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A nomenclatural note on *Mosasaurus hoffmanni* (Squamata, Mosasauroidea)

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Abstract

The historically important mosasaur fossil (known as 'le grand animal fossile des carrières de Maestricht') has been known as *Mosasaurus hoffmanni* for almost two centuries now. Recently, it has been proposed to amend the spelling of the species name, by adding a second 'i' to the species epithet. We present historical evidence to the contrary, and recommend, following article 33.2.3.1 of the ICZN, to retain the specific epithet *hoffmanni*.

Introduction

The cradle of vertebrate palaeontology, one might argue, lies in the Maastricht area (south-east Netherlands). The first discovery, in 1764, of the fossilised remains of impressive carnivorous reptiles in the type area of the Maastrichtian Stage (Dumont, 1849; Jagt et al., 2024), comprised a partial skull that is now on display at Teylers Museum (Haarlem, the Netherlands). This was followed in October 1778 by the historically even more important specimen that ultimately made it, in 1795, to the collections of the Muséum national d'Histoire naturelle at Paris, almost immediately sparking a debate on the identity and origin of such marine giants. Subsequently, the historical importance of 'le grand animal fossile des carrières de Maestricht' increased further through the first description of the 'Paris' specimen (Cuvier, 1808) and further works of Georges Cuvier, who used it in his development of the concept of extinction (Cuvier, 1812). Only later were formal generic and specific names for this specimen proposed, i.e., *Mosasaurus hoffmanni*, by Conybeare (1822) and Mantell (1829), respectively, followed by the introduction of the family of the Mosasauridae by Gervais (1848–1852). The species name honours the Maastricht-based, Swiss-born army surgeon and naturalist, Johann Leonhard Hoffmann (1710–1782), who had been the first to comment on the identity of the partial skull (Mantell, 1829). Recent contributions covering aspects of the discovery, history, taxonomy and nomenclature of *Mosasaurus hoffmanni* include Rompen (1995), Bardet & Jagt (1996), Mulder (2004), Pieters et al. (2012), Schulp et al. (2013) and Hovens (2020), to which reference is made here.

Almost two centuries after the taxon was named, Konishi et al. (2014) proposed to use the spelling of the species name with double *–i*, as *Mosasaurus hoffmannii*, instead of the widely used *M. hoffmanni*. In favour of this, those authors listed several considerations, mainly revolving around the first use of the spelling with *–ii* by Mantell (1829), as a presumed Latinisation of the surname Hoffmann; however, they also mentioned that, shortly after its introduction, the version with a single *–i* became the one that has been exclusively used ever since.

In the present note, we shall add other observations and considerations to arguments outlined by Konishi et al. (2014). Based on these, we recommend that the spelling *hoffmanni*, rather than *hoffmannii*, be retained so as to ensure a stable, unambiguous nomenclature and reflect the lack of any historical evidence of Latinisation of Hoffmann's name during his lifetime.

Historical background and discussion

Following the arguments in Konishi et al. (2014, p. 803) for reverting to the initial spelling with double *–i*, we consider it of importance to home in on the historical context and explore the use and mode of Latinisation of surnames in Hoffmann's time, and, more generally, in northwest European academic circles in the late 18th and early 19th centuries. To that end, we wish to address the following four questions and add our considerations to the debate initiated by Konishi et al. (2014).

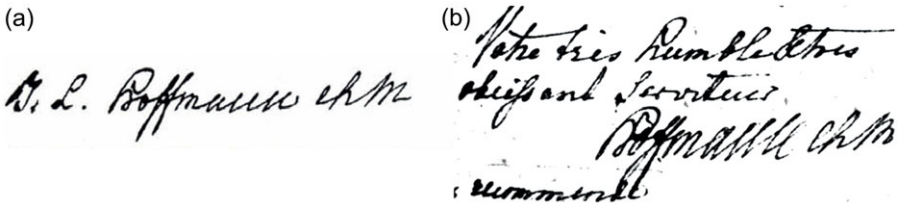

Figure 1. Latinisation of names in academia in Hoffmann's time. In signing his letters, Hoffmann used his German family name, Hoffmann (double n); not the Latinised 'Hoffmannius' (as envisaged by Konishi et al., 2014) (reproduced from **A**, Lever, 1995 and **B**, Van Regteren Altena, 1956, respectively, courtesy of Natuurhistorisch Genootschap in Limburg). The suffix 'ChM' stands for 'Chirurgien major' (see Lever, 1995).

Did Hoffmann Latinise his name?

Three letters (dated 1771, 1774 and 1775), written by Johann Leonhard Hoffmann, survive to this date. These letters show that Hoffmann himself (at least judging from his signature) did not Latinise his surname (Van Regteren Altena, 1956) (Fig. 1A and B).

Was Latinisation still common practice in Hoffmann's time?

The use of Latin in academic circles across western Europe already began to decline in the mid-17th century. While scientists in the Low Countries, amongst whom Herman Boerhaave (1668–1738), still used some form of Latinisation ('Herman' became 'Hermannus', but 'Boerhaave' remained 'Boerhaave'), this became fully outdated soon after. We have compiled an overview of Latinised names of professors at Leiden and Utrecht universities (Fig. 2), which shows that Hoffmann was active at a time when this was no longer common practice, with the great majority (94%) of professors at both institutions in the 50-year bin not listed with a Latin(ised) name.

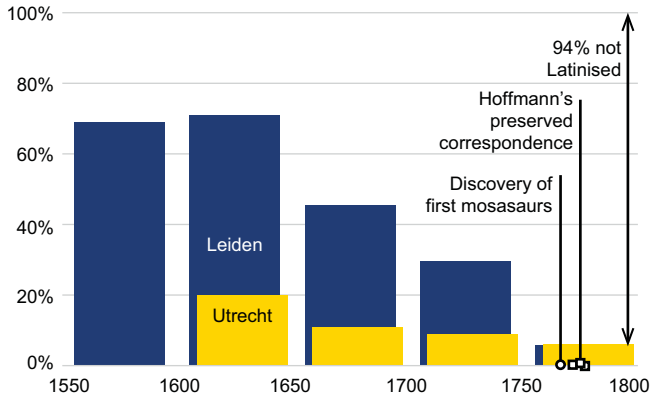

Figure 2. Latinisation of (Dutch) family names rapidly went out of fashion towards the second half of the 18th century in the Netherlands. This graph tracks the Latinisation (or lack thereof) of the family names of professors at the universities of Leiden (blue) and Utrecht (yellow), in 50-year bins by the year of accepting their position; data retrieved from hoogleraren.leidenuniv.nl and profs.library.uu.nl (accessed September 2019 and August 2021, respectively). Mosasaur discoveries and dates of Hoffmann's surviving letters are indicated on the timeline as well.

If Hoffmann's name was Latinised, then how?

If indeed Hoffmann had decided to translate his surname 'in full' into Latin, the proper Latinisation would not have been 'Hoffmannius', as argued by Konishi et al. (2014), but 'Hortulanus' or 'Agricola' instead. Note that, in this case, the meaning of the name 'Hoffmann' would be synonymous with 'Gärtner' ('gardener'). Thus, if Latinisation would be the deciding factor, we might even argue that the specific epithet should have been *Mosasaurus hortulani* or *Mosasaurus agricolae*, rather than *Mosasaurus hoffmanni.* In our opinion, this would be a particularly undesirable route to pursue as far as an unambiguous and stable taxonomic nomenclature is concerned (see the last point below).

The simple addition of a Latin ending was occasionally done as well. However, the question remains as to *how* exactly to 'Latinise' the name in the first place. Indeed, Hoffmannius would have been an option: in the Netherlands, surnames like Althuisius and Janssenius do exist, having been derived from Althuis and Janssen, respectively. This would have resulted in the species name *hoffmannii*. But in turning 'Hoffmann' into Latin, 'Hoffmannus' (with the resultant genitive '*hoffmanni*') would have been an equally valid choice (Nicolson, 1974). In view of this, to present only one of the many possible Latinisations, as Konishi and colleagues did, does not settle the issue unambiguously.

It should also be noted here that in his papers Mantell was rather inconsistent in the use of *–i* vs. *–ii*, and that we have not been able to detect any underlying pattern. Examples include a number of Late Cretaceous macrofossil taxa such as the lobster *Enoploclytia Leachii*, the ammonite *Ammonites Woollgari* and the limid bivalve *Plagiostoma Hoperi*, as well as the inoceramid bivalves *Inoceramus Cuvieri*, *I. Brongniarti* and *I. Lamarckii*.

What are the rules as set forth in the ICZN Code?

Even if we assume that Hoffmann actually did use the Latinisation of 'Hoffmannius', the 'prevailing use' of the specific epithet *hoffmanni* would still have priority, as careful reading of the ICZN code demonstrates. Article 33.2.3.1 reads, '. . . when an unjustified emendation is in prevailing usage and is attributed to the original author and date it is deemed to be a justified emendation. Example. Because *Helophorus*, an unjustified emendation by Illiger (1801) of *Elophorus* Fabricius, 1775, is in prevailing use in the Coleoptera and attributed to Fabricius, it is deemed to be a justified emendation; the name *Helophorus* Fabricius, 1775 is to be maintained as the correct spelling.' With respect to our specific example, Konishi et al. (2014) observed that, 'Starting with Mantell (1851), [. . .] virtually all subsequent authors have spelled the specific name with a single 'i' (e.g., Camp, 1942; Russell, 1967; Bell, 1997).' Following this, they made reference to ICZN Article 31.1.1, concerning the genitive of the Latinised name and specifically noted that Hoffmann's '[. . .] family name *can* be latinised as Hoffmannius.' (Konishi et al., 2014, p. 803) [our italics]. Above, under the first three questions, we have indicated that a Latinised 'Hoffmannius' would not have been very likely, and, most importantly, in the last point we show that Mantell's, 1851 spelling '*hoffmanni*' has been in prevailing use ever since. In summary, this is the version that should be retained, following ICZN Article 33.2.3.1.

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Conclusion

In view of the historical interest of *Mosasaurus hoffmanni*, an unambiguous and stable nomenclature is highly desirable. In response to suggestions made by Konishi et al. (2014) to use the spelling *hoffmannii* instead of *hoffmanni* for the species name, we here present historical evidence to make a case to the contrary, and recommend, following article 33.2.3.1 of the ICZN, to retain the specific epithet *hoffmanni*.

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