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Among hyenas: Nery Delgado, Albert Gaudry, Edouard Harlé and the hyenas of Furninha cave (Portugal)

João Luís Cardoso

The excavation of the Furninha cave, located on the coast of the Peniche Peninsula (Central Portugal), was directed by Nery Delgado in 1879/1880, and provided the largest European assemblage of Hyaena prisca/Hyaena hyaena prisca. *This is only comparable to the collection from the cave of Lunel-Viel, in the French Midi, from which the taxon was defined in 1828 by Marcel de Serres and collaborators. Delgado (1884) considered the existence of two distinct species:* Hyaena vulgaris *(=* H. hyaena*), the striped hyena, a species presently living in North and East Africa, as well as West and South Asia; and the extinct* Hyaena prisca*, which is of larger size. Albert Gaudry, who was consulted by Delgado, suggested the presence of a single species, known from Late Middle Pleistocene sites, which would anatomically differ only in size and robustness from the current striped hyena. This same collection was later studied by Edouard Harlé, who followed Gaudry's opinion, which has generally been accepted in the course of the 20th century. However, more recent studies carried out by the author, as well as J.-P. Brugal and collaborators (2012) have revealed that, besides its larger size and robustness, there are also morphometric differences between the current striped hyena and the Furninha hyena. These differences are supported by statistical tests, including PCA (principal component analysis). Although only one species appears to be present at Furninha, the difference in size observed by Nery Delgado, possibly due to geographic variation, suggests some morphological and size difference between* H. prisca *and the current striped hyena (*Hyaena hyaena*).*

Keywords: Furninha; *Hyaena prisca;* Nery Delgado; Albert Gaudry; Edouard Harlé

Joaquim Filipe Nery Delgado: a brief biography

Nery Delgado (1835–1908) was a Portuguese army engineer, geologist and archaeologist (Fig. 6.1). From 1857, he was remarkably active as assistant of the Second Geological Commission of Portugal. He assumed the direction of this institution in 1882, immediately after the death of Carlos Ribeiro. The value of his performance is attested by the successive promotions in his military career, reaching the rank of Lt. General. After 51 years at that institution, his sudden death in 1908 ended this glorious career when he contracted double pneumonia during his then to be last fieldwork season.

He was also was notable for his geological survey of the country, which resulted in the 1:500,000 scale edition of the Geological Map of Portugal published in 1876. This was almost immediately followed by a second edition two years later. It should be noted that a first, hand-coloured, sketch of this map, was awarded a prize at the Paris Universal Exhibition in 1867. In addition, he was actively involved in the stratigraphic and paleontological characterisation of the main geological formations of Portugal, especially those of Palaeozoic age. In this context, the Bilobites of the Beira quartzites and those related to the Palaeozoic of the Alentejo are particularly noteworthy (Choffat 1908).

As a geologist and archaeologist, he was internationally renowned, as proved by the correspondence he maintained with some of the most notable geologists and archaeologists of his time (Cardoso and Melo 2001). Nery Delgado, with Carlos Ribeiro and Francisco Pereira da Costa, embodies the emergence in Portugal of a scientifically-based research

Figure 6.1. Nery Delgado (1835–1908). Archive and photo by the author.

methodology for prehistory, closely linked to that of geological studies, whose methodological approach he was prepared to borrow (Cardoso 2020).

Furninha cave (Peniche)

'Furninha da descida do mar', or simply 'Furninha' (small cave) is a karstic cavity located on the escarpment of the southern coast of the Peniche Peninsula, in a Jurassic limestone formation, whose opening was caused by marine erosion (Fig. 6.2). During the last interglacial the sea level was 15 m above the current level, which is demonstrated by a sharp platform in front of the cave entrance. It was during this period that the opening of the cave formed, along with a vertical well in its interior. The base of the well was filled by a conglomerate that can be correlated with the more recent sea level of 5–8 m, observed on the exterior of the cave.

In the report of the Geological Works for the economic year 1879/1880, details of the excavation were reported (Relatório 1881, 19–20): 'The deputy [adjunto] of the section, Major Nery Delgado […] In the Peniche cave, which was completely empty, besides the objects in the upper deposit of Neolithic age, […], a partially extinct fauna […] was obtained in the lower deposit and at different successive levels […], that evidently was contemporary of man, as evidenced by the numerous bones, broken longitudinally, accompanying flint flakes and some instruments of this same substance, in which is evident an intentional action or intervention of an intelligent being […]. This officer made some short-term excursions to the sites where the caves' explorations were carried out, which he immediately had to examine' (Translated from Portuguese by the author; English version revised by Roz Gillis).

This description allows us to conclude that Nery Delgado was not permanently at the excavations of Furninha cave. Labels preserved today on some of the pieces of the LNEG Geological Museum also allow us to situate the first excavations taking place in 1865. The archaeological excavations carried out in the cave in 1879 and in the early 1880s by Nery Delgado were essentially due to the need to present new archaeological and paleontological findings at the IX Session of the 1880 International Congress, held in Lisbon. The previous Geological Commission had been deprived of almost all the collections, due to their move to the Escola Politécnica, (Polytechnic School) following the 1868 extinction of the Commission decreed by the Government (Cardoso 2013).

The lower deposit consisted of alternating sandy and faunal beds that accumulated above the basal conglomerate level of the 5 to 8 m beach. These were only observed in the vertical well identified inside the cave. The sedimentary sequence accumulated above this basal conglomerate level appears to be contemporaneous with the early Würm period. This is suggested by a uranium/thorium dating, though with large uncertainty limits (80 886 +42 423, –31 265 BP), since it was not possible to date any bone by radiocarbon method due to the lack of collagen (Cardoso 1993).

Some Middle and Upper Palaeolithic materials without known stratigraphy do occur, though these were not mentioned by Delgado (1884). The Upper Palaeolithic is represented by several techno-complexes, some of which have long been identified (Breuil and Zbyszewski 1945). They were recently reviewed (Bicho and Cardoso 2010), as well as the Neolithic remains (Cardoso and Carvalho 2010/2011), associated with two Neolithic necropolises.

Pleistocene faunas originate exclusively from the lower deposit explored in the well that opened vertically within the cave, corresponding approximately to a sequence of about 8 m in depth. The stratigraphic sequence was composed of alternating beds of sterile yellowish sands, as a result of wind transport from the vast exposed emerged area to the west, with seven bone levels. The bones were in an excellent state of preservation with abundant manganese staining on the surface. The fauna content appears to be similar in all

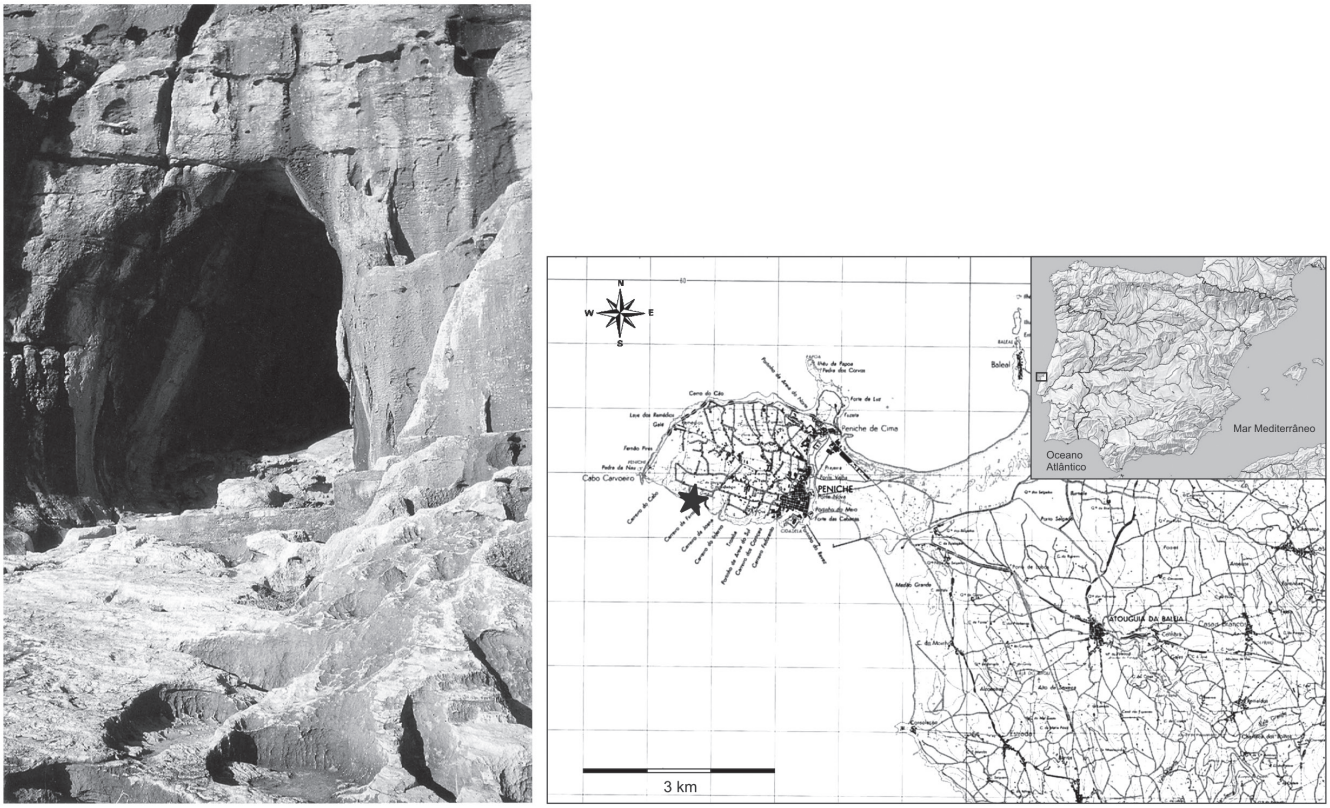

Figure 6.2. Location of the Furninha cave and view of its entrance. Photo and map by the author.

levels, which has led various authors to consider it as a single assemblage (Harlé 1910/1911; Cardoso 1993).

The identified seven bone levels reveal the occupation of the cavity essentially by hyenas, whose remains accumulated in great quantity along with their prey (horse, deer and aurochs) and coprolites show a recurring presence. The cave also served as a temporary refuge for other carnivores, such as bear, wolf, lynx and fox (Cardoso 1993). Humans used the cave at the same time as a shelter. This is evidenced by Middle Palaeolithic material, coeval to the Pleistocene occupation, along with a child's jaw, presumably belonging to a Neanderthal (Delgado 1884), collected from the third and richest bone level.

The importance conferred by Nery Delgado to the description of the Pleistocene deposits is demonstrated by his careful recording. The details of find location, in terms of level and depth, were marked individually on hundreds of the collected pieces. This care and attention to detail, as well as the unusual ability to report on the collected scientific data, confers to Nery Delgado the status of a pioneer of modern archaeological methodology (Zilhão 1993; Cardoso 2008).

The Furninha hyenas and their story

Among the remains of extinct faunas collected in the Furninha cave, the presence of *Hyaena hyaena prisca* deserves to be highlighted. Some authors prefer to call it simply *Hyaena prisca*, considering it as a separate species from the extant *Hyaena hyaena* (also known as *Hyaena striata*).

Marcel de Serres in 1828 was the first to propose the existence in Europe of a hyena species, which he called *Hyaena prisca,* which was different form the European cave hyena (*Crocuta crocuta spelaea*). With Dubreuil and Jeanjean, he characterised the first remains attributed to this species, from their explorations of the Lunel–Viel caves (SE of France) (de Serres *et al.* 1828). In the same year, another article was dedicated to the same faunal remains (Christol and Bravard 1828) designating them as belonging to *Hyaena monspessulana*, but without illustrating or describing the taxon. For this reason the original designation by de Serres and his collaborators has prevailed, despite the fact that Christol and Bravard's article was published first.

Currently the Furninha collection constitutes the most important *Hyaena prisca* fossil record on the European continent, even more so than those from the Lunel–Viel assemblage, which are stored at the Laboratoire de Géologie du Quaternaire de Marseille–Luminy (CNRS), and were examined personally by the author in 1989.

Following de Serres *et al.'s* (1828) publication, *Hyaena prisca* was considered to be a form of *Hyaena hyaena* in some Pyrenean deposits of the Middle Pleistocene:

Montsaunès (Harlé 1894) and Es–Taliens (Harlé 1895). Conversely, the bone remains from Montmaurin were classified as *Hyaena brunnea* (Boule 1902).

We can, however, be confident that the Furninha's material does not belong to *H. brunnea*. A modern jaw mould from Southern Africa observed at the Laboratoire d'Anatomie Comparée (MNHN de Paris) has a clearly distinct morphology that separates this piece from the Furninha remains (Cardoso 1993, 391). The Furninha remains were attributed to *H. hyaena* by Harlé (1910/1911), except one or two fragments later mentioned by Bonifay (1971), although she did not examine them personally. This conclusion put an end to a long period of uncertainty about the specific attribution of the remains of hyenas collected from Furninha. This uncertainty dates back to the time when Nery Delgado (1884) studied them. The eminent Portuguese geologist considered the occurrence of two forms (Delgado 1884, 239–240): 'One [of them] more frequent, intimately related to *H. vulgaris* [*i.e. H. hyaena* in modern terminology], and the other much rarer and of a larger size, which we suppose to be *H. prisca*' (original text in French).

The uncertainty of the taxonomic status of these two forms justified the consultation by Nery Delgado of the French palaeontologist Albert Gaudry (1827–1908) (Fig. 6.3), to whom he wrote two letters in 1885. These were accompanied by photographs of a skull and two hemi-mandibles, one of them attributed to the photographed skull. The official justification for such an initiative was presented in the following terms:

> Having the wise professor of Palaeontology at the Paris museum, Gaudry, presented to the Institute a note, in which he noted with surprise that the species of fossil hyena found in France's quaternary deposits is not the same as that found in Algeria, but rather that which is seen in Southern Africa, and today is not found north of the 17th degree latitude; the head of the section, who had previously expressed a different view from Portugal, arguing that the two species coexisted here in the fourth epoch, felt that he should address himself to this expert and to receive his opinion on the matter; and by the correspondence exchanged with him, he was pleased to see his appraisals confirmed (Relatório 1886, 18).

The drafts of these missives written by Nery Delgado are preserved at the LNEG Historical Archive. Unfortunately, Gaudry's response to these letters has been not found. Similarly, the original letters received by Gaudry are not included in the archive of his correspondence, kept at the MNHN (Paris), as was personally verified by the author in 2015.

Following Edouard Harlé's (1850–1922) interest in studying the Pleistocene mammals and birds of the Portuguese territory, Nery Delgado refers to the prior studies undertaken by himself and Albert Gaudry in two letters sent to the French scholar in 1897 and 1899. These two documents can be considered as the genesis of the paper presented by Harlé on the hyena of Furninha (Harlé 1909) and his remarkable synthesis of the Pleistocene mammals and birds known from Portugal (Harlé 1910/1911, 30).

Figure 6.3. Albert Gaudry (1827–1908). Marble portrait in the Muséum National d'Histoire Naturelle, Paris. Photo by the author.

More recent work (Kurtén 1968) has supported Albert Gaudry and Edouard Harlé's opinion that the hyena fossil represented by the Furninha remains, belong to a fossil form of the modern-day striped hyena, which could be referred to as *Hyaena hyaena prisca.* The only distinction between the modern and fossil forms is the greater size and robustness of the latter.

The correspondence between Nery Delgado and Albert Gaudry

Two letters written by Nery Delgado in French addressed to Albert Gaudry, are translated below in full, keeping the original form. The letters are in a draft form as the final version received by Gaudry could not be found.

1st letter. Pack 91 – Folder 1 (Fig. 6.4)

Autograph draft letter sent by Nery Delgado to Albert Gaudry.

Lisbon, April 8, 1885

Dear Sir and most honoured master.

I hope you excuse me for the inconvenience I am about

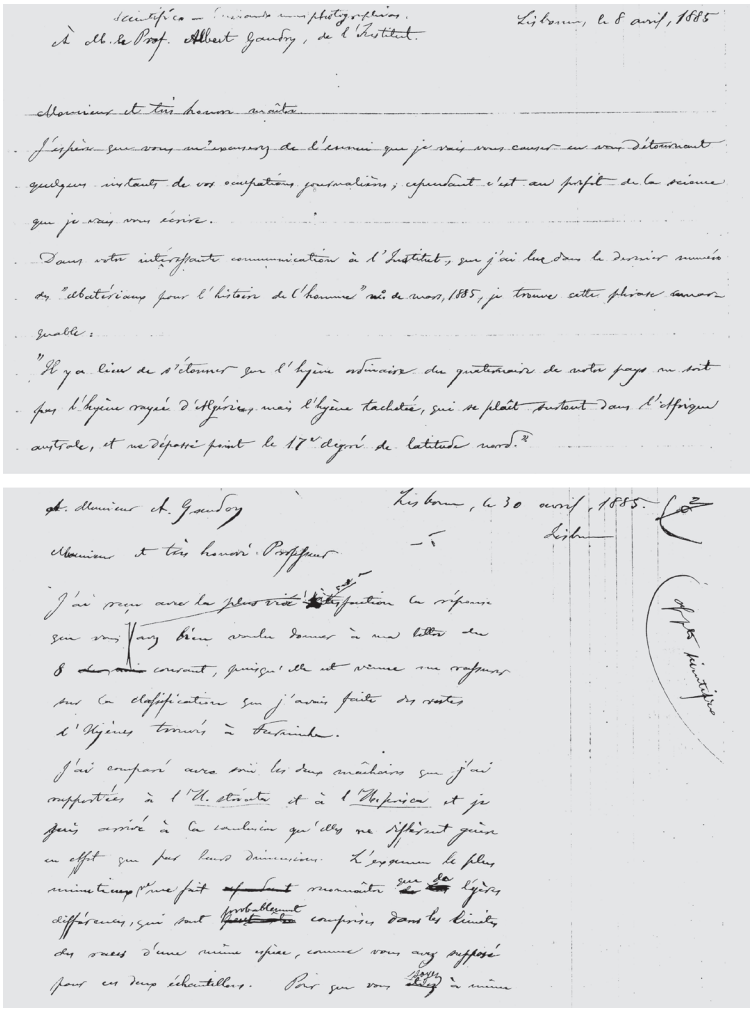

Figure 6.4. Partial reproductions of the two drafts of the letters sent by Nery Delgado to Albert Gaudry in 1885. LNEG (Lisbon). Photo by the author.

to cause you by diverting you for a few moments from your daily occupations; however, it is for the benefit of science that I am going to write to you. In your interesting communication to the Institute, which I read in the last issue of 'Matériaux pour l'histoire de l'homme' (Materials for the History of Man), issued in March, 1885, I found this remarkable sentence:

> 'It is astonishing that the ordinary hyena of the Quaternary of our country is not the striped hyena of Algeria, but the spotted hyena, which occurs particularly in southern Africa, and does not go beyond the 17th degree of north latitude.'

This sentence contains an important correction to what I wrote in my description of the Furninha cave (Report of the Prehistoric Congress of Lisbon, page 240), where, speaking of the remains of hyena found in the Quaternary deposit of this cave, I argued that the two species of hyena were only found in northern and southern Africa. (See Blainville: genus Hyaena*, page 74). Moreover, as the species of hyena which was more abundantly in Furninha's cave does not appear to differ from the* H. crocuta*, it occurred to me the idea to let you know the main pieces on which I based my classification.*

I wrote in my description of Furninha (pp. 239–240):

> 'Among the remains of hyena, one can easily distinguish two species; one more frequent, closely related to *H. vulgaris* [*i.e. H. hyaena*], which currently lives in northern Africa; and the other, much rarer and larger, which we supposed to be *H. prisca* (M. de Serres)'.

The presence of the first species in the cave of Furninha is very interesting, because in another cave, near Cercal, recently explored by my illustrious superior, Mr. Carlos Ribeiro, a cave that is only a short distance from that of Furninha (about 37 kilometres), this species seems to be missing, and in its place H. spelaea *has been discovered, which has, as we know, the most intimate relation of affinity with* H. crocuta*, which currently lives in southern Africa.*

I should further add, at least for the foreign reader, to make easier the understanding of this passage, that the Furninha cave is located on the coast, while the cave of Cercal is placed on the slope of a hill in the interior, where the water of the Tagus and the Atlantic mingle, at an altitude of over 300 meters, where the climate is now very different from that of Peniche.

Since I do not have at my disposal a better way than photography to let you know the main pieces on which I based myself to write this passage, I made reproductions of two skulls and some jaws, which I am pleased to send you, giving you more details to complement my description above.

If these pieces are valid for the distinction I have established, and if you approve of it, my classification would acquire the authority it now lacks; if, on the contrary, they are worthless for that purpose, I must declare it so that no one is misled by the false interpretation I have given to these documents.

In the affirmative case or in the negative case, if this letter deserves an answer, I hope you will allow me to [*???*]*, either as confirmation of the study I have done, or to put the question in its true light.*

However, I must say that when I wrote the description of Furninha I did not have any suitable pieces for comparison, nor did I have the time to send my copies to a competent verifier to determine their reliably; I had no other choice but use some descriptions and plates, having then had the opportunity to benefit especially from the magnificent work of Blainville.

That there is a difference between the hyena species found in Portugal, it is a point which seems to me beyond doubt; that these species represent spotted hyena, striped hyena, and H. prisca*, that is what I was not in a position to assert peremptorily.*

The larger skull and the corresponding jaw (I), which I consider to belong to H. crocuta*, were accompanied by other pieces of the skeleton of the same individual, and were found together, wrapped in quaternary red silt. The difference in size and thickness of the bones of this skull compared with those of the other skulls from Furninha is found in other pieces of the skeleton. The other, smaller, skull and jaw (II) that I reported as belonging to* H. vulgaris*, belonged to the 3rd fossiliferous level of the Furninha cave and were mixed with many pieces of the skeletons of different individuals (see Report, p. 253). From the same level comes the large jaw (III), which seems to me to have close relations with* H. prisca *(Mem. of the Museum, tome 7, plate XXIV, Fig. 1).*

I take this opportunity to thank you, Sir, for sending the note on the new palaeontology gallery which has just been installed at the Museum under your wise guidance, and I congratulate you for this great service you have just given to science and especially to your capital.

Accept, dear Sir, the expression of my most distinguished and devoted sentiments.

This interesting letter shows the quality of Nery Delgado's analysis regarding the hyena species represented in Furninha. Despite the limited literature available, as he himself admitted, he found that the hyena remains from Furninha, especially the skulls, were morphologically different from the hyena skull collected from the Cercal cave. This is now known as Fontainhas cave in the Montejunto mountain range, where he correctly attributed the skull to the European cave hyena (*Crocuta crocuta spelaea*).

Regarding the Furninha set, the differences pointed out were biometric only, as indicated in the difference in size between two hemi-mandibles. Such differences in Nery Delgado's opinion supported the attribution of the larger specimens to *H. prisca,* while the smaller should be attributed to *H. vulgaris*, today's North African species and presently designated as *Hyaena hyaena* (= *H. vulgaris*, *H. striata*) (Delgado 1884).

The only aspect that Nery Delgado did not consider was the intraspecific biometric variation inherent to the hyena species present in Furninha, a conclusion only possible if he had made a statistical study of the collected biometric data. This practice was at the time uncommon. But the essential conclusion, namely the confirmation of a single genus, *Hyaena,* on the basis of the sparse scientific literature available to him (largely confined to the beautiful de Bougainville atlas), shows the quality of the work done.

In the second letter sent in reply to Albert Gaudry, transcribed below, the Portuguese geologist comments on the conclusion that Gaudry had previously sent to him. This letter was later mentioned to Edouard Harlé.

2nd letter. Pack 91 – Folder 1

Autograph draft letter send by Nery Delgado to Albert Gaudry.

Lisbon, April 30, 1885

Dear Sir and very honoured Professor

I received with the liveliest satisfaction the answer you kindly gave to my letter of the 8th of this month, since it came to reassure me as to the classification I had made of the remains of hyenas found at Furninha.

I carefully compared the two jaws that I have associated to H. striata *and* H. prisca *and I have come to the conclusion that they differ only in their size. The most minute examination only allowed me to recognise some slight differences, which are probably within the limits of races of the same species, as you have supposed for these two specimens. In order for you to be able to recognise these differences, I am sending you today four new photographs, which I am happy to offer you as well as the others, assuming they are of interest to you*.

The differences that I have noticed are the following. The disposition and the shape of the teeth are nearly the same in both specimens; however, in the largest jaw (III) the anterior roots of the two premolar teeth and especially of the main tooth are much more developed than in the jaw

(II); on the other hand, the point of the posterior root of the main tooth of the larger jaw is less acute than in the same tooth of the smaller jaw. I still find small differences in the size and shape of the ascending branch, in the size of the condyle and its inclination in relation to the plane of the jaw, and in the form of the angular apophysis. Finally, I will add that the masseterian pit is proportionally wider and deeper in jaw III than in jaw II.

But are these characters sufficient to distinguish two different species, or will they barely be sufficient to distinguish two races belonging to the same species? It seems to me that you are leaning towards this latter opinion; in any case, I am very satisfied to have learned that you accept the distinction of the two species of Furninha and Cercal, which is for me the most important point.

Please, Sir and honoured Master, accept the expression of my respectful sentiments and my entire devotion.

Based on the photographs sent to him by Nery Delgado, Albert Gaudry considered the differences identified, between the skulls and mandibles of the Cercal cave (= the Fontainhas cave) and the Furninha specimens, attributing them respectively to *Crocuta* and *Hyaena*.

As for the presence of two distinct species in Furninha based on differences in size and morphological details, Gaudry considered such differences to be explainable within the range of variation of the same species, in this case *Hyaena hyaena*, as mentioned above.

Gaudry's view is also known through a passage of his letter sent to Nery Delgado, which was reproduced in a letter sent to Edouard Harlé years later:

> Your beautiful research in the caves of Portugal proves the existence of two very well characterised species of hyena: *Hyaena crocuta* (race *spelaea*) of which you sent me three photographs labelled as n.I, and *Hyaena striata* (*vulgaris*) of which you sent me three photographs labelled as No.II. Concerning the mandible, whose photograph is labelled as number III, it is larger than your *Hyaena striata*, but, as far as I can judge from the photograph, it is very similar in shape. It does not represent a *Hyaena arvernensis*, because in this species the carnassial is proportionately more elongated. Concerning the *Hyaena prisca* of Montpellier, I confess that I do not know of any distinction from *Hyaena striata*. Perhaps as there were larger races in the Quaternary than today, to which we give the names of *Bos taurus* (race *primigenius*), *Bison europaeus* (race *priscus*), *Cervus elaphus* (race *canadensis*), *Arctomys marmotta* (race *primigenia*), *Felis leo* (race *primigenia*), *Hyaena crocuta* (race *spelaea*), your jaw no. III indicates a larger race of *Hyaena striata* that could be called *Hyaena striata* (race *prisca*).

Gaudry's statement is clear. He was unable to distinguish the remains of the fossil form, *H. prisca* from the current remains of *H. striata* (*H. hyaena*), except by size, as is the case with many other large mammal species. He suggests that the hyena remains of Furninha could be designated as *Hyaena striata* race *prisca* or, following modern terminology, *Hyaena hyaena prisca*. This conclusion was later reaffirmed in a paper he wrote with his then disciple Marcellin Boule (Gaudry and Boule 1892, 120), stating that the hyena of Furninha 'only differs from the striped hyena because of its considerably larger size', a conclusion that was adopted ever since by several authors, including the author of this article (Cardoso 1993; 1996).

The correspondence between Nery Delgado and Edouard Harlé

About 12 years after the correspondence between Nery Delgado and Albert Gaudry about the specific determination of the hyena remains from Furninha, Edouard Harlé (1850–1922), residing in Toulouse, expressed his interest in studying the Furninha collection.

The research rigor and perfectionism of Nery Delgado meant that he was pleased by Harlé's interest, as that would help to clarify the *status* of the Furninha hyena. Harlé's interest was justified by the fact that, unlike the Quaternary faunas of France, those of the Iberian Peninsula were largely understudied (Harlé 1910/1911: 23). It was therefore important to obtain the opinion of such researcher who, at the time, specialised in the study of hyenas. The first letter by Nery Delgado to Edouard Harlé is reproduced below.

3rd letter. Pack 91 – Folder 5

Draft letter from Nery Delgado to Edouard Harlé, copied by an officer.

Lisbon, June 11, 1897

Dear Sir,

In reply to your letter of May 26th, I have the honour to send to you by this mail several photographs which represent some samples of hyenas (the most characteristic specimens) found at Furninha (Peniche). […]

Albert Gaudry has accepted the distinction which I made of the remains of Hyenas into three different forms, but he considers Hyaena prisca *as a variety of* Hyaena striata *and not as a distinct species.*

As far as the remains of Es-Taliens are especially concerned, I have not found in my collection any piece which would resemble the one represented in your Fig. 3. Each tubercle is only as large as this one; besides, in my specimens, this tooth always shows a direction almost perpendicular to that of the carnassial. Perhaps the hyena of Es–Taliens, which you consider to be a striped hyena, corresponds to the larger race of this species (Hyaena striata*) that Mr. Gaudry named* race prisca.

I hope I have satisfied your desire; however, I will gladly give you further explanations, if you will need them.

I beg you, Sir, to accept the expression of my highest consideration.

The morphological differences between the Furninha and the Es–Taliens specimens are carefully described by Nery Delgado, demonstrating the thoroughness he adopted in the analysis of this question. The differences he mentioned are consistent with the classification of the Es-Taliens specimens as *Hyaena brunnea* (Gaudry and Boule 1892) rather than *H. striata* (Harlé 1895). Nery Delgado insisted on his view that two different species of hyenas existed at Furninha, regardless of Gaudry's opinion. In the second letter sent to E. Harlé, Nery Delgado discusses the morphological features of the hyenas of Monsaunés and Es–Taliens, previously studied by Harlé, Gaudry and Boule, displaying a detailed knowledge of the questions concerning the classification of fossil hyenas.

4th letter. Pack 91 – Folder 5

Draft letter from Nery Delgado to Edouard Harlé copied by a secretary of Delgado.[1]

Lisbon, June 25, 1899

Mr. E. Harlé

I acknowledge receipt of your letter of the 15th of this month, to which I have the pleasure of replying.

First, I must tell you that there is no need to return the photographs; you may keep them and I will be happy that they can be useful to you. The remarks you make about my hyenas are very accurate and you have perfectly understood what I wanted to say to you. The tubercle of Es–Taliens is larger than any that I have in my collection, though it appears to be of a similar shape; moreover, it is implanted in the jaw in a manner quite different from that of the hyenas of Portugal, which are always placed perpendicularly to the carnassial. Now, I am inclined to believe, like you, that the hyena of Es-Taliens represents a particular race, if not a species different from those I know from my caves.

I must, however, declare that I have no upper jaw associated to the prisca *race; the identification of this species was based on mandible III. It is for this reason that I wrote in my previous letter that the hyena of Es-Taliens, which, considering the larger size of the tubercles than those of Montsaunés, and which in your text (p. 47) is indicated as also being a striped hyena, could possibly correspond to a* H. prisca.

Please accept, dear Sir, the expression of my respectful and very devoted feelings.

Following this correspondence, Nery Delgado sent to Harlé important mammal and bird remains from Portuguese Pleistocene deposits, including the Furninha material, thus enabling their study in France in optimal conditions. Harlé published a note on the fauna of the Fontainhas cave (Cercal cave) as mentioned in the missive from Delgado to Gaudry, where an intact skull of *Crocuta crocuta* was collected (note that in the old literature *Crocuta crocuta* was referred to as *Hyaena crocuta*). This was followed by the study of the fauna of the cave of Furninha and other caves (Harlé 1908; 1909). Such studies led to an important review that was published shortly thereafter (Harlé 1910/1911). Harlé attributed all the hyena remains from Furninha to *H. striata*, after discussing the *H. brunnea'*s alternative, except for a lower third premolar, in which he could not see, unlike other eight third premolars, 'a well-marked salience at the bottom of the anterior ridge' (translated from French) (Harlé 1910/1911, 33).

This tooth, was not identified in a studied set from Furninha (Cardoso 1993), so it was not possible to verify Harlé's observations. However, the absence of the morphological criteria may simply be explained by damage, as the size of the tooth is consistent with the known range of variation for *H. striata* (Cardoso 1993).

Discussion

Hyaena hyaena (aka *H. vulgaris* and *H. striata*) is a species currently known in the northern part of the African continent, as well as several Asian regions. The comparative study carried out by the author on the remains from Furninha allowed him to conclude that they all belong to a single form, *Hyaena hyaena prisca* or, alternatively, *H. prisca*, whose characteristics are close to those of the Lunel-Viel and L´Escale material (Cardoso 1993, 414), which is generally considered to represent the Pleistocene form of the current *H. hyaena*. More recently, some authors, influenced by an ethological perspective, have interpreted the Furninha's hyenas as belonging to a different species (*Hyaena prisca*) (Brugal, 2010), perhaps inspired by the monograph of M.-F. Bonifay (1971).

From a biometric point of view, the four skulls of Furninha (Fig. 6.5) are longer and especially narrower in the orbits than the 17 skulls of the current subspecies of *H. hyaena* studied at the Museum of Paris by the author (Cardoso 1993). These differences are even more pronounced for the two skulls of Lunel-Viel (Bonifay 1971). The nine mandibles of Furninha are also more robust than in the current species, this feature being even more obvious in the specimens from Lunel-Viel (2) and L'Escale (1) (Cardoso 1993).

The ratio between the height of the mandibular horizontal branch between the third and fourth premolars and the distance between the condyle border and the distal part of the first molar, indicates that the mean values of the Furninha and modern data sets (based on samples kept at the MNHN Paris) to be statistically different, as indicated by a Student's t-test (Cardoso 1993, 414). In addition, the comparative biometric study using Principal Component Analysis (PCA) to compare the three living species of hyenas – *Crocuta crocuta, Hyaena hyaena* and *Parahyaena brunnea* – and applied to skulls and jaws (Brugal *et al.* 2012, fig. 10) confirm these differences, as well as the uniqueness of the Furninha dataset.

Figure 6.5. Skull of Hyeana prisca from Furninha cave. In Harlé (1910/1911), modified. Photo by the author.

Most European Pleistocene deposits with fossil hyaenids belong to the Middle Pleistocene: Montsaunes (Harlé 1894), Es-Taliens (Harlé 1895), Montmaurin (Boule 1902) and L´Escale (Bonifay 1971). Lunel-Viel has been dated to the beginning of the Mindel-Riss interglacial, but M.-F. Bonifay (1971) questioned the survival of *Hyaena prisca* at this time. The writer suggests the replacement of *Hyaena prisca* during the Mindel-Riss with an archaic form of cave hyena. For this author, the *Hyaena prisca* of Lunel-Viel, which is particularly old in origin, represents the last individual of a lineage that died out during the Middle Pleistocene (Bonifay 1971, 178). However, the remains of Verzé, probably from the beginning of the Riss (Argant 1991) and especially those of Hollabrunn (Austria), attributed to the Riss-Würrn period (Thenius 1965), suggest a later survival of the species in Europe. In Palestine, Kurtén (1965) observed the survival of *H. prisca* at the beginning of the Würm period, when it is replaced by *Crocuta crocuta spelaea*, which agrees with the age of the Furninha cave. In the context described, the Furninha assemblage assumes an ever increasing importance. Dated probably to the early Würm period (OIS 5), the Furninha hyenas probably represent a late surviving population of *H. prisca*, in the most western area of the Iberian Peninsula. Like in Palestine, the favourable ecological conditions may have led to this late survival, while the species had become extinct throughout the rest of Europe (Cardoso 1993; 1996).

Conclusions

Alongside Lunel-Viel (France), where the species was originally described, Furninha cave, whose age can be attributed to the beginning of the last glaciation (OIS 5), has produced the most important European collection of *Hyaena prisca* remains,. Nery Delgado, responsible for the 1879/1880 excavations, proposed in 1884 the coexistence of two types of hyenas, *Hyaena vulgaris* and *H. prisca*, based on the difference in size. In order to obtain confirmation of his evaluation, he consulted Albert Gaudry with two letters he sent in April and June 1885, which have been reported here. From the study carried out by the author of all the Furninha specimens preserved in the Geological Museum (LNEG) and its comparison with other collections held at the MNHN (Paris), differences in size and robustness within the assemblage were confirmed. Such variation, observed in both fossil and current species can be interpreted within the range of variation of each respective species. Thus, the suggestion proposed by Nery Delgado, when evaluating the variation in size of the Furninha remains, that two distinct species of hyenas occurred at the site, cannot be regarded as valid, as already stated by Albert Gaudry. Gaudry thought that the size variation was due to intraspecific variation. However, the author has identified significant size differences between the Furninha specimens and modern *H. hyaena*. Such differences could thus potentially support differentiation at a specific level and the recent application of PCA methodology to skulls and jaws confirmed the existence of clear differences between Furninha and the living hyaenids. In summary, the points of view of both Delgado, on the one hand, and Gaudry and Harlé, on the other, needed the integration of further analytical evidence.

The merit of Nery Delgado's research must be emphasised, as he had identified correctly, for the first time in the Pleistocene of the Iberian Peninsula, the presence of the striped hyena, using only the scanty information and analytical techniques he had available at the time. Also, the bold but at the same time careful approach he took to examine the research question, provides us with a good idea of his scientific rigour. The research question discussed in this paper, like many others, must be evaluated within the context of the historic times in which it was investigated. It is also likely that new methods and techniques will, in the future, allow us to refine our understanding of the intriguing problem of the identification of the Furninha remains, as well as the broader issue of which hyena species occurred in the Pleistocene of Europe.

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Note

1 Original text in French.

References

Argant, A. (1991) Carnivores quaternaires de Bourgogne. *Documents du Laboratoire de Géologie de Lyon* 115, 301.

Bicho, N. and Cardoso, J.L. (2010). Paleolithic occupations and lithic assemblages from Furninha cave, Peniche (Portugal). *Zephyrvs* 66, 17–37.

Bonifay, M.-F. (1971) Carnivores quaternaires du Sud-Est de la France. *Mémoires du Museum national d'histoire naturelle* N.S.(C) 21(2), 43–377.

Boule, M. (1902) La caverne à ossements de Montmaurin (Haute-Garonne). *L'Anthropologie* 13, 305–319.

Breuil, H. and Zbyszewski, G. (1945) *Contribution à l´ étude des industries paléolithiques du Portugal et de leurs rapports avec la géologie du Quaternaire. 2 – Les principaux gisements des plages quaternaires du littoral d´Estremadura et des terrasses fluviales de la basse vallée du Tage.* Lisboa, Serviços Geológicos de Portugal (Comunicações dos Serviços Geológicos de Portugal. Lisboa, 25).

Brugal, J.P. (2010) Carnivores pléistocènes (Hyenidés, Canidés, Félidés) dans les grottes du Portugal. *1.ª Reunión de científicos sobre cubiles de hiena (y otros grandes carnívoros) en los yacimientos arqueológicos de la Península Ibérica*. Zona Arqueológica 13, 93–106.

Brugal, J.-P., Argant, J., Crispim, J.A., Figueiredo, S., Martín Serra, A. and Palmqvist, P. (2012) The complex carnivore-rich assemblages from Furninha (Peniche, Portugal): a multidiciplary approach. *Journal of Taphonomy* 10 (3/4), 417–438.

Cardoso, J.L. (1993) *Contribuição para o conhecimento dos grandes mamíferos do Plistocénico superior de Portugal*. Oeiras, Câmara Municipal de Oeiras.

Cardoso, J.L. (1996) Les Grands Mammifères du Pléistocène Supérieur du Portugal. Essai de synthèse. *Geobios* 29(2), 235–250.

Cardoso, J.L. (2008) Joaquim Filipe Nery Delgado, arqueólogo. In *Nery Delgado (1835–1908), Geólogo do Reino*, 65–75. Lisboa, Museu Geológico/INETI/Centro de História e Filosofia das Ciências/FCT/UNL.

Cardoso, J.L. (2013) Carlos Ribeiro, a 'Breve notícia acerca do terreno quaternario de Portugal' e a questão do Homem terciário em Portugal. *Estudos Arqueológicos de Oeiras* 20, 27–88.

Cardoso, J.L. (2020) A primeira escavação arqueológica metodologicamente moderna foi realizada em Portugal em 1879/1880: a intervenção de Nery Delgado na gruta da Casa da Moura (Óbidos, Portugal). *Estudos Arqueológicos de Oeiras* 26, 123–242.

Cardoso, J.L. and Carvalho, A.F. (2010/2011) A gruta da Furninha (Peniche): estudo dos espólios das necrópoles neolíticas. *Estudos Arqueológicos de Oeiras* 18, 333–392.

Cardoso, J.L. and Melo, A.A. (2001) Correspondência anotada de Carlos Ribeiro e de Nery Delgado: contribuição para a história da arqueologia em Portugal. *Comunicações do Instituto Geológico e Mineiro* 88, 309–346.

Choffat, P. (1908) Notice nécrologique sur J.F. Nery Delgado (1835–1908). *Jornal de Sciencias Mathematicas, Physicas e Naturaes*, S. II, 7 (28), 14.

Christol, J. de and Bravard, A. (1828) Nouvelles espèces d´hyènes fossiles. *Mémoires de la Société d´ Histoire Naturelle de Paris* 5, 368.

Delgado, J.F.N. (1884) La grotte de Furninha a Peniche. In *Congrès International d'Anthropologie et d'Archéologie Préhistoriques*, *Compte- Rendu de la 9ème Session (Lisboa, 1880)*, 207–278. Lisboa, Typografia da Academia.

Gaudry, A. and Boule, M. (1892) Les oubliettes de Gargas. *Matériaux pour l'Histoire des Temps Quaternaires* 4, 130.

Harlé, E. (1894) Découverte d´ossements d´Hyènes rayées dans la grotte de Monsaunès (Haute-Garonne). *Bulletin Société Géologique France* S. III 22, 44–49.

Harlé, E. (1895) Restes d´Hyènes rayées de la brèche d´Es-Taliens, à Bagnères-de-Bigorre (Hautes-Pyrenées). *Bulletin Société Géologique de France* S. IV 8, 460–466.

Harlé, E. (1908) Faune de la grotte das Fontainhas (Portugal). *Bulletin Société Géologique de France* S. IV 8, 460–466.

Harlé, E. (1909) Faune de la grotte à Hyènes rayées de Furninha et d'autres grottes du Portugal. *Bulletin Société Géologique de France* S. IV 9, 85–99.

Harlé, E. (1910/1911) Les mammifères et oiseaux quaternaires connus jusqu´ici en Portugal. *Comunicações da Comissão do Serviço Geológico de Portugal* 8, 22–85.

Kurtén, B. (1965) The carnívora of the Palestine caves. *Acta Zoologica Fennica* 107, 1–74.

Kurtén, B. (1968) *Pleistocene Mammals of Europe*. London, Weidenfeld & Nicolson.

Relatório (1881) *Relatorio do anno económico de 1880/1881*. Direcção Geral dos trabalhos Geologicos, Topographicos, hydrographicos e Geologicos do Reino. Lisboa, Imprensa Nacional 13, 14.

Relatório (1886) *Relatorio dos trabalhos geodesicos, topographicos, hydrographicos e geologicos do Reino pertencente ao anno economico de 1884–1885.* Lisboa, Imprensa Nacional.

Serres, M., de Dubreuil, J. and Jean-Jean, B. (1828) Mémoire sur les diverses espèces d'Hyènes fossiles découvertes dans les cavernes de Lunel-Viel (Hérault). *Mémoires Muséum Histoire Naurelle Paris* 17, 269–311.

Thenius, E. (1965) Uber das Vorkommen von Streifenhyänen (Carnivora, Mammalia) im Pleistozän Niederösterreichs. *Ann. Naturhist. Mus. Wien* 68, 263–268.

Zilhão, J. (1993) As origens da arqueologia paleolítica em Portugal e a obra metodologicamente precursora de J.F. Nery Delgado. *Arqueologia e História* S. X 3, 111–125.