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Artículo

VALLE DE LAS CUEVAS AND FUERTE DE SAN RAFAEL (MENDOZA, ARGENTINA), TWO ELUSIVE TYPE LOCALITIES OF RODENTS REVISITED

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ABSTRACT. Based on various resources, the original collection localities for five species of rodents whose type specimens were collected by Thomas Bridges during the 19th century are discussed. The taxa examined are the caviomorph species *Aconaemys fuscus* and *Ctenomys pontifex*, and the cricetids *Abrothrix hirta*, *Euneomys mordax*, and *Paynomys macronyx*. *A. fuscus* was indicated as coming from Valle de las Cuevas, while the others were collected in or near Fuerte de San Rafael, both located in Mendoza Province, Argentina. After a detailed scrutiny of the original publications, specimen labels, historical cartography, and pertinent literature, we conclude that (1) Valle de las Cuevas, a fancy name coined by Bridges, corresponds to the current locality of Valle Hermoso and (2) the association of Fuerte de San Rafael with some of the abovementioned species is apocryphal. We propose that both type localities should be corrected to Valle Hermoso, a high-Andean valley located about 30 km to the east of Volcán Peteroa.

RESUMEN. Valle de las Cuevas y Fuerte de San Rafael (Mendoza, Argentina): dos problemáticas localidades típicas de roedores re-evaluadas. Sobre la base de diversos recursos, se discuten las localidades de colecta original para cinco roedores cuyos especímenes tipo fueron coleccionados por Thomas Bridges durante el siglo XIX. Los taxones examinados son las especies de caviomorfos *Aconaemys fuscus* y *Ctenomys pontifex* y los cricétidos *Abrothrix hirta*, *Euneomys mordax* y *Paynomys macronyx*. *A. fuscus* fue descripto como procedente de Valle de las Cuevas, mientras que los restantes como coleccionados en o cerca de Fuerte de San Rafael, ambos localizados en la Provincia de Mendoza, Argentina. Luego de un detallado escrutinio de las publicaciones originales, etiquetas de los especímenes, cartografía histórica y literatura vinculada, concluimos que (1) Valle de las Cuevas, un nombre de fantasía acuñado por Bridges, corresponde a la actual localidad Valle Hermoso y (2) que la asociación de Fuerte de San Rafael con algunas de las especies indicadas es apócrifa. Proponemos que ambas localidades típicas sean corregidas como Valle Hermoso, un valle alto-andino ubicado 30 km hacia el este del Volcán Peteroa.

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Palabras clave: *Aconaemys*, *Ctenomys*, *Euneomys*, *Paynomys*, Thomas Bridges.
Key words: *Aconaemys*, *Ctenomys*, *Euneomys*, *Paynomys*, Thomas Bridges.

INTRODUCTION

Only one thing distinguishes a type locality from the myriad of collection localities that usually compose the geographic range of a taxon: its association to the name-bearing specimen (ICZN 1999). For clades with well resolved alpha-taxonomies, no special attention to type localities is required. Indeed, because many species were described more than a century ago, these localities have been dramatically transformed by human activities and the taxon in question may have disappeared from that site. In other cases, however – including many groups of rodents – disentangling complex histories and numerous nominal forms needs the study of topotypes. In a few cases the species has never been collected again since its original description. This, in turn, requires accurate understanding of type localities.

South American rodents provide many examples of type localities that for decades have remained terra incognita (e.g., Hershkovitz 1955; Massoia & Fornes 1964; Pearson & Lagiglia 1992; Bidau & Avila-Pires 2009; Christie & Pardiñas 2016). Several factors may contribute to uncertainties regarding type localities, two of which may be more particularly important in southern South America: poor cartographic support at the time of the original collection and, especially for those specimens obtained in the first half of the 19th century, a less rigorous perspective regarding the importance of geographic details. Both factors apply to the many type localities produced by famous collectors such as Charles Darwin, Alcides d'Orbigny, Thomas Bridges, Louis Fraser, and Johann von Tschudi (e.g., Thomas 1906; Osgood 1943; Hershkovitz 1987; Ortega et al. 2014).

Five species of rodents, two caviomorphs and three cricetids, were described based on materials collected by Thomas Bridges in southwestern Mendoza (Argentina) during the first half of the 19th century. These are, in order of nomination and according to current taxonomy (Teta & Pardiñas 2014; Patton et al. 2015; Teta et al. 2017), *Aconaemys fuscus* (Waterhouse 1842 [1841]) (Octodontidae), *Paynomys macronyx* (Thomas 1894) (Cricetidae), *Abrothrix* (*Abrothrix*) *hirta* (Thomas 1895) (Cricetidae), *Euneomys mordax* Thomas 1912 (Cricetidae), and *Ctenomys pontifex* Thomas 1918 (Ctenomyidae). Four of these species (*P. macronyx*, *A. hirta*, *E. mordax*, and *C. pontifex*) were originally attributed to come from, or near Fuerte de San Rafael as the type locality while the fifth (*A. fuscus*) is connected to "Valle de las Cuevas". These rodents are currently known from the Andean slopes habitat across the general area which we are discussing, but none of them are present in the lowlands of southeastern Mendoza surrounding Fuerte de San Rafael, where much of the original native Monte habitat still remains. As a result, several authors have questioned the former locality as an actual terra typica for these taxa (e.g., Reise & Gallardo 1990; Pearson & Christie 1991; Pearson & Lagiglia 1992; Massoia et al. 1994). In contrast, although "Valle de las Cuevas" has never been questioned, the exact location of this valley remains unknown. In addition, *C. pontifex* is only known from the type description and has never been recaptured, so establishing the correct type location is critical to our understanding of this enigmatic species and its protection. This paper aims to resolve the geographic uncertainties associated with the above-mentioned rodents and their type localities.

MATERIALS AND METHODS

To evaluate the type localities for the focal taxa, we reviewed the original specimens, their labels, museum catalogues, historical cartography (available at <https://www.oldmapsonline.org>), and associated literature. In addition, we visited the region containing the purported type localities as part of four field trips conducted during 2018-2019. We gave particular attention to original information regarding the South American trips made by Bridges; because he was involved primarily in botanical collections (Johnston 1928; Fernández et al. 2017), the literature describing his life and travels have been overlooked by authors who have discussed his mammal collections (e.g., Osgood 1943; Mann Fischer 1978).

RESULTS AND DISCUSION

Pearson & Lagiglia (1992) have provided the most detailed discussion of the accuracy of Fuerte de San Rafael (FSR, from here on) as a type locality. In brief, the conclusions reached by these authors can be summarized as follows: (1) the location of FSR is not in doubt due to the ruins preserved there; (2) FSR is located near but is distinct from city of San Rafael; (3) the local environment at FSR is not appropriate for the four species supposedly collected there and thus Bridges must have collected his

specimens elsewhere; (4) Bridges crossed the Andes between Talca (Chile) and San Rafael (Argentina); (5) local historical routes between these are well known and in the province of Mendoza Province they pass close to the Volcán Peteroa; and (6) because the rodents in question are largely Andean in distribution, they were probably obtained by Bridges while he crossed the Andes. Collectively, these observations led them to the conclusion that (7) the materials collected by Bridges were obtained near Volcán Peteroa. Subsequent authors writing about these species have cited this conclusion with varying degrees of detail (Braun & Pardiñas 2015; Patterson et al. 2015; Teta et al. 2015; Verzi et al. 2015). For example, Bidau (2015:861) referred to the type locality of *C. pontifex* as "… restricted to Volcán Peteroa, Malargüe department, ca. 35°26'S, 70°20' W by Pearson & Lagiglia (1992)" although Pearson & Lagiglia (1992) made no formal restrictions on the type locality of this species. Similarly, Ojeda et al. (2015:62) stated that "The location of the type locality [Fort of San Rafael] was clarified by Pearson & Lagiglia (1992), who made a historical reconstruction of the trips by Bridges between Fort San Rafael and Talca, Chile, and restricted the type locality to the region near the Volcán Peteroa, Malargüe Department, Mendoza Province, Argentina."

To resolve the uncertainties surrounding the original collection localities for these rodents, it is first necessary to identify those elements that are not in doubt, namely: (1) the materials in question were collected by Bridges; (2) these materials and the associated written records (as letters; for example, Waterhouse 1845 [1844]:155 "From Mr. Bridges' notes I learn that this little animal was found near the margin of the Lake of Quintero;" or Waterhouse 1848:259 "the contents of various letters, which Mr. Bridges has been so kind as to address to me on these subjects" were sent to the Zoological Society of London (ZSL) or to the Natural History Museum (NHM; London, UK); and, (3) Bridges also collected several other type materials from neighboring Chilean localities, including the lectotypes of *Chelemys megalonyx* (Waterhouse 1845 [1844]) and *Octodon bridgesii* Waterhouse 1844 (see Thomas 1927). Chronologically, the oldest material under discussion is the lectotype of *A. fuscus*. The type locality was originally described as "Chile" (Waterhouse 1842 [1841]:89) but was quickly corrected to "Valle de las Cuevas, on the eastern side of the Andes, about six leagues from the slopes of the volcano of Peteroa, at an elevation of from 5-7000 feet, in S. lat. 35°" (Bridges 1844 [1843]:130). It was later amended by Thomas (1927:553), when he selected the lectotype of the species, to "Valle de las Cuevas, near Peteroa, E. side of Andes, Chili." Subsequent authors writing about *A. fuscus* have repeated this type locality without questioning its exact location (e.g., Verzi et al. 2015), although the Argentine provenance of the material was more equivocal ("Valle de las Cuevas, described by Bridges as some six leagues from the volcano of Peteroa and apparently on the eastern side of the Andes in Argentine territory;" Osgood 1943:112, see also his "Map 1," probably the single existing map on which this locality is plotted). This valley was described as located "on the eastern side of the Andes, where it [*A. fuscus*] completely undermines the face of the country, especially in dry places, making it very disagreeable for the rider, as the horses are continually plunging into the burrows. It must lay up a winter store, or otherwise migrate, or remain buried in the snow at least three months during the winter season" (Waterhouse 1842 [1841]:92). Bridges (1844 [1843]:130-131) added "Whilst rambling in search of the beautiful alpine plants I could not help feeling surprise at finding animals of this order [rodents] in such a locality as those elevated valleys, which are covered with snow at least four months during the year" (see also Waterhouse 1848:265). We suggest that Valle de las Cuevas is a name coined by Bridges to highlight the numerous burrow systems detected there and, as a result, this locality name is not recorded in cartography. By the contrary, Las Cuevas is a high-Andean station very close to the Argentinean-Chilean border over the route between Los Andes and Mendoza, distant about 300 km north of the locations here discussed.

In contrast, Peteroa (the other geographic reference provided in the description of the type locality) is a well-known volcano that sits on the Argentine-Chilean border. Setting one league equal to 5 km, Bridges' "Valle de las Cuevas" would be about 30 km from Volcán Peteroa. However, there is no indication as to whether Bridges traveled to the east, to the north, or to the south after passing near this volcano. This uncertainty is not trivial, as several trans-Andean routes were in use in that region during the first half of 19th century (Valenzuela-Márquez 2007; Lacoste 2018; Lenoble 2019). If we assume that Bridges was travelling to Mendoza and that during that time he settled in or near Curicó, Chile (Johnston 1928:102-103), then the most obvious direction from Peteroa is to the east. However, it remains to be determined which pass was used to cross the

Andes and in which year these collections were made.

Bridges botanical collections have received attention due not only to their number and variety but also to the associated geographic uncertainties. Thanks to the detailed research by Johnston (1928) based largely on Bridges' notes and letters, we were able to extract crucial information regarding his activities. He was born in 1807 and began working as collector in Chile in 1828. Settled in Valparaíso, he spent his first years near this city with only a single excursion to Argentina that followed the route of Aconcagua (in 1830), well north of Peteroa. By the end of 1832 and during 1833, Bridges worked around Valdivia, reaching Chiloé Island. He spent the following several years pursuing other activities near Curicó but returned to botanical collecting in 1841. In a letter dated 1 June 1841, he indicated that during this year he "… made an excursion over the Andes by Pass of Planchon, lat. 34-35°, to the elevated valley on the eastern slope;" accordingly, "to reach Paso El Planchon, lat. 35°12'S., Bridges had to ascend the cordillera entirely within Curico" (Johnston 1928:102). The association between this excursion and the collection of *A. fuscus* is largely without doubt, since this animal was presented by G. Waterhouse on November 9, 1841, right after Bridges' excursion. Based on these data, we can assert the following two pieces of information: (1) Bridges crossed the Andes from Chile to Argentina using the Paso (= Pass) del Planchón and (2) he collected the original specimen of *A. fuscus* during the southern summer (January to March) of 1841. Paso del Planchón is located about 5 km north of Volcán Peteroa (summit point at 4 135 m). On the Argentine side, this route leads to a nearby series of small valleys and, after approximately 30 km, to a large valley containing the río Tordillo that is known as Valle Hermoso (Carta Topográfica del Instituto Geográfico Militar "Malargüe", Hojas 3572-IV and 3569-III, 1971, scale 1:250 000; **Fig**. 1). To access the next valley to the east (Valle de las Leñas), it is necessary to cross about 10 km of mountains (**Fig**. 1), indicating that there is no other nearby valley that matches Bridges description of the location at which he captured *A. fuscus*. To suggest that Valle Hermoso is the Bridges' "Valle de las Cuevas" is the most parsimonious hypothesis according to the evidence at hand.

The four species of rodents from southern Mendoza that Thomas named after Bridges were originally associated with FSR (Thomas 1894, 1895, 1912, 1918). This locality was not mentioned by Waterhouse (1842 [1841], 1848), nor by Johnston (1928). We found a single reference to this fort, related to a comment about the elegant crested tinamou (*Eudromia elegans*) in Bridges (1847:29), "My men informed me that it is abundant on the Pampas, near the forts of San Raphael [Rafael] and San Carlos, between 33° and 34° south lat." After the trip to Valle de las Cuevas in 1841, there are no records of subsequent collecting activities by Bridges in Argentina. Instead, he directed his attention to northern Chile, Bolivia, Brazil, and then to the USA and Canada before returning to Chile, and, finally, traveling to Nicaragua before his death in 1865 (Johnston 1928). The last quarter of a century of his life also involved travels to Europe, at least one which, in 1842, was made via Mendoza (1928:103). Therefore, there is almost nothing to connect the rodents described by Thomas with collecting trips near FSR. If Bridges has occasionally passed through this locality, we have no confirmation of this from any source.

We agree with Pearson & Lagiglia (1992) that FSR is a spurious type locality. In addition to the information presented above and the known ecological preferences of the rodents in question, crucial evidence for this point comes from the book of entries for the NHM. Page 277 of this volume, which dates to the year 1860 (**Fig**. S1), lists materials received from the ZSL collections (see below). At the top of the page are two specimens of *Ctenomys* recorded as *Ctenomys braziliensis*; added in different handwriting is the epithet "*pontifex*," the locality "Fort San Rafael," and the remark "Type [underlined], 1912." These additions were made by O. Thomas and link these two specimens to museum numbers BM 60.1.5.1 and BM 60.1.5.2, this latter designated as the holotype of *C. pontifex*. Similar corrections and additions are evident on the original labels for the skins and the skulls of both animals (**Fig**. S2). On the same page of the book of entries, below the two specimens of *Ctenomys,* a variety of "*Mus*" are listed. The entry for the fourteenth of these specimens, originally referred to as *megalonyx*, has been crossed out and replaced with Thomas' handwriting identifying the animal as "*macronyx*," and adding the locality "San Rafael," as well as the notation "Type [underlined]." On the following line, the fifteenth specimen, originally identified as *longipilis*, has been corrected to be "*hirtus*" and notation "Type [underlined] Thos. 1895" has been added (**Fig**. S1).

Why did Thomas add "FRS" to the materials collected by Bridges? We do not have a definitive response but the labels for these materials offer a

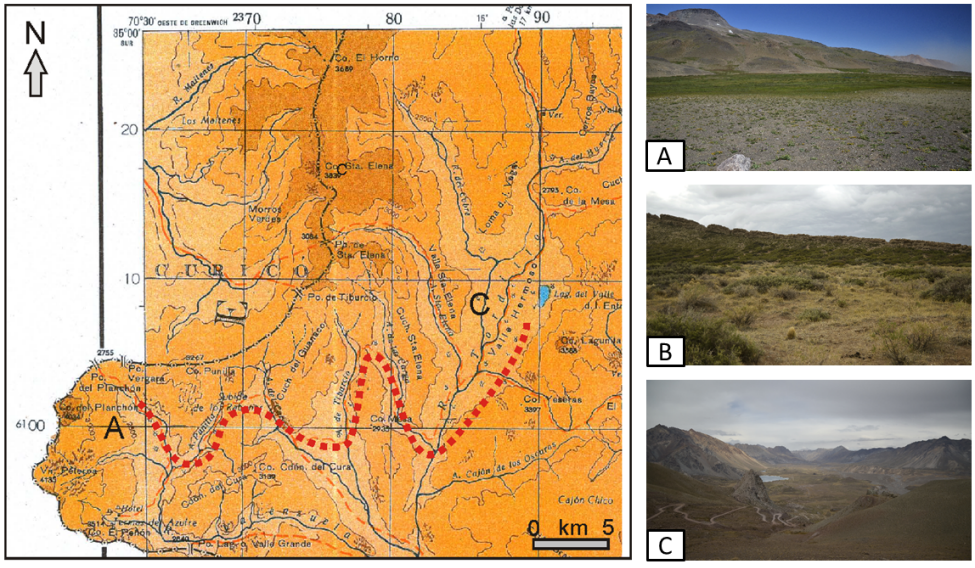

Fig. 1. Plausible route followed by Thomas Bridges in southwestern Mendoza Province (dashed line in red), from Paso del Planchón A) to Valle Hermoso C), reconstructed in the right side of the Carta Topográfica del Instituto Geográfico Militar "Malargüe" (Hojas 3572-IV and 3569-III). A) Landscape views of the high-Andean steppes at Paso del Planchón; B) The Monte desert habitat near Fuerte de San Rafael; C) Panoramic of Valle Hermoso taken from the north divisor ridge (photos by M. Tammone, 2019).

potential clue. The holotype of *Ctenomys pontifex* has three labels attached to it, two of them tied to the skin and the third tied to the skull (**Fig**. S2A-B). This information on the latter was clearly handwritten by Thomas (**Fig**. S2B), probably when the skull was removed from the stuffed skin, as was typical for specimens sent to London in the early 19th century. The two labels attached to the skin look much older and, on one side, reveal two sets of handwriting (**Fig**. 2A and **Fig**. S2A). One of these labels is a small, rectangle piece of paper indicating "60.15.2 G. R Waterhouse Esq." The other, which is larger and currently broken in two pieces, states "*Ctenomys magellanicus*? From the East side of the andes near Fort San Rafael. Province of Mendoza." To the best of our knowledge, this is probably the original source that Thomas used to attribute this material to FSR. However, several questions remain. For example, who prepared these labels? Were the labels written by one or two different people? Thomas can clearly be discarded as the author of these labels due to his distinct handwriting, as evident from the corrections to this tag: crossing out "magellanicus" and replacing it with "pontifex, Thos.," and also adding "Type," "♀," "60.1.5.2.," and "Coll. T. Bridges." Other potential candidates include Waterhouse and Bridges, although other possibilities exist (e.g., ZSL or NHM curators). The handwriting employed on the small, rectangular label is the same used to complete several of the entries in the NHM catalogue (**Fig**. S1); it is an elegant calligraphic hand that can be attributed to the NHM curator (by 1860, J. E. Gray; see Thomas 1906). The larger label was clearly not written by the same person; if the larger label was made by Bridges, it would provide an original indication about the geographic provenance of the material under discussion. To address this possibility, we compared this tag with several examples of labels handwritten by Bridges for plant specimens (**Fig**. S3). Even allowing for some variations in handwriting, Bridges can be discarded as the author of the larger label attached to the holotype of *pontifex*.

The evidence provided here indicates that neither Thomas nor Bridges were the creators of the larger, broken label, attached to the holotype of *pontifex* on which FSR is mentioned. Thus, a third person was involved. The smaller label is clearly from 1860 or later because it has an original museum number; according to the system employed by the NHM, the first number on a tag indicates the year. In contrast, the larger tag has nothing to indicate a date. However, considering how these materials arrived in the London collections may shed some light on this issue. According to the

historical account of the Mammal Collection of the NHM (Thomas 1906:23), Bridges contributed "254 Mammals, mostly small, from Chili, Bolivia, and Argentina. Purchased, either direct from M. Bridges, or from his agent, H. Cuming, or received with the Zoological Society's Museum… The specimens were worked out by Mr. G. R. Waterhouse, then Curator of the Zoological Society's Museum…" Therefore, two sources for Bridges materials are indicated – Bridges and Cuming.

The ZSL collection was actively managed by G. Waterhouse beginning in 1836 (after the death of Edward T. Bennett) and continuing until 1843, when he became assistant curator in the NHM. Transfer of the ZSL collections to the NHM began several years later. Thomas (1906:8) summarized "1853. Accessions, 267. In this year the first commencement was made of the transfer of the specimens in the Zoological Society's Museum to the National Museum…" ; 1855. Accessions, 582. This year is memorable in the annals of the Museum for the receipt of the chief portion of the Zoological Society's Museum, the most important and historical accession ever received." After Waterhouse left the ZSL, the institution made several efforts to preserve their scientific collections, although this interest progressively declines due to a lack of funding (Scherren1905:99).

We can "fix" several dates by trying to reconstruct the history of Bridges' materials and the associated localities. If the holotype of *pontifex* is part of the material catalogued in 1860, it was transferred from the ZSL around 1853 or 1855 (cf. Thomas 1906:8). Therefore, the specimen in question was collected prior to 1853 or 1855. However, given that it was not mentioned by Waterhouse (1848:272-285) in his detailed account on *Ctenomys*, it seems reasonable to suppose that the material was sent by Bridges to the ZSL after ca. 1848 but before 1853-1855. We can try to narrow this temporal window by comparing the several rodents collected by Bridges with their respective dates of publication and museum numbers (Thomas 1927; **Table** 1).

Aconaemys fuscus, presented by Waterhouse in 1841 (but published in 1842, see Duncan 1937), was catalogued in 1855, almost certainly as part of the large set of material transferred from the ZSL to the NHM collections (Thomas 1906:8). However, a paralectotype of *Octodon bridgesii*, although presented by Waterhouse in 1844 (but published in 1845, see Duncan 1937) was catalogued in 1843, clearly indicating that this specimen was accessioned directly (i.e., received directly from Bridges or via Cuming) into the NHM collections without intermediaries. Indeed, Thomas (1906:23) indicated 1843 as the year for the first accession of a mammal specimen secured by Bridges into the NHM collections. The lectotype for *O. bridgesii* was catalogued in 1855, at the same time as the lectotype for *A. fuscus*. For *Chelemys megalonyx*, a species described by Waterhouse in 1844, the type specimens were catalogued in 1843 and 1844. Therefore, all of these materials likely were originally received by the NHM without having passed through the ZSL collections. The same seems to be true for the two Bolivian *Ctenomys*, which were published in 1847 and catalogued in 1846 (**Table** 1). Apparently, the relationship between the year of cataloguing and the year of publication is variable, with no fixed temporal pattern to these events. The common elements behind these species and museum actions are the role of G. Waterhouse and the housing of these materials in the NHM collections beginning in 1843, which coincides with his move to this institution.

Of the four species described by Thomas as collected at FSR, all but one were catalogued in 1860 (**Table** 1); the sole exception was *E. mordax*, which was included in the batch of specimens accessioned in 1855 and, in consequence, was part of the transfer between the ZSL to the NHM collections. Here, we detect the first potential "inconsistency" among these materials. If one specimen was catalogued in 1855 and the remainder in 1860 yet all share a common geographic provenance, it is possible that there was more than one round of collecting, that the lone specimen was personally delivered by Bridges (directly or via Cuming), or that there was a delay of five years between the acceptance of these materials and their cataloguing. The latter seems unlikely because it is not logical that one specimen was catalogued in 1855 but the others were maintained without museum numbers for multiple years. It seems most plausible that the specimens incorporated to the NHM collections in 1860 were received in that year or shortly before. Bridges had virtually ceased his collection activities in South America by 1851 (Johnston 1928:105) and, as a result, the specimens catalogued in 1860 were not collected during the previous decade (i.e., 1850-1860). Instead, all available evidence points toward the material already being in London.

The most parsimonious explanation for the peculiarities described here rests with the actions taken by G. Waterhouse. The holotypes of *hirta*, *macronyx* and *pontifex* are part of a batch of specimens recorded in the NHM catalogue page for 1860

Table 1

Dates of publication and museum numbers for several species of rodents based on materials collected by T. Bridges.

Species (original name)*	Date of publication	Voucher museum number (BM)**	Remarks
Schizodon fuscus	1842	55.12.24.195 (lectotype)	Mentioned in Waterhouse (1848)
Octodon bridgesii	1844	43.7.20.5 (paralectotype) 55.12. 24.196 (lectotype)	Mentioned in Waterhouse (1848)
Hesperomys megalonyx	1844	43.12.30.39 (paralectotype) 44.10.7.37 (lectotype)	
Ctenomys boliviensis	1847	46.7.28.57 (lectotype)	Mentioned in Waterhouse (1848)
Ctenomys leucodon	1847	46.7.28.60 (lectotype)	Mentioned in Waterhouse (1848)
Acodon macronyx	1894	60.1.5.14	
Acodon hirtus	1895	60.1.5.15	
Euneomys mordax	1912	55.12.24.199	
Ctenomys pontifex	1918	60.1.5.2	Not mentioned in Waterhouse (1848)

*Ordered by year of publication
**Holotype, unless otherwise indicated

(**Fig**. S1). At the top of the page, the specimens were recorded in careful handwriting and with sequential numbers (1 to 41). The first 15 specimens were originally recorded only by genus names (*Ctenomys* or *Mus*), material type (skin), under the heading "Presented by G. R. Waterhouse, Esq." In contrast, specimens 28 to 41 are labeled "Zoological Society s Collection Received from Waterhouse." This subtle difference, between "presented" and "received" is an indication that the specimens of interest (1 to 15) were entered to the NHM collection in 1860 or shortly after and, until that, they were under the control of G. Waterhouse. Returning to the large, ripped label associated with the *pontifex* holotype, all of the above evidence suggests that G. Waterhouse is the most likely author. Why FSR has become associated with this specimen remains a mystery but it is possible that Waterhouse received additional information from Bridges that allowed the former to be more specific than the vague "Eastern side of the Andes" repeatedly used by Bridges in his botanical collections (**Fig**. S3).

Why Thomas chose to use FSR to geographically anchor these materials will probably never be easy to understand. Perhaps he realized that Valle de las Cuevas was a made up name and, as a good connoisseur of Argentinean geography, he opted to use the name of a well-established locality at that time. In the publication in which he erected *P. macronyx*, Thomas (1894:363) noted the locality as "Hab. East side of the Andes, near Fort San Rafael. Province of Mendoza. Coll. T. Bridges." More than two decades later he used the same locality but included quotation marks around a portion of this description ('East side of the Andes near Fort San Rafael, Province of Mendoza.' Thomas 1918:40), perhaps to indicate some degree of geographical uncertainty. It is possible that the rationale behind Thomas' geographic conjecture was simply cartographic: all English maps depicting southwestern Mendoza during the second half of 19th indicate FSR (under several abbreviations such as "Ft S. Rafael," "F. S. Rafael," or "S. Rafael") as the single named locality near Volcán Peteroa (**Fig**. 2B and C).

All of this raises the question that, if the connection between these rodents and FSR is apocryphal, where were the actual collection localities for these animals? Pearson & Lagiglia (1992:38) proposed that the animals were collected near Peteroa volcano. They based this conclusion on a potential orthographic error or misunderstanding of Bridges' notes regarding the "Petorca" or "valley of Petorca" locality mentioned by Waterhouse (1842 [1841]) for these specimens. Pearson & Lagiglia (1992) appear, however, to have overlooked that Petorca is a well-known Chilean locality that was worked by Bridges (Johnston 1928:103). Our hypothesis is more parsimonious; according to available evidence (see above), all of the mammals collected by Bridges in southwestern Mendoza were obtained at a single locality, Valle de las Cuevas. Therefore, following the recommendation 76A.2 of the ICZN (1999), we suggest that the type localities for *Aconaemys fuscus*, *Paynomys macronyx*, *Abrothrix* (*Abrothrix*)

Fig. 2. A) Original labels attached to the skin of the holotype of *Ctenomys pontifex*; B) and C) Details of two historical maps (B: Colton, G.W. 1869; C: Letts, Son & Co. 1883) showing vicinities of Volcán Peteroa and the supposed location of Fuerte de San Rafael (source: <https://www.oldmapsonline.org>).

hirta, *Euneomys mordax*, and *Ctenomys pontifex* be corrected to Valle Hermoso (35.15° 70.21°, 2 200 m, Department of Malargüe, Province of Mendoza, Argentina; Appendix 1). Valle Hermoso is a long-standing toponym recorded from the map of V. Martin de Moussy made in 1873. Valle de las Cuevas is a made up name, the use of which should be limited to historical discussions about the collections of T. Bridges.

FINAL REMARKS

Does it make sense to correct the type locality of these rodents, particularly if the linear distance between Valle Hermoso and the historical placement of Fuerte de San Rafael is only ca. 160 km? We believe that the change is necessary not because of the distance but yes due to their environmental distinctiveness (**Fig**. 1). The sharp altitudinal gradient between Fuerte de San Rafael and Valle Hermoso determines that these localities are occupied by almost completely different communities of small mammals (Fernández et al. 2011). Fuerte de San Rafael is located in Monte desert shrubland dominated by the cricetids *Akodon dolores molinae*, *Calomys musculinus*, *Graomys griseoflavus*, and the caviomorphs *Ctenomys mendocinus* and *Microcavia australis* (Pearson & Lagiglia 1992; Ojeda et al. 2011). In contrast, the high-Andean, grassy steppe habitat at Valle Hermoso is occupied primarily by Patagonian cricetids, including those discussed in this paper. This locality was recently sampled, and both *Euneomys* and *Paynomys* were collected there (Ojeda et al. 2005).

Several additional concerns persist regarding the mammal collections by Bridges. According to Thomas (1917:282), "The British Museum contains eleven specimens of *Aconæmys fuscus*, received at different dates from Mr. T. Bridges, but whether all were from the 'Valle de Las Cuevas, on the east side of the Andes, near the Volcano of Peteroa, altitude 6000' where Mr. Bridges discovered the species, there is, unfortunately, no evidence to show." In addition, when he described *C. pontifex*, Thomas stated "Mr. Bridges collected in this region [southwestern Mendoza] a number of tuco-tucos which have hitherto been assigned to Philippi's *Ctenomys mendocinus*" (Thomas 1918:40). This suggests that there may be materials from Bridges not yet revised in the NHM collections that may help to clarify the geographic uncertainties described here. However, regarding Bridges' collecting activities, Thomas (1906:23) also wrote "He obtained considerable series of many obscure species, making at the same time most careful observations on their distribution and habits. Unfortunately owing to the lax ideas about geography then prevalent, his specimens were simply recorded as being from 'Chili,' and their exact habitats, with a few exceptions, were lost."

These remaining concerns aside, the mammalogical legacy of T. Bridges is noteworthy and is not diminished by the geographical issues discussed in this contribution. He conducted extensive field work in hostile regions under harsh environmental and political conditions. Thanks to his efforts we have the sole Argentinean records for *A. fuscus* and *C. pontifex*, two caviomorphs which await further studies by collectors as intrepid as Bridges was.

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APPENDIX 1

Taxonomic summary for the species discussed in this contribution.

Family Cricetidae
Subfamily Sigmodontinae
Tribe Abrotrichini

Abrothrix (*Abrothrix*) *hirta* Thomas, 1895 [holotype BM 60.1.5.15]. Originally described as *Acodon hirtus* with type locality "Fort San Rafael, Mendoza" (Thomas 1895:370), here corrected as Valle Hermoso, Mendoza, Argentina.

Paynomys macronyx (Thomas, 1894) [holotype BM 60.1.5.14]. Originally described as *Acodon macronyx* with type locality "East side of the Andes, near Fort San Rafael, Province of Mendoza" (Thomas 1894:363), here corrected as Valle Hermoso, Mendoza, Argentina.

Tribe Euneomyini

Euneomys mordax Thomas, 1912 [holotype BM 55.12.24.199]. Originally described as *Euneomys mordax* with type locality "Fort San Rafael, Province of Mendoza" (Thomas 1912:410), here corrected as Valle Hermoso, Mendoza, Argentina.

Family Ctenomyidae

Ctenomys pontifex Thomas, 1918 [holotype BM 60.1.5.2]. Originally described as *Ctenomys pontifex* with type locality "East side of the Andes near Fort San Rafael, Province of Mendoza" (Thomas 1918:40), here corrected as Valle Hermoso, Mendoza, Argentina.

Family Octodontidae

Aconaemys fuscus (Waterhouse, 1842 [1841]) [lectotype BM 55.12.24.195]. Originally described as *Schizodon fuscus* with type locality "Valle de las Cuevas, near Peteroa, E. side of Andes, Chili" (Thomas 1927:553), here corrected as Valle Hermoso, Mendoza, Argentina.

ONLINE SUPPLEMENTARY MATERIAL

Supplement 1

Fig. S1. The image is of page 277 of the accession log from the British Museum of Natural History, London. The page is dated 1860; the first two specimens shown correspond to *Ctenomys pontifex*. The 14th and 15th specimens correspond to *Paynomys macronyx* and *Abrothrix hirta*. Taxonomic corrections as well as the locality "fort San Rafael" and notes "Type" were later added by O. Thomas (photo: BM data portal <https://data.nhm.ac.uk/>).

Fig. S2. A. and B. Original labels associated to the skin and skull of the holotype of *Ctenomys pontifex* BM 60.1.5.2., respectively. C. and D. Original labels associated to the skin and skull of *Ctenomys pontifex* BM 60.1.5.1., respectively (photo: Kevin Webb).

Fig. S3. Examples of some of the examined labels handwritten by Thomas Bridges associated to plant specimens (source: JSTOR Global Plants <https://plants.jstor.org/>).