

THE LOST CETACEANS OF AMEGHINO: A REVIEW OF QUATERNARY MYSTICETES FROM THE ARGENTINE PAMPAS

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Abstract. Florentino Ameghino described in 1891 the new species *Balaena pampaea* and the new genus *Notiocetus*, with the new species *N. romerianus* and *N. platensis*. These taxa were based on isolated tympanic bullae coming from different Pleistocene fossiliferous localities of Buenos Aires Province, Argentina. However, since their original description, the specimens were considered lost, and subsequent authors were not able to review the specimens at first hand. Based on the descriptions and illustrations provided by Ameghino for *Balaena pampaea* and *Notiocetus romerianus* (*N. platensis* was very briefly described, but not illustrated), most authors considered them as valid taxa. The finding of the holotype specimens of *Balaena pampaea*, *Notiocetus romerianus*, and *N. platensis* allows to reevaluate the morphology and validity of these taxa. *Notiocetus platensis* is based on a partial bulla of an indeterminate mysticete. *Balaena pampaea* and *N. romerianus* are very similar to each other, and are re-identified as belonging to an indeterminate balaenid. Previously noted differences are most-likely the result of preservational artifacts or intraspecific variations. We also include brief comments on isolated bullae of other Pleistocene and Holocene mysticetes that were studied by Ameghino, but which remained unpublished up to the date. In this contribution we aim to highlight that paleontological collections preserve much more than samples of our planet’s past. Many of the preserved specimens have a value that goes beyond their biological value, since they have a cultural background that is part of the history of our discipline.

INTRODUCTION

Florentino Ameghino was deeply interested in cetaceans (Agnolín et al. 2023). He described several new species and several of his contribu-

tions were focused on these taxa (Ameghino 1883; 1889; 1891a,b; 1892; 1898; 1905; 1908). Particularly, he considered that cetaceans had clues to understand the origin of mammals because he regarded them as part of the earliest branching mammalian stock, together with monotremes and xenarthrans (Ameghino 1905; 1908).

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For the Argentine Pampas, Florentino Ameghino reported multiple extant cetacean species from Holocene coastal deposits (Ameghino 1889). He also described three new taxa of Pleistocene cetaceans from Argentina in two papers published in 1891. The new species *Balaena pampaea* Ameghino, 1889 and the new genus and species *Notiocetus romerianus* Ameghino, 1889 are based on relatively complete, but isolated, tympanic bullae from the Pampean Formation (Pleistocene) at the locality of Bahía Blanca, southern Buenos Aires Province, Argentina (Figs. 1, 2). Both specimens were lent to Ameghino by Commander Antonio Romero, who found the fossils rolled on the marine beach, and thus, lacking clear stratigraphical context. Both were described and figured (Ameghino 1891a), but diagnostic characters were not listed. In the case of *Notiocetus*, Ameghino (1891a; 1898) only indicated that it showed a combination of traits present in *Balaena*, *Megaptera*, and *Balaenoptera*. Otherwise, *B. pampaea* was later considered by him as closely related to the extant *Eubalaena australis* (Desmoulins 1822), and its Pleistocene age was questioned (Ameghino 1898).

Notiocetus platensis was later described by Ameghino (1891b) also based on an isolated bulla from Belgranian (Middle Pleistocene) deposits found during excavations made in the port of La Plata (now Ensenada city). In contrast to *B. pampaea* and *N. romerianus*, this species has a clear stratigraphical occurrence. It was described in a brief paragraph, lacking illustrations, and was distinguished from *N. romerianus* by its much smaller size and depressed bulla.

Apparently, these specimens were not available since Ameghino's original contributions, and thus, subsequent authors reviewed them relying only on the description and figures provided by him (Ameghino 1891a,b). Kellogg (1928) considered *Notiocetus* as a valid genus, but ascribed it to the lower Pliocene, a criterion shared by Palacky (1902). Later, Kellogg (1931) included *Notiocetus* among balaenopterids and cetotheriids and this interpretation was followed by Fordyce (1978), who indicated that the affinities of this taxon were still uncertain. Kellogg (1940) considered *N. romerianus*, *N. platensis*, and *B. pampaea* as valid taxa. Simpson (1945) left *Notiocetus* as a valid balaenopterid genus from the Pliocene, a criterion followed by Paula Couto (1979) and McKenna and Bell (1997), whereas Rusconi (1967) included it among cetotheriids.

Gondar (1966) sustained *Notiocetus* as a valid genus from lower Holocene (Querandí beds) deposits (probably a typographic mistake, since the species described by Ameghino comes from Pleistocene beds). She considered *Notiocetus* as closely related to the genus *Plesiocetus* within Balaenopteridae. Furthermore, Gondar regarded *B. pampaea* as from middle Pleistocene (Belgranian) beds and included it within the genus *Eubalaena*. She reproduced Ameghino's (1891a) figure of *N. romerianus* (Gondar 1966: plate LXI, fig. f).

As noted by Cozzuol (1996) in his review of fossil marine mammals from South America, the Pleistocene and Holocene cetacean record is very sparse (probably not because of the lack of material, but for the lack of interest). He indicates that supposedly extinct species of such time span were based on inadequate material and thus needed to be revised. Cozzuol (1996) and Buono et al. (2016) accepted the late Pleistocene age and validity of *N. romerianus*, but they did not mention *B. pampaea* nor *N. platensis* in their revisions. Finally, Westgate and Whitmore (2002) mentioned *B. pampaea* without further comments, in their description of *Balaena ricei*. More recent works on the evolution and fossil records of cetaceans from Argentina do not even mention these taxa (Viglino et al. 2022, 2023).

In sum, *N. romerianus*, *N. platensis*, and *Balaena pampaea* have been regarded as valid by most workers, but no other naturalist besides Ameghino has reviewed these specimens by first hand since their original description. Although these specimens belong to Colección Nacional Ameghino, which was acquired by the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN) in 1927 (Bordas 1936), the history of their location within the museum is still a mystery and were considered lost during decades.

Recent reassessment of extant vertebrate collections at the MACN resulted in the finding of a box containing the lost tympanic bullae of Ameghino's collection.

The aim of present contribution is to report, illustrate and briefly redescribe Ameghino's specimens that were recently found at the MACN.

MATERIAL AND METHODS

As indicated above, in spite of Ameghino's interest on cetaceans, the catalogue of his personal

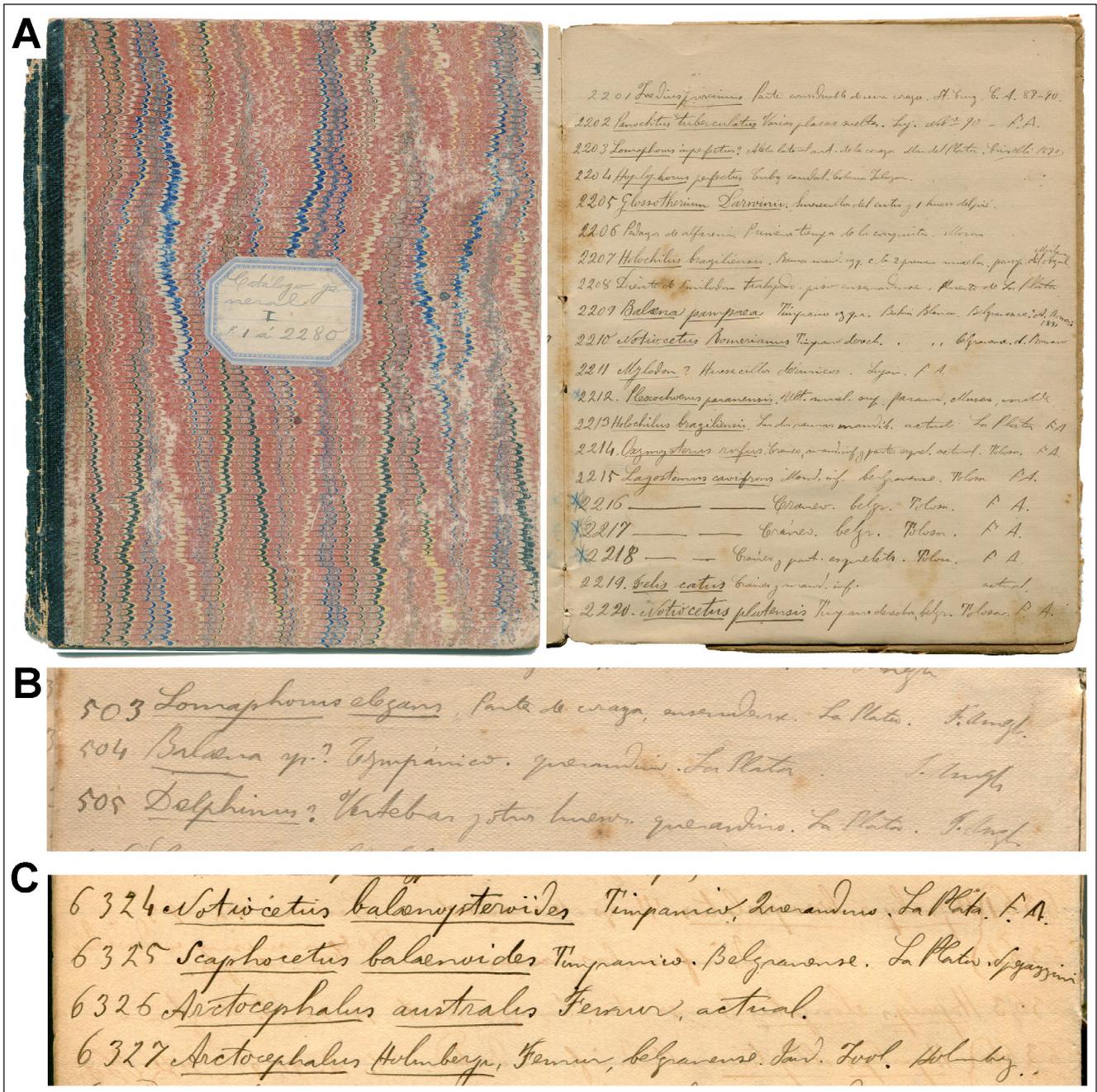


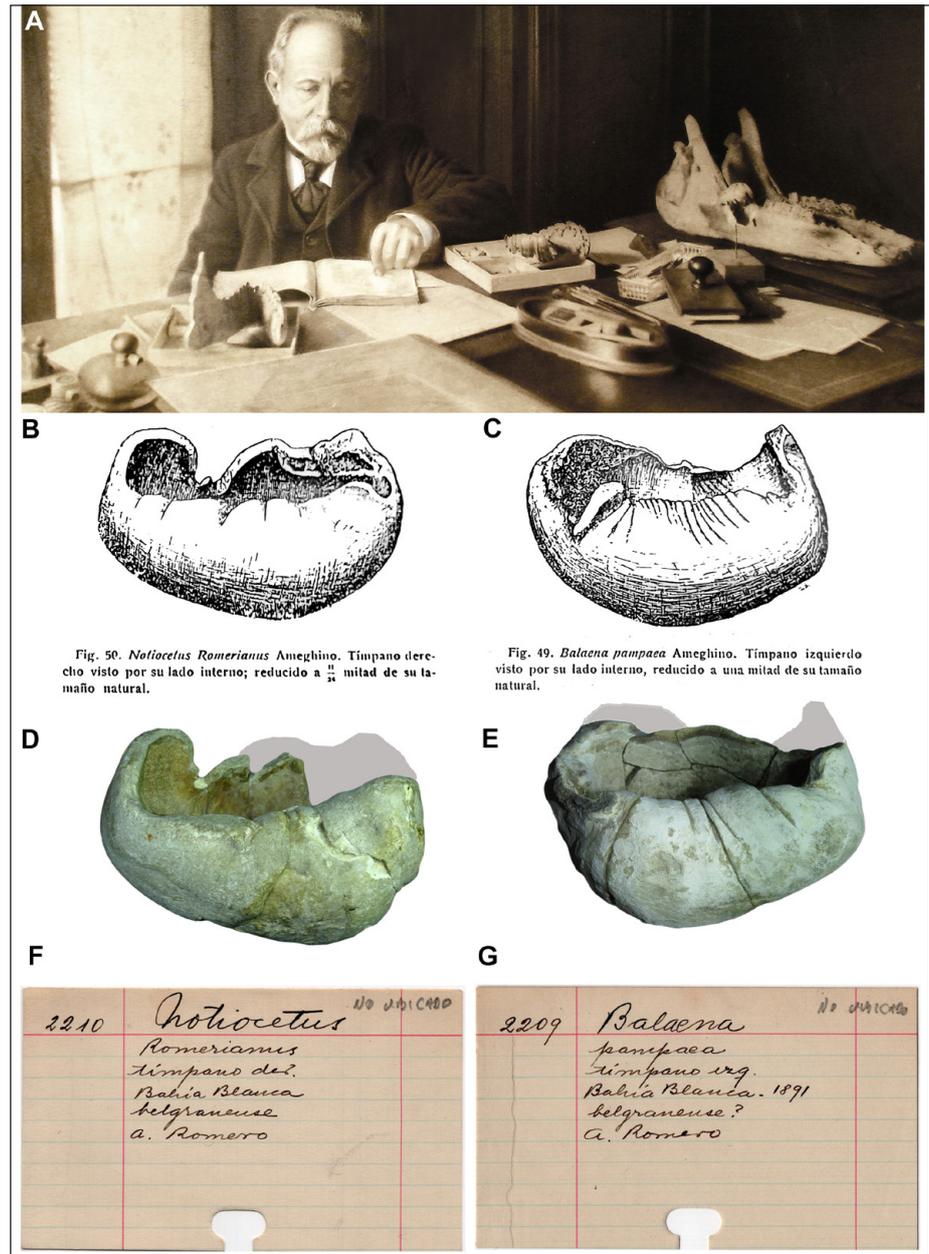
Fig. 1 - A) Cover and page including some cetaceans fossils of the handwritten catalogue of the Ameghino's collection (now Colección Nacional Ameghino) housed at the Sección Paleontología de Vertebrados at the MACN; B, C) detail of the catalogue numbers of the specimens analyzed here.

fossil collection only included the mention of six whale remains (MACN-A 504, *Balaena* sp.; MACN-A 2220, *Notiocetus platensis*; MACN-A 2210, *Notiocetus romerianus*; MACN-A 2209, *Balaena pampaea*; MACN-A 6324, *Notiocetus balaenopteroides*; MACN-A 6325, *Scaphocetus balaenoides*; Fig. 1).

Years after Ameghino's death, these materials, together with a huge collection of fossils, mostly mammals, were acquired by the MACN in 1927 (Bordas 1936) and constitute the now called Col-

lección Nacional Ameghino (MACN-A), housed at the Sección Paleontología de Vertebrados of the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Mones 1986). There, each piece was labeled according to the original number in Ameghino's handwritten catalogue (Fig. 2). During the late 1980s and 1990s, a census of the collection at the Sección Paleontología de Vertebrados was performed and these specimens were not found. As a consequence, the catalogue cards corresponding to

Fig. 2 - A) Florentino Ameghino in his desk; B-C) original illustrations of B, *Notiocetus romerianus* and C, *Balaena pampaea*, modified from Ameghino (1891a); D-E) specimens tentatively identified as the holotypes of D, *Notiocetus romerianus* (MACN-A 2210) and E, *Balaena pampaea* (MACN-A 2209); F, G) corresponding catalogue cards of the Colección Nacional Ameghino housed at the MACN, indicating that the specimens were found during the census conducted between the late 1980s and 1990s.



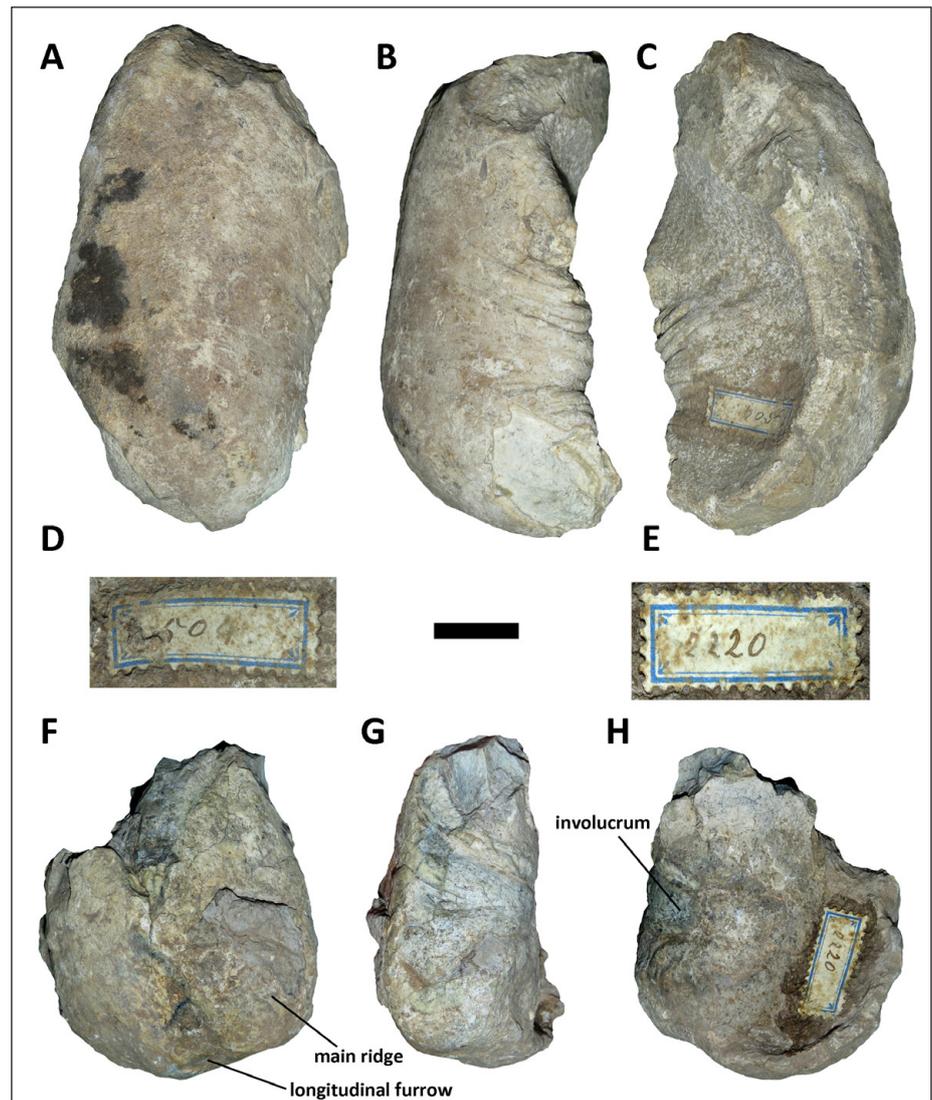
each specimen have annotations in graphite pencil, indicating that the material could not be located (Figure 2C-D). Recently, the specimens here described were found in a box, lacking any indication of their provenance, during a revision of extant specimens of the marine mammal collection located within the Colección de Mastozoología of the MACN. The box contained six fossil tympanic bullae of mysticetes. At some point during the 20th century, these fossils were moved to the Colección de Mastozoología of the MACN, where they remained mixed with modern cetacean bones.

Among the discovered specimens, only two maintain the labels and collection numbers 504 and

2220. These numbers match with those of the holotype of *Notiocetus platensis* and *Balaena* sp. of the Colección Nacional Ameghino (MACN-A).

MACN-A 504 comes from the “Querandinense” (lower-middle Holocene beds of the Canal de las Escobas Formation) at the La Plata city. This specimen was probably the evidence that Ameghino (1889) used to indicate the presence of *Eubalaena australis* (*Balaena* at that time) in Holocene beds of Argentina. In spite of its incomplete nature, the bulla is similar to balaenids by having a stepped and transversely narrow involucrum having numerous and closely appressed involucral striae, and obtuse posterior end (Gondar 1966; Agnolín & Lucero 2004;

Fig. 3 - Balaenidae indet. A-D) MACN-A 504, eroded right tympanic bulla in A, medial; B, dorsal and C, lateroventral views. D, detail of label with the MACN-A collection number; E-H) MACN-A 2220 holotype of *Notiocetus platensis*, badly eroded posterior half of right tympanic bulla in E, medial; F, dorsal; and G, lateral views. Main anatomical features are indicated. H, detail of label with the MACN-A collection number. Scale bar: 1 cm.



Ekdale et al. 2011; Govender 2019; Govender & Marx 2023; Fig. 3A-C).

MACN-A 2220 is unambiguously identified here as the holotype of *Notiocetus platensis* not only because it has its collection number, but also because its morphology and measurements are completely congruent with those in the original description of Ameghino (1891b) (Fig. 3F-H).

Other two tympanic bullae lack collection numbers, and their identification is not so straightforward (Fig. 4). They approximately correspond in the shape, size, and morphology to those described and figured by Ameghino (1891a) as the types of *Notiocetus romerianus* and *Balaena pampaea*. These specimens resemble Ameghino's figures in most anatomical details, including general shape and number and disposition of ridges and grooves. Thus, they are ascribed as the holotypes of both species in spite of lacking collection number. Finally, the preservation

present in the fossils is indistinguishable from similar specimens from the marine coasts of southern Buenos Aires Province, which is the area that yielded their type specimens (see Agnolín et al. 2024). Both specimens show some differences with Ameghino's original figures mainly because they show recent fractures in several parts. In this regard, MACN-A 2110 shows along its posterior margin a long fracture that retains the remains of "mastic glue", an old adhesive that was frequently used by Ameghino to repair fossil specimens of his collection (Laza 2019).

There are two additional bullae that lack a collection number and to which there is no reference in any of the Ameghino's publications. In spite to that, in the catalogue of the Colección Nacional Ameghino (handwritten by Ameghino himself) there are two bullae under the numbers MACN-A 6324 and MACN-A 6325. MACN-A 6324 is registered under the name *Notiocetus balaenopteroides* and was collected

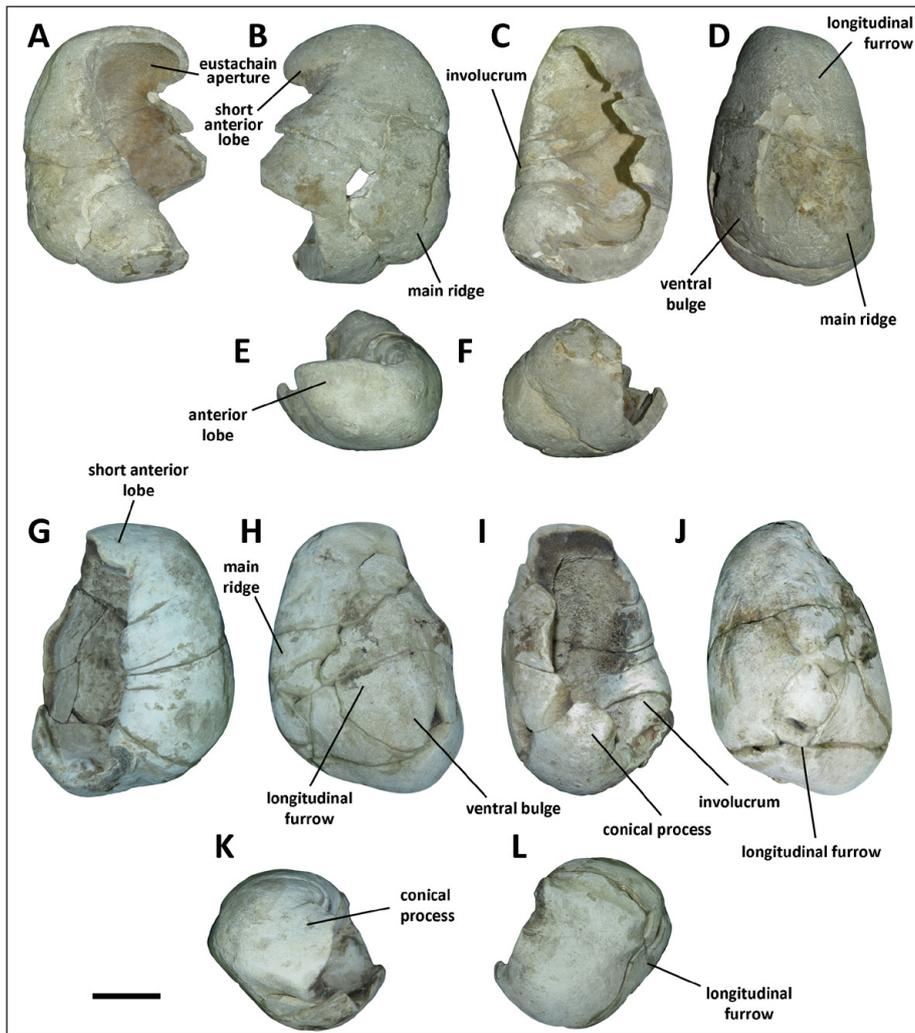


Fig. 4 - Balaenidae indet. A-F) MACN-A 2210 (holotype of *Notiocetus romerianus*), right tympanic bulla in A, dorsal; B, ventral; C, lateral; D, medial; E, anterior; and F, posterior views. G-L) MACN-A 2209 (holotype of *Balaena pampaea*), left tympanic bulla in G, dorsal; H, ventral; I, lateral; J, medial; K, anterior; and L, posterior views. Scale bar: 1 cm.

by Florentino Ameghino at the Post-Pampeana Que-
randinense Formation (currently Lower-Middle Ho-
locene beds) in La Plata city, Buenos Aires Province.
This could correspond to one of the bullae that lack
collection numbers, which is morphologically similar
to the holotype of “*Notiocetus romerianus*” (Fig. 5A-F).

The other number, MACN-A 6325 refers to a
“tympanic” found in La Plata city and comes from
the Pampean Formation, “Belgranense”, which cor-
responds to the Middle Pleistocene. The catalogue
indicates that it was found by the well-known botan-
ist Carlos Spegazzini and is listed under the name
Scaphocetus balaenoides. We tentatively identify this tax-
on with the larger bulla, which is very different from
all the specimens identified as “*Notiocetus*” by Ameghino
(Fig. 5G-L). Instead, MACN-A 6325 resembles the
extant Southern Right Whale *Eubalaena australis* in size
and shape.

Thus, in spite that MACN-A 6324 and MACN-
A 6325 lack clear indication of their provenance, they
may be tentatively identified as belonging to the un-

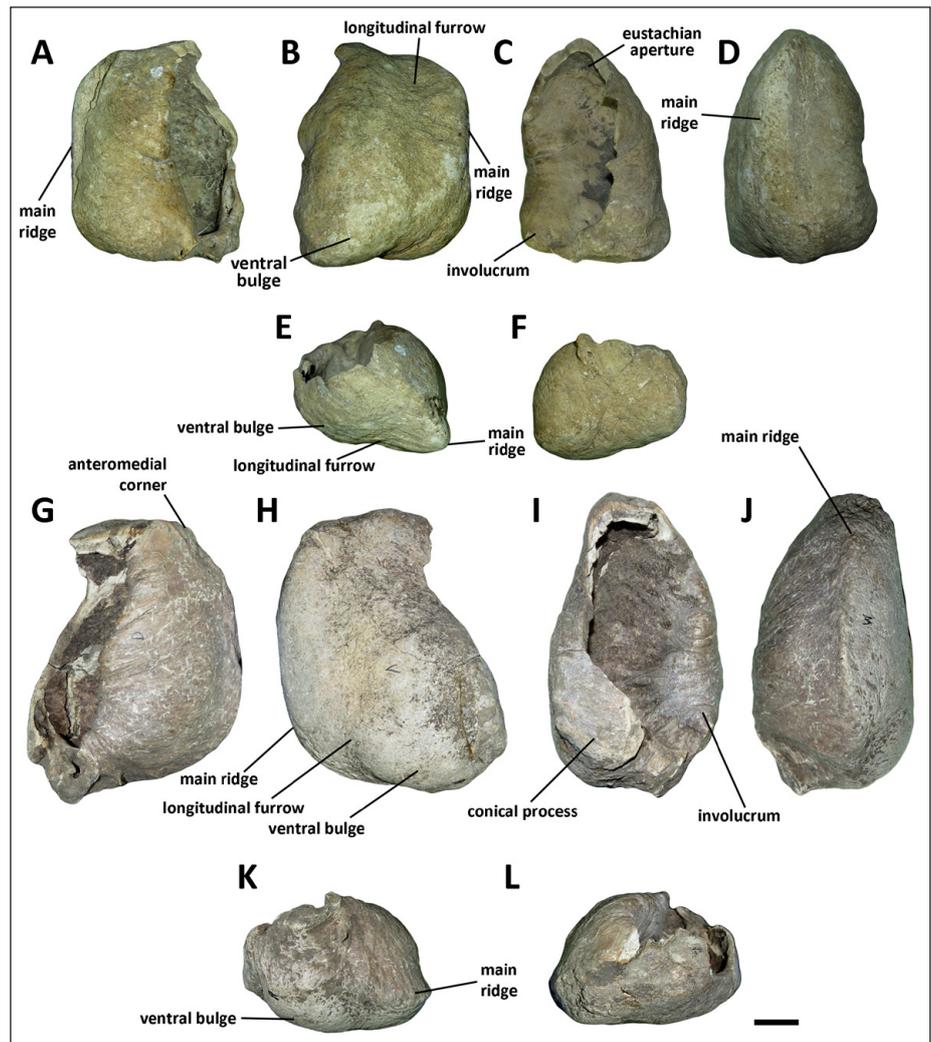
published species *Notiocetus balaenopteroides* and *Scapho-
cetus balaenoides*, respectively.

Nomenclature. We follow the anatomical
terminology and orientation of mysticete tympanic
bullae employed by Ekdale et al. (2011; see also Oishi
& Hasegawa 1995), with modifications by the exten-
sive analyses by Bisconti (2010) and Bisconti and Bos-
selaers (2021). Measurements follow those used by
Ekdale et al. (2011). The composition and taxonomy
of Cetotheriidae is that employed by El Adli et al.
(2014) with modifications by Bisconti (2015) and Marx
et al. (2019). Taxonomy of extant mysticetes follows
Deméré et al. (2005).

Comparative material from extant species.

Eubalaena australis (Desmoulins, 1822): MACN-
Ma 23576, Brazil. Sao Paulo, Iguapé; MACN-Ma
31218, Brazil. Sao Paulo, Iguapé. *Megaptera novaengliae*
(Borowski, 1781): MACN-Ma 29.778 South Georgia
Island. Coll. Compañía Argentina de Pesca; MACN-
Ma 23575 South Atlantic Ocean; MACN-Ma

Fig. 5 - A-F, Balaenidae indet. MACN-A 6324, right tympanic bulla tentatively identified as *Notiocetus balaenopteroides* Ameghino in schedis, in A, dorsal; B, ventral; C, lateral; D, medial; E, anterior; and F, posterior views. G-L, MACN-A 6325, right tympanic bulla tentatively identified as *Scaphocetus balaenoides* Ameghino in schedis, in G, dorsal; H, ventral; I, lateral; J, medial; K, anterior; and L, posterior views. Scale bar: 1 cm.



30.66 s/d; MACN-Ma 31219, South Georgia Island. Coll. A. Carcelles; MACN-Ma 31220, South Georgia Island. Coll. A. Carcelles; CFA-MA-13084, Buenos Aires, Isla Talavera, Zarate, Coll. S. Bogan, J. Meluso, S. Lucero, F. Agnolín, A. Giacchino y D. del Castillo. *Balaenoptera acutorostrata* (Lacepede, 1804): MACN-Ma 7.48, Río de la Plata, Ciudad de Buenos Aires; MACN-Ma 25.176, Buenos Aires, San Isidro, Coll. Antonio Liberali; MACN-Ma 39.412, Geórgias del Sur; Coll. L. Martinez; MACN-Ma 17823, s/d; MACN-Ma 20520, Buenos Aires, 25 km al sur de Magdalena; MACN-Ma 20521, s/d; MACN-Ma 31221, Brazil, Cerrillo Bahia; MACN-Ma 31222, Brazil, Cerrillo Bahia; MACN-Ma 31223, Brazil, Santa Catarina; MACN-Ma 23828, Buenos Aires. Necochea; MACN-Ma 31224, s/d. *Balaenoptera bonaerensis* Burmeister, 1867: MACN-Ma 31226, s/d. *Balaenoptera borealis* (Lesson, 1828): MACN-Ma 31227 s/d, Coll. A. Carcelles; MACN-Ma 54.115, Buenos Aires, Quequén, Coll. E. Balech. CFA-MA-13231, Buenos

Aires, Medanos de Bosch, San Cayetano. Coll. S. Bogan, J. Meluso and S. Lucero. *Balaenoptera physalus* (Linnaeus, 1758): MACN-Ma 24.90, South Georgia Island, Coll. Compania Argentina de Pesca; MACN-Ma 31228, South Georgia Islands. Powell Island, Coll. A. Carcelles; MACN-Ma 31231 South Georgia Island, A. Carcelles; MACN-Ma 31232, South Georgia Island, Coll. A. Carcelles; CFA-MA-13928, Argentina. Buenos Aires. La Plata River. Dock Sud. Coll. M. Junín and M. Weissel. *Balaenoptera musculus* (Linnaeus, 1758): MACN-Ma 31229, South Georgia Island, Coll. A. Carcelles; MACN-Ma 31230, South Georgia Island, Coll. A. Carcelles.

Institutional abbreviations. CFA-MA, Colección Mastozoología, Fundación de Historia Natural “Félix de Azara”, Ciudad Autónoma de Buenos Aires, Argentina; MACN-A, Colección Nacional Ameghino, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Ciudad Autónoma de Bue-

nos Aires, Argentina; MACN-Ma, Colección Nacional de Mastozoología, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Ciudad Autónoma de Buenos Aires, Argentina; MACN-Pv, Colección Nacional de Paleovertebrados, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Ciudad Autónoma de Buenos Aires, Argentina.

SYSTEMATIC PALEONTOLOGY

CETACEA Brisson, 1762

Mysticeti Cope, 1891

Notiocetus platensis Ameghino, 1891 *nomen dubium*

Holotype: MACN-A 2220, incomplete posterior half of right tympanic bulla (Figure 3E-H).

Geographic and stratigraphic occurrence: The specimen comes from the Belgrano Formation (Middle Pleistocene) and was found during the excavations at the port of Ensenada city (by 1891, this was the port of the La Plata city), Buenos Aires Province, Argentina (Ameghino 1891b).

Measurements: Maximum length: 63 mm, maximum width: 56 mm.

Description. The specimen is poorly preserved and consists of the posterior half of a right tympanic bulla. The margins are strongly weathered, and the surface of the bone is slightly eroded.

In dorsal view, the involucrum is transversely wide and shows well-developed ridges and crests. There are two deep transverse creases, which are notably prominent when the specimen is seen in lateral view. The main ridge is poorly defined and is delimited by a relatively shallow, but wide, longitudinal furrow.

Balaenidae Gray, 1825

Notiocetus romerianus Ameghino, 1891 *nomen dubium*

Holotype: MACN-A 2210, right tympanic bulla with strongly weathered margins and eroded bony surface (Figure 4A-F).

Geographic and stratigraphic occurrence: MACN-A 2210, comes from the seashore close to Bahía Blanca city, southern Buenos Aires province, Argentina. It was found without a clear stratigraphic context, but based on recent research (Agnolín et al., 2024) it is possible that it comes from Middle Pleistocene beds (see above).

Measurements: MACN-A 2210: maximum length: 116 mm, maximum width: 80 mm.

Description. The general shape of the tympanic bulla is similar to that of other balaenids, with a squared posterior margin and is box-shaped in lateral and medial views. The anterior lobe is notably short and transversely compressed and is separated from the posterior lobe by a deep groove.

In dorsal view the anterior platform is antero-posteriorly short and does not form a shelf. The involucrum is transversely narrow, with a stepped lateral edge and a squared dip at its anterior end. The eustachian opening is transversely wide.

In lateral view there is no evidence of a strong pillar for the sigmoid process nor a dorsoventral sulcus delimiting it.

In ventral view there is no marked ventral keel and a longitudinal furrow is represented by a very shallow and wide groove. This groove separates a prominent ventral bulge from the poorly defined main ridge. The main ridge is low and thick, and is obliquely oriented.

Balaena pampaea Ameghino, 1891 *nomen dubium*

Holotype: MACN-A 2209, left tympanic bulla with weathered margins and eroded bony surface (Figure 4G-L).

Geographic and stratigraphic occurrence: MACN-A 2209 comes from the seashore close to Bahía Blanca city, southern Buenos Aires province, Argentina. The specimen was found without a clear stratigraphic context, but based on recent research (Agnolín et al., 2024) it is possible that it comes from Middle Pleistocene beds (see above).

Measurements: MACN-A 2209: maximum length: 110 mm, maximum width: 76 mm.

Description. This specimen is very similar to MACN-A 2210. As in the later, most margins are poorly preserved and the bony surface of the bulla is eroded. The tympanic bulla shows a squared posterior margin and is box-shaped in lateral and medial views. The anterior lobe is notably short and transversely compressed and is separated from the posterior lobe by a groove shallower than in MACN-A 2210.

In dorsal view the anterior platform is antero-posteriorly short and does not form a shelf. The involucrum is transversely narrow, with a stepped lateral edge and a shallow and squared dip at its anterior end. The eustachian opening is transversely wide, but is slightly deeper and narrower than in MACN-A 2210.

In lateral view there exists a dorsally-far protruding conical process. There is no evidence of a

strong pillar for the sigmoid process nor a dorsoventral sulcus delimiting it.

In ventral view there is no marked ventral keel and a longitudinal furrow is represented by a very shallow and wide groove. This groove separates a prominent ventral bulge from the poorly defined main ridge. The main ridge is low and thick, and is obliquely oriented.

Notiocetus balaenopteroides Ameghino, *in schedis*

Holotype: MACN-A 6324, right tympanic bulla with weathered margins and relatively well-preserved external surface (Figure 5A-F).

Geographic and stratigraphic occurrence: MACN-A 6324 was collected by Florentino Ameghino at the Post-Pampeana Querandinese Formation (currently Lower-Middle Holocene beds) in La Plata city, Buenos Aires Province. No more data is available on this specimen.

Measurements: MACN-A 6324: maximum length: 115 mm, maximum width: 83 mm

Description. The tympanic is similar in size and shape to MACN-A 2209 and MACN-A 2210. It shows a squared posterior margin and is box-shaped in lateral and medial views.

In dorsal view the anterior platform is antero-posteriorly short and does not form a shelf. The involucrum is transversely narrow (being proportionally wider than in MACN-A 2209 and MACN-A 2210), a squared dip at its anterior end. The eustachian opening is transversely wide.

In ventral view the bulla is less eroded than specimens MACN-A 2209 and MACN-A 2210, and thus the shape and orientation of the main ridge and longitudinal furrow are well defined. The longitudinal furrow is represented by a very shallow and wide groove. This groove separates a prominent ventral bulge from the thick and well-defined main ridge. The main ridge is prominent, rounded and thick, and is obliquely oriented. The posterior margin of the bulla shows a concave contour.

Scaphocetus balaenoides Ameghino, *in schedis*

Holotype: MACN-A 6325, right tympanic bulla with weathered margins and relatively well-preserved external surface (Figure 5G-I).

Geographic and stratigraphic occurrence: MACN-A 6325 was collected by Carlos Spegazzini in La Plata city and comes from the Pampean Formation, “Belgranense”, which corresponds to the Middle Pleistocene.

Measurements: MACN-A 6325 maximum length: 145 mm, maximum width: 82 mm.

Description. The tympanic bulla is notably dorsoventrally compressed, and shows a squared posterior margin and is box-shaped in lateral and medial views. The anterior lobe is notably short and transversely compressed and is separated from the posterior lobe by a groove.

In dorsal view the anterior platform is antero-posteriorly short and does not form a shelf. The involucrum is notably transversely narrow, with a stepped lateral edge and a squared dip at its anterior end. The eustachian opening is transversely wide.

In lateral view there exists a dorsally-far protruding conical process. There is no evidence of a strong pillar for the sigmoid process nor a dorsoventral sulcus delimiting it. In medial view there exists a prominent anteromedial corner.

In ventral view there is no marked ventral keel and a longitudinal furrow is represented by a very deep and well-defined longitudinal furrow. It delimits a very prominent and keel-like main ridge that extends along the ventral margin of the bulla.

DISCUSSION

In this section we make brief comments on the taxonomic status of each specimen. It should be mentioned that in spite that the anatomy of the tympanic bulla in mysticetes shows several characters that are anatomically relevant (Ekdale et al. 2011), naming species based on isolated tympanic bullae is a reckless approach nowadays, still it was a common practice among paleocetologists in the past.

Taxonomic status of *Notiocetus platensis*

The original description of *Notiocetus platensis* by Ameghino (1891b) is very brief: “Remarkably smaller size than *Notiocetus romerianus*. Very depressed tympanum, very wide posteriorly, with a pronounced pear-shaped involucrum. Inner margin exceedingly thickened. Longitudinal diameter (approximate), 75 millimeters; transverse diameter, 6 centimeters.” (translated from the Spanish: “Tamaño muchísimo menor que el de *Notiocetus romerianus*. Tímpano muy deprimido, muy ancho atrás, con el involucrum de aspecto piriforme muy pronunciado. Borde interno excesivamente grueso. Diámetro longitudinal (aproximado), 75 milímetros; diámetro transverso, 6 centímetros.”). These characteristics are frequent in Mysticeti cetaceans. The specimen matches in size

(usually less than 9 centimeters long; Tomilin 1957; Whitmore & Kaltenbach 2008; Ekdale et al. 2011) the tympanic bulla of the small extant balaenopterid *Balaenoptera acutorostrata*. The incomplete nature of MACN-A 2220 does not allow identifying it beyond Mysticeti indet, and thus, *Notiocetus platensis* should be regarded as a *nomen dubium*.

Taxonomic status of *Balaena pampaea* and *Notiocetus romerianus*

Balaena pampaea and *N. romerianus* share with Balaenidae a tympanic bulla with a squared posterior margin and that is box-shaped in lateral and medial views, a notably short and transversely compressed anterior lobe that is separated from the posterior lobe by a deep groove, anteroposteriorly short anterior platform, transversely narrow involucrum, with a stepped lateral edge and a squared dip at its anterior end, and a ventral longitudinal furrow (Gondar 1966; Agnolín & Lucero 2004; Ekdale et al. 2011; Govender 2019; Bisconti & Bosselaers 2021; Bisconti & Carnevale 2022; Govender & Marx 2023). Further, *Balaena pampaea* shows a dorsally-far protruding conical process in lateral view, a feature characteristic of balaenids (Ekdale et al. 2011).

Some authors suggested that *Notiocetus* was probably related to the family Cetotheriidae (Kelllogg 1931; Rusconi 1967; Fordyce 1978). However, it differs from cetotheriids in the overall oval contour of the bulla (contrasting with a subtriangular to subquadrate outline, with truncate anterior end and lacking an anterior lobe), convex ventral margin (contrasting with a smoothly convex to flat, with deep main and involucral ridges), lack of posterior process, and lack of an indentation along the posterior margin of the bulla (Bouetel & de Muizon 2006; Whitmore & Kaltenbach 2008; Kimura & Hasegawa 2010; Bisconti & Bosselaers 2021; Bisconti & Carnevale 2022). Consequently, the possible presence of Pleistocene cetotheriids (based on *Notiocetus*) in the Buenos Aires Province during the Pleistocene is rejected.

B. pampaea and *N. romerianus* differ from *Balaena* and *Eubalaena*, because of their smaller size, a convex and inflated ventral margin, and in the shape and curvature of the main ridge (see Gondar 1966; Bouetel & de Muizon 2006). These differences are probably not taxonomically relevant and may be not enough to recognize that *B. pampaea* and *N. romerianus* represent a valid taxon.

Although *B. pampaea* and *N. romerianus* could be distinguished from each other, according to Ameghino (1891a), because of the different shape of the involucrum margins and contour, degree of excavation of the eustachian aperture, and number of involucrum rugosities, these features have been proven to be variable within a single species and along ontogenetic series (Whitmore & Kaltenbach 2008; Ekdale et al. 2011). Otherwise, both share similar gross morphology and size, suggesting that both belong to the same species (see below).

Based on comparisons carried out above, MACN-A 2209 and MACN-A 2210 are here considered as indeterminate balaenids, and both *B. pampaea* and *N. romerianus* may be regarded as *nomina dubia*. On the other side, if the Pleistocene Pampean whale is proven to be valid, its name should be *Notiocetus pampaeus* (Ameghino, 1891) by priority criterion.

Taxonomic status of *Notiocetus balaenopteroides* and *Scaphocetus balaenoides*

Both *Notiocetus balaenopteroides* and *Scaphocetus balaenoides* are unpublished cetaceans that were just mentioned by Ameghino in his handwritten catalogue. This is why both are species *in schedis*.

N. balaenopteroides and *Scaphocetus balaenoides* share with Balaenidae a tympanic bulla which show a squared posterior margin and is box-shaped in lateral and medial views, a notably short and transversely compressed anterior lobe that is separated from the posterior lobe by a deep groove, anteroposteriorly short anterior platform, transversely narrow involucrum, with a stepped lateral edge and a squared dip at its anterior end, and a ventral longitudinal furrow (Gondar 1966; Agnolín & Lucero 2004; Ekdale et al. 2011; Govender 2019; Bisconti & Bosselaers 2021; Bisconti & Carnevale 2022; Govender & Marx 2023).

N. balaenopteroides is very similar to bullae belonging to “*B. pampaeae*” and “*N. romerianus*”, and differs from *Eubalaena* and *Balaena* in its smaller size, a convex and inflated ventral margin, and in the shape and curvature of the main ridge. Otherwise, *N. balaenopteroides* differs from “*B. pampaeae*” and “*N. romerianus*”, in having transversely wider involucrum and in the different contour of the posterior margin of the bulla in dorsal view. We are not aware about the taxonomic relevance of such traits, and may indicate that there are at least two different taxa represented by these bullae.

Scaphocetus balaenoides resembles the extant Southern Right Whale *Eubalaena australis* in size (maximum length: 145 mm, maximum width: 82 mm.), shape, and the smooth external surface of the posterior lobe (rugose surface present in *Balaena*; Ekdale et al. 2011). This specimen cannot be distinguished from members of *Eubalaena australis*.

CONCLUSIONS

The finding of the holotypes of *Balaena pampaea*, *Notiocetus romerianus* and *N. platensis* allow re-evaluating their taxonomic validity and morphology. *Notiocetus platensis* is based on a partial bulla of an indeterminate Mysticeti the size of the small living rorqual species *B. acutorostrata*. *Balaena pampaea* and *Notiocetus romerianus* are very similar to each other, and very likely belong to the same species. Because of the lack of diagnostic features, *Balaena pampaea*, *Notiocetus romerianus* and *N. platensis* are here regarded as *nomina dubia*.

Recent works on the fossil record of cetaceans in southern South America (Cozzuol 1996; Buono et al. 2016; Viglino et al. 2022, 2023) indicate that during the Pleistocene, the cetaceans taxa present in the southwestern Atlantic ocean were very similar (or the same) than the modern ones inhabiting the same area. Present work includes the citation of Pleistocene balaenopterids and balaenids belonging to extant genera, a finding that comfortably fits with the above mentioned proposal.

The six specimens here described are now located at the Colección Nacional Ameghino (MACN-A) after decades of being considered lost and unavailable for researchers. The interaction of curators, technicians, and scientists within an institution is mandatory to improve collections that have not only scientific value, but also a remarkable historic legacy.

Data Availability Statement. The data supporting the results of this research are available upon request. Interested researchers may contact the corresponding Author to obtain access.

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