view.
- 5 *Cythereis? incerta* Bertels, n. sp.
Paratype, FCEN-LM no. 762, x 80; right valve in dorsal view showing hinge structure.
- 6 *Cythereis? excellens* Bertels
FCEN-LM no. 600, x 60; female carapace, left lateral view.
- 7 *Cythereis? excellens* Bertels
FCEN-LM no. 601, x 60; female carapace, dorsal view.
- 8 *Cythereis? excellens* Bertels
FCEN-LM no. 768, x 60; a, male carapace, left lateral view; b, male carapace, dorsal view.
- 9 *Cythereis? excellens* Bertels
FCEN-LM no. 769, x 70; male right valve, internal view.
- 10 *Cythereis? excellens* Bertels
FCEN-LM no. 772, x 130; anterior part of calcified inner lamella of right valve.
- 11 *Henryhowella splendida* Bertels, n. sp.
Holotype, FCEN-LM no. 773, x 40; female left valve, lateral view.
- 12 *Henryhowella splendida* Bertels, n. sp.
Paratype, FCEN-LM no. 774, x 50; female right valve in dorsal view showing hinge structure.
- 13 *Henryhowella splendida* Bertels, n. sp.
Paratype, FCEN-LM no. 775, x 40; a, male carapace, right lateral view; b, male carapace, dorsal view.
- 14 *Henryhowella splendida* Bertels, n. sp.
Paratype, FCEN-LM no. 779, x 115; anterior part of calcified inner lamella of left valve.
- 15 *Henryhowella splendida* Bertels, n. sp.
Paratype, FCEN-LM no. 778, x 50; female right valve, internal view.
- 16 *Protocosta spinosa* Bertels, n. sp.
Holotype, FCEN-LM no. 604, x 60; female carapace, left lateral view.
- 17 *Protocosta spinosa* Bertels, n. sp.
Paratype, FCEN-LM no. 781, x 60; female carapace, dorsal view.



Eye tubercle and eye sinus absent. Subcentral node absent. Hinge antimerodont to hemimerodont; right valve with anterior and posterior positive hinge elements elongate and with crenulations (5 anteriorly and 6 posteriorly); median hinge element of same valve consisting of a crenulate anteromedian socket and a crenulate groove; hinge elements of left valve complementary to those of right valve; anteromedian hinge element of left valve composed of two toothlets which continue in a posteromedian crenulate bar with its larger toothlets following those of anteromedian element. Inner lamellae moderately wide; fusion line and inner margin not coincident, enclosing an anterior vestibule; marginal zone traversed by 23–25 marginal pore canals, mostly straight and simple, with some anterodorsal ones curved. Muscle-scar pattern composed of a row of four adductor-muscle scars and one simple, rounded frontal scar. Sexual dimorphism weak but present.

Remarks: *Tumidoleberis australis* differs slightly in hinge structure from the original description of the genus, which mentions a median element in which the diminution of the size of the denticles is progressive; whereas in the Argentine species the median element of the left valve tends to subdivide into an anteromedian with two toothlets and a posteromedian in which the toothlets diminish in size toward the posterior end.

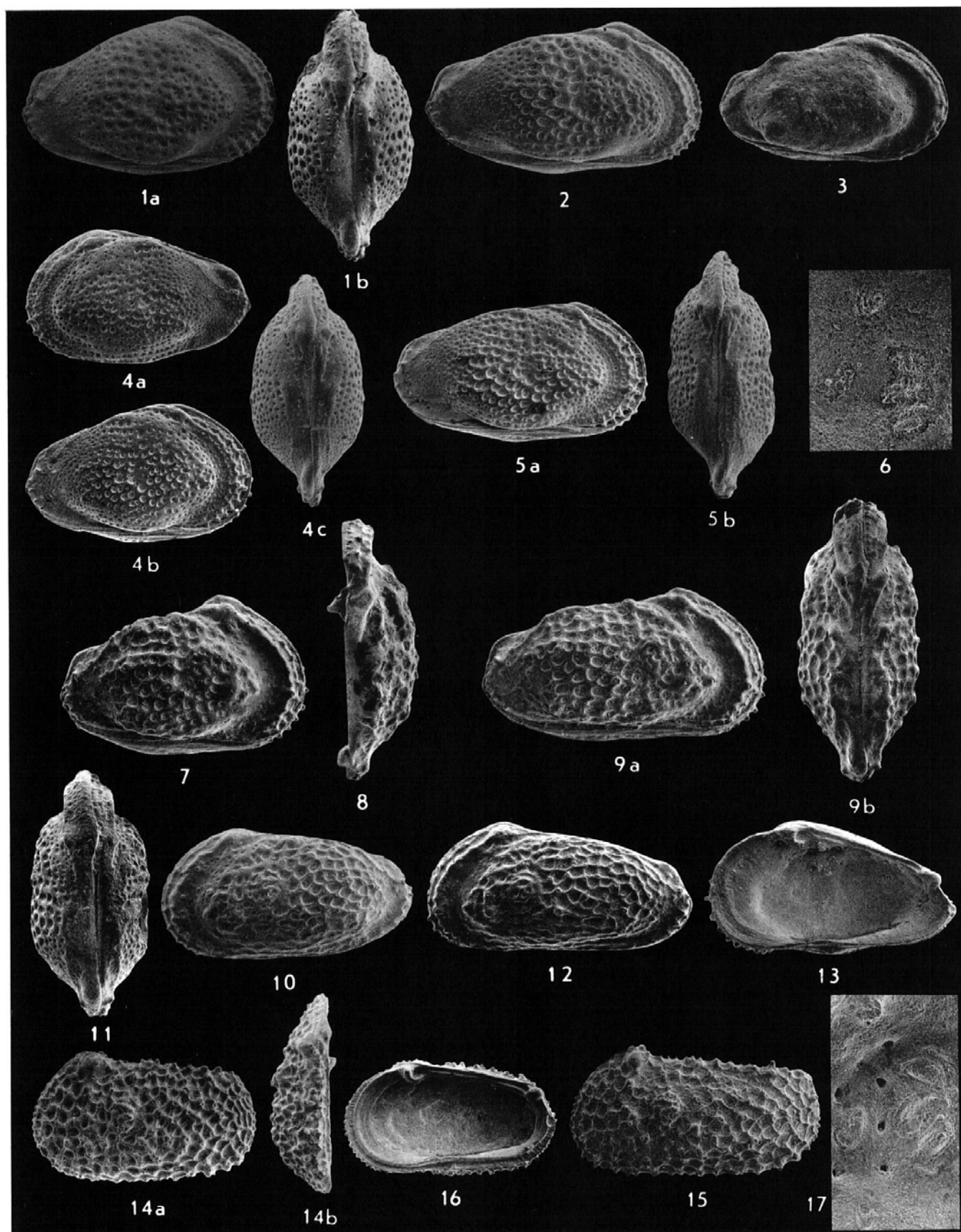
Tumidoleberis australis shows some similarities to *Tumidoleberis laevis* Deroo, 1966, from the type Maastrichtian (Deroo, 1966, p. 126, pl. 17, figs. 475–480), from which it differs especially by the clear reticulation pattern, in its arrangement, and in details of the outline.

Dimensions: Length 0.87 mm., height 0.60 mm., width 0.51 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

PLATE 4

- 1 *Veenia (Nigeria) punctata* Bertels
FCEN-LM no. 609, x 50; a, female carapace, right lateral view; b, female carapace, dorsal view.
- 2 *Veenia (Nigeria) punctata* Bertels
FCEN-LM no. 783, x 50; male carapace, right lateral view.
- 3 *Veenia (Nigeria) inornata* Bertels, n. sp.
Holotype, FCEN-LM no. 787, x 50; female carapace, right lateral view.
- 4 *Veenia (Nigeria) jaguelensis* Bertels, n. sp.
Holotype, FCEN-LM no. 789, x 50; a, female carapace, left lateral view; b, female carapace, right lateral view; c, female carapace, dorsal view.
- 5 *Veenia (Nigeria) jaguelensis* Bertels, n. sp.
Paratype, FCEN-LM no. 790, x 50; a, male carapace, right lateral view; b, male carapace, dorsal view.
- 6 *Veenia (Nigeria) jaguelensis* Bertels, n. sp.
Paratype, FCEN-LM no. 791, x 200; female right valve, muscle-scar pattern.
- 7 *Veenia (Nigeria) tumida* Bertels, n. sp.
Holotype, FCEN-LM no. 794, x 50; female carapace, right lateral view.
- 8 *Veenia (Nigeria) tumida* Bertels, n. sp.
Paratype, FCEN-LM no. 795, x 60; female right valve, dorsal view showing hinge structure.
- 9 *Veenia (Nigeria) tumida* Bertels, n. sp.
Paratype, FCEN-LM no. 796, x 50; a, male carapace, right lateral view; b, male carapace, dorsal view.
- 10 *Veenia (Nigeria) argentinensis* Bertels, n. sp.
Holotype, FCEN-LM no. 799, x 50; female carapace, left lateral view.
- 11 *Veenia (Nigeria) argentinensis* Bertels, n. sp.
Paratype, FCEN-LM no. 800, x 50; female carapace, dorsal view.
- 12 *Veenia (Nigeria) argentinensis* Bertels, n. sp.
Paratype, FCEN-LM no. 801, x 50; male carapace, left lateral view.
- 13 *Veenia (Nigeria) argentinensis* Bertels, n. sp.
Paratype, FCEN-LM no. 803, x 50; female right valve, internal view.
- 14 *Wichmannella magna* Bertels, n. sp.
Holotype, FCEN-LM no. 804, x 50; a, female left valve, lateral view; b, female left valve, dorsal view showing hinge structure.
- 15 *Wichmannella magna* Bertels, n. sp.
Paratype, FCEN-LM no. 805, x 50; male left valve, lateral view.
- 16 *Wichmannella magna* Bertels, n. sp.
Paratype, FCEN-LM no. 806, x 50; female right valve, internal view.
- 17 *Wichmannella magna* Bertels, n. sp.
Paratype, FCEN-LM no. 807, x 200; right valve, muscle-scar pattern.



Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 854, paratypes FCEN-LM nos. 855-858.

Genus SPHAEROLEBERIS Deroy, 1966

***Sphaeroleberis? abnormis* Bertels, n. sp.**

Plate 6, figures 7a-b, 8-9

Etymology: Latin *abnormis* = abnormal, irregular.

Holotype: Carapace.

Paratypes: 5 carapaces, 7 valves (NCW-8 and NCW-9).

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

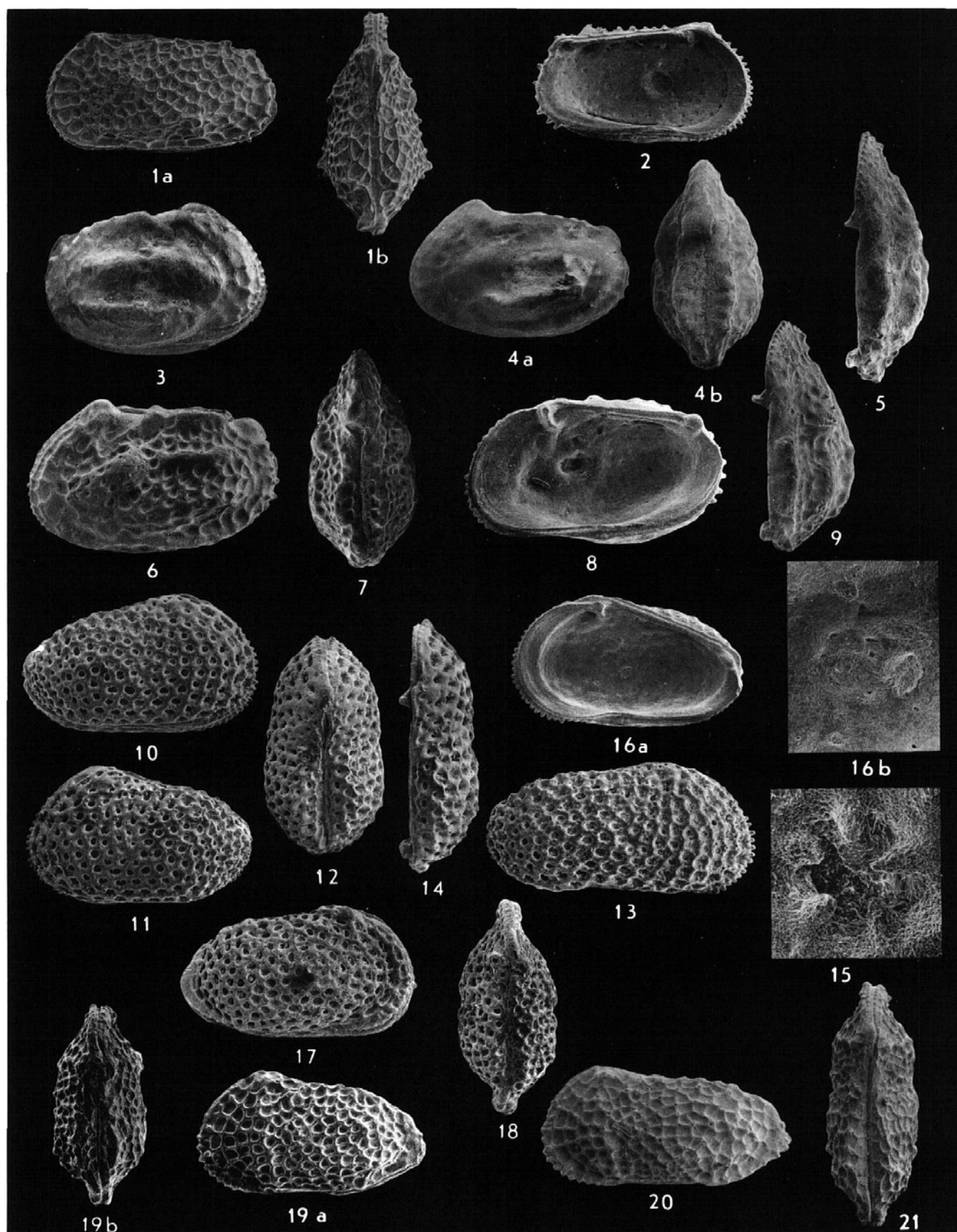
Type level: NCW-8.

Diagnosis: *Sphaeroleberis?* with concentrically arranged ornamentation and reversed overlap.

Description: Carapace of median to large size, in lateral view subovoid; dorsal margin convex; ventral margin convex; anterior margin obliquely rounded; posterior margin rounded and subacuminate; greatest height somewhat anterior to middle of carapace, at anterior cardinal angle; in dorsal view carapace subovoid; maximum width at middle of carapace.

PLATE 5

- 1 *Bradleya? argentinensis* Bertels, n. sp.
Holotype, FCEN-LM no. 812, x 50; a, carapace, left lateral view; b, carapace, dorsal view.
- 2 *Bradleya? argentinensis* Bertels, n. sp.
Paratype, FCEN-LM no. 813, x 50; left valve, internal view.
- 3 *Bradleya? patagonica* Bertels, n. sp.
Holotype, FCEN-LM no. 815, x 50; carapace, right lateral view.
- 4 *Bradleya? patagonica* Bertels, n. sp.
Paratype, FCEN-LM no. 816, x 60; a, carapace, left lateral view; b, carapace, dorsal view.
- 5 *Bradleya? patagonica* Bertels, n. sp.
Paratype, FCEN-LM no. 817, x 70; right valve, dorsal view showing hinge structure.
- 6 *Bradleya? attilai* Bertels, n. sp.
Holotype, FCEN-LM no. 821, x 60; carapace, left lateral view.
- 7 *Bradleya? attilai* Bertels, n. sp.
Paratype, FCEN-LM no. 822, x 60; carapace, dorsal view.
- 8 *Bradleya? attilai* Bertels, n. sp.
Paratype, FCEN-LM no. 827, x 60; right valve, internal view.
- 9 *Bradleya? attilai* Bertels, n. sp.
Paratype, FCEN-LM no. 823, x 60; right valve, dorsal view showing hinge structure.
- 10 *Anticythereis venusta* Bertels, n. sp.
Holotype, FCEN-LM no. 608, x 60; female carapace, right lateral view.
- 11 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 828, x 60; female carapace, left lateral view.
- 12 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 829, x 60; female carapace, dorsal view.
- 13 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 830, x 60; male right valve, lateral view.
- 14 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 831, x 70; female right valve, dorsal view showing hinge structure.
- 15 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 833, x 750; details of the five triangular plates which partially cover each of the pits of the ornamentation.
- 16 *Anticythereis venusta* Bertels, n. sp.
Paratype, FCEN-LM no. 837; a, female right valve, internal view, x 60; b, muscle-scar pattern, x 200.
- 17 *Anticythereis arcana* Bertels, n. sp.
Holotype, FCEN-LM no. 838, x 60; female carapace, right lateral view.
- 18 *Anticythereis arcana* Bertels, n. sp.
Paratype, FCEN-LM no. 839, x 60; female carapace, dorsal view.
- 19 *Anticythereis? attenuata* Bertels, n. sp.
Holotype, FCEN-LM no. 842, x 60; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 20 *Anticythereis? attenuata* Bertels, n. sp.
Paratype, FCEN-LM no. 843, x 60; male carapace, left lateral view.
- 21 *Anticythereis? attenuata* Bertels, n. sp.
Paratype, FCEN-LM no. 844, x 60; male carapace, dorsal view.



Valves bearing concentrically arranged rows of pits, which are of larger size in middle and posterior regions.

Eye tubercle and subcentral node absent. Inner lamella of moderate width; selvage slightly removed from periphery. Hinge antimerodont with two crenulate terminal sockets (8 crenulae in anterior socket and 7 in posterior socket) and a faintly crenulate median bar in right valve; left valve with hinge elements complementary to those of right. Other features not observed.

Remarks: This form is included questionably in *Sphaeroleberis* regardless of its reversed overlap. This feature distinguishes it from all other Progonocytheridae. The general outline, sculpture and hinge structure may allow relating the Argentine species with the group of *Sphaeroleberis mosaensis* Deroo, 1966 (p. 125, pl. 17, figs. 442–448), from which it differs mainly by the reversed overlap and the more markedly concentrically pitted surface ornamentation.

Dimensions: Length 0.94 mm., height 0.54 mm., width 0.60 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of the upper member of the Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 859, paratypes FCEN-LM nos. 860–862.

Family CYTHERURIDAE G. W. Müller, 1894
Genus CYTHEROPTERON Sars, 1866

Cytheropteron sp.

Plate 6, figure 10a–b

Material: 1 carapace.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

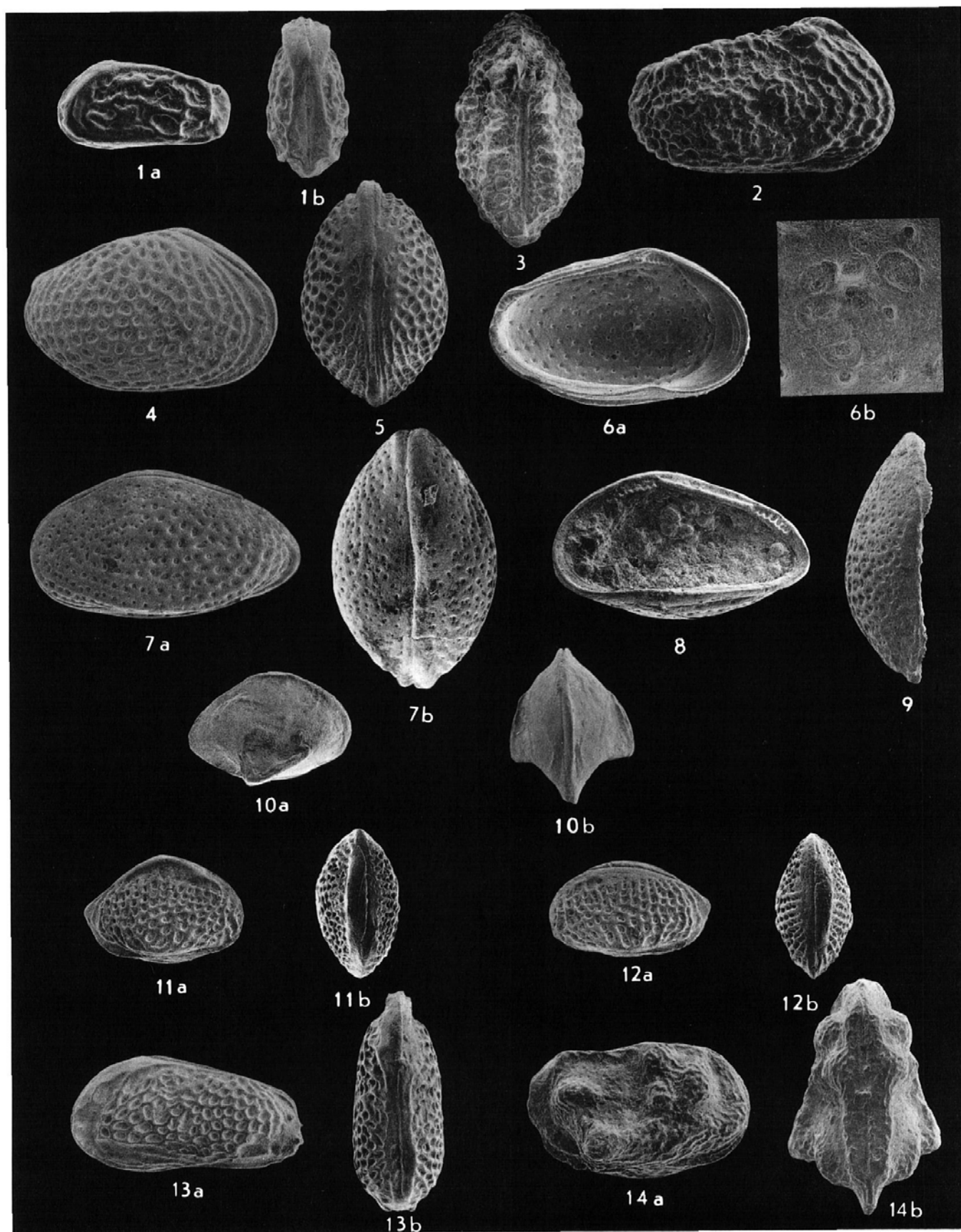
Level: RS-1.

Description: Carapace small, in lateral view subovoid; dorsal and ventral margins convex; valves alate ventrally; anterior margin obliquely rounded anterodorsally; posterior end caudate below middle; greatest height at middle of carapace; in dorsal view carapace rhomboidal, alate ventrally with greatest width behind middle. Surface smooth. Other features not observed.

Remarks: *Cytheropteron* sp. shows some similarities to *Cytheropteron harrisi* Skinner, 1956, from the Maastrichtian Arkadelphia Marl of Arkansas (Skinner, 1956, p. 201, pl. 4, fig. 7), from which it differs by its less pointed posterior extremity.

PLATE 6

- 1 *Munseyella minima* Bertels, n. sp.
Holotype, FCEN-LM no. 847, x 70; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 2 *Mosaeleberis? argentinensis* Bertels
FCEN-LM no. 850, x 50; female carapace, right lateral view.
- 3 *Mosaeleberis? argentinensis* Bertels
FCEN-LM no. 851, x 50; female carapace, dorsal view.
- 4 *Tumidoleberis australis* Bertels, n. sp.
Holotype, FCEN-LM no. 854, x 50; female carapace, right lateral view.
- 5 *Tumidoleberis australis* Bertels, n. sp.
Paratype, FCEN-LM no. 855, x 50; female carapace, dorsal view.
- 6 *Tumidoleberis australis* Bertels, n. sp.
Paratype, FCEN-LM no. 856; a, left valve, internal view, x 50; b, left valve, muscle-scar pattern, x 200.
- 7 *Sphaeroleberis? abnormis* Bertels, n. sp.
Holotype, FCEN-LM no. 859, x 50; a, carapace, left lateral view; b, carapace, dorsal view.
- 8 *Sphaeroleberis? abnormis* Bertels, n. sp.
Paratype, FCEN-LM no. 860, x 50; right valve, internal view showing hinge structure.
- 9 *Sphaeroleberis? abnormis* Bertels, n. sp.
Paratype, FCEN-LM no. 861, x 50; left valve, dorsal view showing hinge structure.
- 10 *Cytheropteron* sp.
FCEN-LM no. 863, x 70; a, carapace, right lateral view; b, carapace, dorsal view.
- 11 *Hemicytherura rionegrensis* Bertels, n. sp.
Holotype, FCEN-LM no. 864, x 80; a, female carapace, right lateral view; b, female carapace, dorsal view.
- 12 *Hemicytherura rionegrensis* Bertels, n. sp.
Paratype, FCEN-LM no. 865, x 80; a, male carapace, left lateral view; b, male carapace, dorsal view.
- 13 *Cytheromorpha flexuosa* Bertels, n. sp.
Holotype, FCEN-LM no. 612, x 70; a, female carapace, left lateral view; b, female carapace, dorsal view.
- 14 *Amphicytherura? sp.*
FCEN-LM no. 869, x 70; a, carapace, right lateral view; b, carapace dorsal view.



Dimensions: Length 0.42 mm., height 0.29 mm., width 0.34 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of upper member of Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM no. 863.

Genus *Hemicytherura* Eofson, 1941

Hemicytherura rionegrensis Bertels, *n. sp.*

Plate 6, figures 11a-b, 12a-b

Etymology: From Río Negro Province, Argentina.

Holotype: Female carapace.

Paratypes: 2 carapaces, 1 valve.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: NCW-8.

Diagnosis: *Hemicytherura* with predominantly vertically arranged ribs between which are found aligned pits.

Description: Carapace small; female carapace in lateral view subsemicircular; dorsal margin convex; ventral margin sinuous; anterior margin rounded; posterior margin with a median caudal process; maximum height at middle of carapace. In dorsal view carapace subelliptical with acuminate extremities.

Valves ornamented by riblets, which are more markedly developed vertically, and between them, by pits, which become larger in ventral region. Hinge antimerodont. Other features not completely observed.

Sexual dimorphism marked; males lower, longer, narrower than females with caudal process relatively higher.

Remarks: In the literature there are many recorded species assigned to the genus *Hemicytherura*. Nevertheless, the Argentine species is differentiated from all in the available literature by the predominantly vertical pattern of the riblets and the arrangement of the pits.

Dimensions: Length 0.36 mm., height 0.25 mm., width 0.18 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of the upper member of the Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 864, paratypes FCEN-LM nos. 865-866.

Family LOXOCONCHIDAE Sars, 1925

Genus CYTHEROMORPHA Hirschmann, 1909

Cytheromorpha? flexuosa Bertels, *n. sp.*

Plate 6, figure 13a-b

Etymology: Latin *flexuosa* = flexuous, full of bends or curves, adaptable.

Holotype: Female carapace.

Paratypes: 39 carapaces, 2 valves.

Type locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Type level: RS-1.

Diagnosis: *Cytheromorpha?* with subtrapezoidal carapace, having a slight posteroventral expansion.

Description: Carapace of small size, elongate; dorsal margin straight; ventral margin concave; anterior margin obliquely rounded anterodorsally; posterior margin obliquely truncate and somewhat expanded posteroventrally; greatest height at anterior cardinal angle. In dorsal view carapace subrectangular with compressed anterior and posterior extremities; greatest width at one-fourth of length from posterior end.

Surface covered by a reticulation which does not reach margins and is arranged in a pattern parallel to periphery along anterior and posterior margins, but has a random arrangement on rest of surface; along dorsal region, small oblique sulci, the reticulum following their distribution; two spines present in posteroventral region and one in posterodorsal region; marginal rib faintly developed.

Eye tubercle and subcentral node absent. Hinge lophodont or faintly crenulate antimerodont; impossible to distinguish which correctly in only two separated valves present in material. Inner lamellae wide; marginal pore canals and muscle-scar pattern not observed.

Sexual dimorphism present; males longer and narrower posteriorly than females.

Remarks: This new species shows affinities to many forms of the genus *Cytheromorpha*. However, *Cytheromorpha* s. s. appeared first in the Oligocene. In the literature have been mentioned many species that occurred before this epoch, and this suggests that a revision of the pre-Oligocene species is needed.

Dimensions: Length 0.60 mm., height 0.31 mm., width 0.22 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of the upper member of the Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: Holotype FCEN-LM no. 612, paratypes FCEN-LM nos. 867-868.

Family SCHIZOCYOTHERIDAE Howe, 1961
Genus AMPHICYTHERURA Butler and Jones, 1957

***Amphicytherura* ? sp.**

Plate 6, figure 14a-b

Material: 1 carapace.

Locality: 5 km. N. of Fortín General Roca, Río Negro Province, Argentina.

Level: NCW-8.

Description: Carapace of small size, subelliptical in lateral view; dorsal margin sinuous; ventral margin convex; anterior margin rounded; posterior margin caudate above middle; maximum height extending along middle of carapace; in dorsal view carapace rhomboidal; greatest width posterior to middle, corresponding to maximum of ventral alate expansions.

Valves with large, probably hollow tubercles, three in anterodorsal region, one in posterior region and one in posteroventral region; surface entirely covered by small pits except along posterior margin. Other features not observed.

Remarks: This single carapace is placed with question in the genus *Amphicytherura*, although its internal features have not been observed accurately, which may originate some doubts about the taxonomic position. The alar expansion would agree with the determination of this genus, although some species of *Eucytherura* with this same feature are also recorded (see Howe and Laurencich, 1958).

Dimensions: Length 0.56 mm., height 0.35 mm., width 0.40 mm.

Age: Upper Jagüelian Substage (middle Maastrichtian).

Distribution: Upper beds of the upper member of the Jagüel Formation, Fortín General Roca area, Río Negro Province, Argentina.

Repository: FCEN-LM no. 869.

ACKNOWLEDGMENTS

The author wishes to express her gratitude to Dr. Horacio J. Harrington, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Buenos Aires, Argentina, who generously provided valuable help in the translation of the manuscript into English and made many interesting critical comments on the manuscript.

I am also indebted to Dr. Erich Triebel, Senckenberg Museum, Frankfurt am Main, West Germany; Dr. Joseph E. Hazel, United States Geological Survey, Washington, D. C.; and Dr. V. Apostolescu and Dr. Gerard Deroo, Institut Français du Pétrole, Paris, France; who have generously provided comparative material, pertinent publications and interesting suggestions.

The author wishes to express gratitude to the Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, and to the Consejo Nacional de Investigaciones Científicas y Técnicas for financial support in the realization of the present work. The last-mentioned institution generously provided the use of the Jeolco JSM-U3 scanning electron microscope with which the micrographs were taken. Particular thanks are expressed to Mr. Natalio de Vincenzo, whose careful work was responsible for the excellent micrographic results.

REFERENCES

APOSTOLESCU, V.

1961 *Contribution a l'étude paléontologique (ostracodes) et stratigraphique des bassins crétacés et tertiaires de l'Afrique Occidentale*. Rev. Inst. Français Pétrole et Ann. Comb. Liquides, vol. 16, no. 7-8, pp. 779-867, pls. 1-18, tables 1-5, map.

1963 *Essai de zonation par les ostracodes dans le Crétacé du Bassin du Sénégal*. Rev. Inst. Français Pétrole et Ann. Comb. Liquides, vol. 18, no. 12, pp. 1675-1694, pls. 1-6, tables 1-2.

BANDY, O. L.

1967 *Cretaceous planktonic foraminiferal zonation*. Micropaleontology, vol. 13, no. 1, pp. 1-31, text-figs. 1-13, table 1.

BENSON, R. H., and TATRO, J. C.

1964 *Faunal description of Ostracoda of the Marlbrook Marl (Campanian), Arkansas*. Kansas, Univ., Pal. Contr., Arthropoda, art. 7, pp. 1-32, pls. 1-6, text-figs. 1-15.

BERTELS, ALWINE

1968 *Micropaleontología y estratigrafía del límite Cretácico-Terciario en Huantrai-co (Provincia de Neuquén)*. Ostracoda. Parte I: Cytherellidae, Bairdiidae, Pontocypridinae, Buntoniinae y Trachyleberidinae (pro parte). Ameghiniana, vol. 5, no. 8, pp. 279-295, pls. 1-3, text-figs. 1-2.

1969a *"Rocaleberidinae", nueva subfamilia (Ostracoda, Crustacea) del límite Cretácico-Terciario de Patagonia septentrional (Argentina)*. Ameghiniana, vol. 6, no. 2, pp. 146-171, pls. 1-5.

1969b *Micropaleontología y estratigrafía del límite Cretácico-Terciario en Huantrai-co (Provincia de Neuquén)*. Ostracoda. Parte II: Paracypridinae, Cytherinae, Trachyleberidinae, Pterygocythereidinae, Protocytherinae, Rocaleberidinae, Thaerocytherinae, Cytherideinae, Cytherurinae, Bythocytherinae. Ameghiniana, vol. 6, no. 4, pp. 253-290, pls. 1-9, tables 1-2.

1970 *Los foraminíferos planctónicos de la cuenca Cretácico-Terciaria en Patagonia septentrional (Argentina), con consideraciones sobre la estratigrafía de Fortín General Roca (Provincia de Río Negro)*. Ameghiniana, vol. 7, no. 1, pp. 1-56, pls. 1-9, text-figs. 1-10, tables 1-2.

1973 *Ostracodes of the type locality of the Lower Tertiary (lower Danian) Rocanian Stage and Roca Formation (Argentina)*. Micropaleontology, vol. 19, no. 3, pp. 308-340, pls. 1-5, text-figs. 1-3, tables 1-2.

- 1975 *Upper Cretaceous (lower Maastrichtian?) ostracodes of Argentina*. Micropaleontology, vol. 20, no. 4, pp. 385-397, pls. 1-2.
- BOLTOVSKOY, E.
- 1968 *Hidrología de las aguas superficiales en la parte occidental del Atlántico Sur*. Mus. Argentino Cienc. Nat. "Bernardino Rivadavia", Rev. Hidrobiología, vol. 2, no. 6, pp. 199-224, text-figs. 1-2, tables 1-2.
- BOSQUET, J.
- 1854 *Les crustacés fossiles du terrain crétacé du Limbourg*. Nederland, Comm. Geol. Besch. Kaart, Verh., vol. 2, pt. 1, pp. 1-138, pls. 1-10.
- DEROO, G.
- 1962 *Mauritsinae, nouvelle sous-famille de Cytheridae (ostracodes) dans le Crétacé supérieur de la région de Maastricht, Pays-Bas*. Rev. Micropal., vol. 4, no. 4, pp. 203-210, pls. 1-2.
 - 1966 *Cytheracea (ostracodes) du Maastrichtien de Maastricht (Pays-Bas) et des régions voisines; résultats stratigraphiques et paléontologiques de leur étude*. Netherlands, Geol. Stichting, Meded., ser. C, vol. 2, no. 2, pp. 1-197, pls. 1-27, tables 1-9.
- DINGLE, R. V.
- 1969 *Upper Senonian ostracods from the coast of Pondoland, South Africa*. Roy. Soc. South Africa, Trans., vol. 38, pt. 4, pp. 347-385, text-figs. 1-21.
- HAZEL, J. E.
- 1967 *Classification and distribution of the Recent Hemicytheridae and Trachyleberididae (Ostracoda) off northeastern North America*. U. S. Geol. Survey, Prof. Paper, no 564, pp. 1-49, pls. 1-11, text-figs. 1-2, table 1.
 - 1968 *Ostracodes from the Brightseat Formation (Danian) of Maryland*. Jour. Pal., vol. 42, no. 1, pp. 100-142, pls. 21-26, text-figs. 1-17.
- HOLDEN, J. C.
- 1964 *Upper Cretaceous ostracods from California*. Palaeontology, vol. 7, pt. 3, pp. 393-429, text-figs. 1-28.
- HORNIBROOK, N. DE B.
- 1952 *Tertiary and Recent marine Ostracoda of New Zealand. Their origin, affinities and distribution*. New Zealand, Geol. Survey, Pal. Bull., no. 18, pp. 1-82, pls. 1-18, text-figs. 1-4, tables 1-3.
- HOWE, H. V., and LAURENCICH, LAURA
- 1958 *Introduction to the study of Cretaceous Ostracoda*. Baton Rouge: Louisiana State Univ. Press, pp. 1-536, text-figs.
- MOORE, R. C., ED.
- 1961 *Treatise on invertebrate paleontology, Part Q, Arthropoda 3, Ostracoda*. New York: Geol. Soc. America, pp. Q1-Q442, text-figs. 1-334.
- MORKHOVEN, F. P. C. M. VAN
- 1962 *Post-Palaeozoic Ostracoda. Their morphology, taxonomy and economic use. Vol. I*. Amsterdam: Elsevier Publishing Co., pp. 1-204, text-figs. 1-79.
 - 1963 *Post-Palaeozoic Ostracoda. Their morphology, taxonomy and economic use. Vol. II*. Amsterdam: Elsevier Publishing Co., pp. 1-478, text-figs. 1-763.
- PESSAGNO, E. A., JR.
- 1967 *Upper Cretaceous planktonic foraminifera from the western Gulf Coastal Plain*. Paleontogr. Amer., vol. 5, no. 37, pp. 243-445, pls. 48-101, text-figs. 1-63.
- REYMENT, R. A.
- 1960 *Studies on Nigerian Upper Cretaceous and Lower Tertiary Ostracoda. Part 1: Senonian and Maastrichtian Ostracoda*. Acta Univ. Stockholm., Stockholm Contr. Geol., vol. 7, pp. 1-238, pls. 1-23, text-figs. 1-71.
 - 1963 *Studies on Nigerian Upper Cretaceous and Lower Tertiary Ostracoda. Part 2: Danian, Paleocene and Eocene Ostracoda*. Acta Univ. Stockholm., Stockholm Contr. Geol., vol. 10, pp. 1-286, pls. 1-23, text-figs. 1-81.
- SKINNER, H. C.
- 1956 *Ostracoda from basal Arkadelphia Marl exposures near Hope, Arkansas*. Gulf Coast Assoc. Geol. Soc., Trans., vol. 6, pp. 179-204, pls. 1-4, tables 1-2.
- TRIEBEL, E.
- 1940 *Die Ostracoden der deutschen Kreide. III. Cytherideinae und Cytherinae aus der Unteren Kreide*. Senckenbergiana, vol. 22, no. 3/4, pp. 160-227, pls. 1-10, text-figs. 1-2.
- VEEN, J. E. VAN
- 1934 *Die Cypridae und Bairdiidae der Maastrichter Tuffkreide und des Kunrader Korallenkalkes von Sud-Limburg*. Natuurh. Maandblad, vol. 23, nos. 7-10, pp. 88-132, pls. 1-8.

Manuscript received April 25, 1973.