

THE DISCOVERY OF THE FIRST CUBAN BLIND CAVE FISH: THE UNTOLD STORY

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INTRODUCTION

Although there have been numerous published reports on blind cave fishes dating as far back as 1541 (Romero, 2001), the first scientific description of one species was not published until 1842. That description was of the northern cavefish *Amblyopsis spelaea* from Mammoth Cave, Kentucky (Romero, 2002). That scientific description took place shortly after it had first been sighted (Romero and Woodward, 2005).

With the exception of the northern cavefish, the history of the discovery of cave fish species and how their discovery impacted the views of speleologists and other scientists at the time they were described has rarely been told.

The first two species of blind cave fishes scientifically described from outside the United States were found in Cuba and their description was published in 1858. They are the Cuban cusk-eel *Lucifuga (Lucifuga) subterranea* and the toothed Cuban cusk-eel, *Lucifuga (Stygicola) dentata*.

I have found the original documents that relate the discovery of these species. These sources are in hard-to-find Cuban publications and in Spanish. Therefore, I will condense the information I have been able to find and discuss the impact of these discoveries at the time they were made.

FELIPE POEY

One of the two central characters in the saga of the discovery of the first blind cave fishes from Cuba was Felipe Poey y Aloy (hence Poey).

Poey (po'-ay) (b. Havana, Cuba, 26 May 1799; d. Havana, 28 January 1891) was the son of a Frenchman who had been involved in the slave trade and a Cuban-born mother who was half Spanish, half Cuban. At the age of 5 Poey went to France with his family where his father died two years later. While there, he was struck by polio, which paralyzed the right side of his body, after which he returned to Cuba. To follow his mother's wishes, he went to Madrid, Spain, where he obtained a law degree in 1822. He began his lawyer's career in Spain and became involved in politics (he was a liberal) but soon became disenchanted, returned to Cuba, married, and decided to become a full-time naturalist.

In 1826 he traveled to Paris, France, where he worked under the famous naturalist Georges Cuvier. At that time Cuvier and Achille Valenciennes were working on the encyclopedic *Histoire naturelle des poissons* (The Natural History of Fishes), which would end up being a 22-volume publication.



Poey arrived in Paris with 35 specimens of Cuban fishes in a barrel of brandy plus 85 drawings of fishes from that island. The information from these fishes was incorporated into Cuvier and Valenciennes's gigantic work. From early on Poey was very interested in working with fishes, visiting the fish market of Havana almost every day. Yet, he was a polymath with areas of interests ranging from anthropology to poetry. He was a very prolific author who corresponded with virtually every noted naturalist of his time and went on to occupy important academic posts at the University

of Havana. He was a member of almost every major scientific society in the U.S. and Europe, and many of his new specimens and life-size drawings are found in the collections of the United States National Museum (Smithsonian), the Museum of Comparative Zoology (Harvard), the Natural History Museum of Madrid and the National Museum of Natural History in Paris.

Because of the dates of his birth and death, he was technically a Spaniard, but he confessed that "As a naturalist I have never been a Spaniard, I have been cosmopolitan." Despite cataracts in old age, he never stopped writing (for more biographical information about Poey see Jordan, 1899; Sánchez Roig, 1937; Vivanco y Díaz, 1951; Cruz, 1979; González López, 1999).

TRANQUILINO SANDALIO DE NODA



The other character in this story is Tranquilino Sandalio de Noda y Martínez (hence de Noda) (*b.* Las Cañas, Guanajay, Pinar del Río, Cuba, 3 September 1808; *d.* San Antonio de los Baños, Havana, Cuba, 27 May 1866). Despite having been born in a rural area, his neighbors were French planters that owned good libraries. He received personal tutoring from his mother, a primary school teacher, and another local teacher José María Dau. From the latter he not only

acquired basic knowledge in the sciences and humanities but also the habit of educating himself in any field, including several languages (for more biographical information on Noda, see Guerra, 1924 and Sánchez Roig, 1942).

THE DISCOVERY

In 1823, the *Capitán General* (governor designated by the Spanish government) of Cuba, Francisco Dionisio Vives, asked Dau, de Noda's tutor, to conduct a geological survey of Santa Cruz de los Pinos (Pinar del Río Province, western Cuba). Dau asked de Noda, then only 15, to accompany him. That is when his interest in caves surged and provided him the opportunity to observe the hypogean fauna and to find many fossils in caves.

In 1831 de Noda learned of the Cuevas del Cajío (Cajío Caves) at Güira de Melena, in the southern portion of the Havana Province, where there were rumored to be blind fishes. After finding the cave and crawling into a very hot, bat-crowded hall, he and his companions reached a pool with "white" fishes in crystal clear waters between 60 and 90 feet underground. His companions captured one fish using a basket. De Noda wrote that the fish were easily disturbed by splashing on the surface of the water.

The captured individual died within a few hours. De Noda drew the specimen and preserved it in a bottle with rum. The fate of the specimen and illustration is unknown but that he sent them to Poey is mentioned in Poey's correspondence. Poey told him that he classified this fish as a new genus and species and gave it the scientific name of *Lucifuga subterraneus* (name later changed to *Lucifuga (Lucifuga) subterranea* for Latin grammatical reasons as well as for classification ones).

In 1876 Poey published in the Havana newspaper *El Mercurio* his correspondence with Tranquilino Sandalio de Noda. A copy of the original article containing such correspondence cannot be found, but it was reprinted in Poey (1888) and Carbonell y Rivero (1928). Three letters from Noda to Poey and one from Poey to Noda are reprinted in Poey (1888), and those are the primary sources I am using for this article.

Poey's scientific description of cave fishes from Cuba was published in different venues. The first was "Memorias sobre la historia natural de la isla de Cuba" (Memoirs about the natural history of the island of Cuba). This work is complicated to cite, particularly when it comes to dates. First of all, this is a collection of papers in two volumes. The first set of papers was published between 1851 and 1854 and the second set between 1858 and 1861.

The paper containing the description of the cave fishes from Cuba was published under the title

“Peces ciegos de la isla de Cuba, comparados con algunas especies de distinto genero” (Blind fishes from the Island of Cuba, compared with some species of a different genus) as the paper “xivi” of volume 2, in pages 95-114 of the whole opus. Therefore the correct date of publication should be 1858.

In that publication Poey creates a new genus and species (*Lucifuga subterraneus*) based on 12 specimens and goes on with a very detailed and accurate description of both external and internal morphology, including some minor differences among the specimens he studied such as variability in eye development from rudimentary to totally blind.

Poey cited the species as from five localities in Cuba: la Cueva del Cajío (near Güiría de Melena), Cueva del Cafetal La Industria (between Alquizar and Guanímar), la Cueva de Ashton (in San Andres), Cueva del Dragón (in San Isidro), and Cueva del Cafetal La Concordia (near Alquizar). Poey does not say if he visited these caves, but despite the fact that he was a man of fair complexion, medium height, and heavy build, polio had paralyzed the right side of his body, so chances are he never visited them. Furthermore, he cited as collectors of specimens from the different localities different people: de Noda, Antonio Dubrocá, Juan Antonio Fabre, and Fernando Layunta. He gives priority to de Noda for visiting the Cajío Cave in 1831.

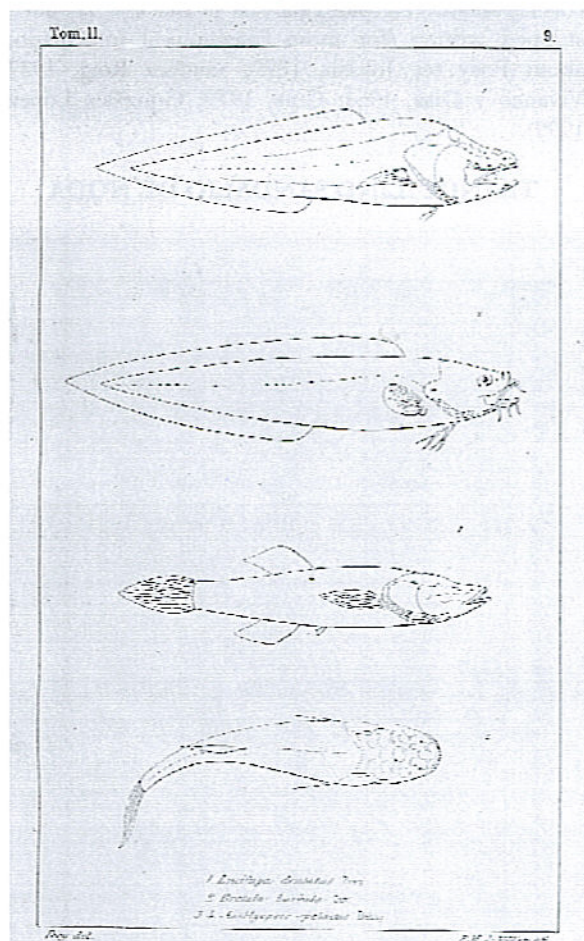
Poey then described a second new species: *Lucifuga dentatus* (now known as *Lucifuga (Stygicola) dentata*, also for Latin grammatical and classification reasons). This one was described as totally depigmented and found in the three first localities cited above. He also comments on the bearded brotula *Brotula barbata*, a deep-sea fish that sometimes has fatty tissue covering its eyes, the northern cavefish *Amblyopsis spelaea*, and the pirate perch *Aphredoderus sayanus*.

The reason he included the bearded brotula was because it is the closest relative to the Cuban cave fishes that he described. He used the northern cavefish for comparison purposes because it was the only other known species of cavefish in the world, and he included the pirate perch because that fish is a close relative to the northern cavefish.

Later, between pages 108 and 114, he discussed whether these fishes were the product of special creation or the product of evolution. In this article published a year before Darwin's *Origin of Species*, Poey compares the two schools of thought (creationism and evolution), the first one defended by his former teacher Cuvier, and the second by Geoffroy Saint-Hilaire.

After saying that he does not belong to either school, Poey says that on one hand he has a great deal of inclination for Cuvier's creationism, but that on the other hand he has found very convincing arguments for evolution. The first statement seems to be the

product of respect for his former ichthyology teacher. But, then, given the variability that he observed among the Cuban cave fishes (the biological characteristic that later Darwin would use to explain how natural selection works), he concluded that these species are the product of “transformation” (older term for evolution). He further rejects the use of the term “degeneration” to describe the loss of eyes and other features among cave organisms, preferring “modification.”



This is the first time that Poey makes any mention of evolution in his writings. Although ambivalent at the beginning (Pruna, 1994), he went on to become an evolutionist based on his studies of blind cave fishes. Thus, when the works of Charles Darwin, Thomas Henry Huxley, and Herbert Spencer were published, he embraced them enthusiastically. He seemed to be particularly impressed with Spencer (Jordan, 1899) probably because of Spencer's progressionist ideas and his belief that cave colonization was not the result of “accidents” but rather an active process. This intellectual development took place rather smoothly. After all, the introduction of Darwinian ideas in Latin America was progressive and without much resistance at least among academic

circles (for an overview of this issue see Pruna and García González, 1989).

Poey wrote that he had had extensive correspondence on the Cuban blind cave fishes with Charles Frédéric Girard with whom he agreed that to better understand the issue of "transformation" of blind cave fishes, studies on the development of these fishes had to be carried out. Actually, this was an idea that Girard's teacher, Jean Louis Rodolphe Agassiz, had previously proposed (Romero, 2001). Girard would go on to describe a new species, the southern cavefish *Typlichthys subterraneus* in 1859, one year after Poey's description of the Cuban species.

Poey went on publishing two other pieces on the blind cave fishes of Cuba. One was in 1865 in his "Repertorio Físico-Natural de la isla de Cuba" (Physical-natural repertoire of the Island of Cuba) in which he updated some of the classification based on comments from the ichthyologist Theodore Nicholas Gill. In this he also added a few new localities for these fishes and reprinted a letter from de Noda that included the fact that the "negros" usually go to the Cajío Cave to fish these animals to eat them. This seems to be the only reported case of cave fishes being consumed by humans. Cave fishes in general are not appreciated as a source of food for humans: they are generally small, found in small numbers, and many feed on bat guano.

He would finally cite these Cuban blind cave fishes again briefly in 1868 in his "Synopsis Piscium Cubensium," or "Catalogo razonado de los Peces Cubanos" (An explained catalog of Cuban fishes), an atlas of 10 volumes with more than 1,000 illustrations drawn by himself, with the descriptions of about 800 tropical American fishes. This work was purchased by the Spanish government, placed in the "Biblioteca de Ciencias Naturales" (Natural History Library) at Madrid, Spain, and exhibited by the Spanish government at the International Exhibit of Amsterdam in 1883, where it received a gold medal and honorable mention.

WHERE ARE POEY'S SPECIMENS?

There is one question worth exploring about Poey's work on the Cuban cave fishes. That is, what was the fate of the specimens that he used to describe these new species (type specimens or holotypes)? Given that there is no trace of those specimens in the Natural History Museum of Havana, which he founded, and the fact that he usually sent specimens to colleagues and museums around the world, it is worth looking at

existing specimens to see which one could be his holotypes.

The list of museums that have specimens of Cuban cave fishes collected in the nineteenth century and that have kept correspondence from Poey are in Table 1. The list of specimens known to exist in museums for the two species in question are in tables 2 and 3. In Table 2, the list includes one specimen in the U.S. National Museum of Natural History (Smithsonian) that was collected by Poey, but without a date. Another is in the Museum of Natural History of Paris labeled as collected by Valenciennes in 1865. This specimen could not have been collected by Valenciennes for the simple reason that he never visited Cuba. It is most likely that he received it from Poey in 1865 (six years after the species was described). The same can be said about similar labeling for the *L. dentata* in Paris in Table 3. All the other specimens were collected by someone else or on dates much after the actual discovery. Thus the holotype for *L. (L.) subterranea* is either the one in Washington, D.C. or the one in Paris.

In the case of *L. dentata*, there is a specimen in the Museum of Comparative Zoology at Harvard University (MCZ 32329) whose collector's information is labeled as "Poey et al." Since in his original description Poey acknowledges the fact that the specimens of these fishes were collected by others, that specimen could well be the holotype for that species. Howell y Rivero (1938) analyzed the vouchers with which this and other specimens were deposited at that museum and reached the same conclusion. Another potential holotype is MCZ 12415, but I lacked sufficient information about that one to make any determination. This could also be a syntype (one of two or more specimens simultaneously selected as types by the original author of a name of a species).

CONCLUSIONS

Poey relied on others to collect blind cave fishes in Cuba. His anatomical and taxonomic analyses of these specimens were highly accurate, and these fishes helped to convince him to embrace the idea of evolution. He had ample correspondence with contemporary colleagues from the U.S. and Europe and most likely sent the specimens he used for describing the two species of Cuban blind cave fishes to museums abroad, particularly the National Museum of Natural History in Washington, D.C. and the Museum of Comparative Anatomy at Harvard University.

Table 1. Museums outside Cuba that have specimens of Cuban cave fishes collected in the nineteenth century and correspondence from Poey.

Correspondent(s)	Museum	Museum Acronym
Georges Cuvier, Achile Valenciennes	Musé Nationale d'Histoire Naturelle	MNHN
Charles Frédéric Girard, Theodore Nicholas Gill	U.S. Museum of Natural History	USNM
?	British Museum of Natural History	BMNH
?	American Museum of Natural History	AMNH
?	Museum of Comparative Zoology (Harvard University)	MCZ
?	Museo Nacional de Historia Natural (Madrid, Spain)	MNCN

Table 2. Known specimens of *Lucifuga (Lucifuga) subterranea* (in chronological order of collection) in museums around the world.

Catalogue #	Locality	Collector	Collection Date
USNM 00001739	Cuba: Cuevas de Alquizas	Poey	?
MNHN a-5234	Cuba	Valenciennes	1865
SU 8510	Cuba: Hawey	C.H. Eigenmann	1893 or before
CAS 30438	Cuba	C.H. Eigenmann & O. Riddle	1902
AMNH 18463	Cuba		ca. 1904
AMNH 18712	Cuba: Tranquilidad	C.H. Eigenman	March 1902
AMNH 18714	Cuba	C.H. Eigenmann	March 1902
FMNH 3934	Cuba: Cañas	C.H. Eigenmann & O. Riddle	March 1902
FMNH 33090	Cuba	Eigenmann?	?
FMNH 52631	Cuba	C.H. Eigenmann	?
SU 8509	Cuba: Jaiguan	C.H. Eigenmann	?
BMNH 1904.1.28.137	Cuba: Cañas	?	1904
BMNH 1904.1.28.135-136	Cuba: Cueva Tranquilidad	?	1904
MCZ 29902	Cuba: Matanzas: Cañas	C.H. Eigenmann	1910
USNM 00204452	Cuba		1936?
MCZ 31221	Cuba: Guira de Melena	Carlos de la Torre	?

Table 3. Known specimens of *Lucifuga (Stygicola) dentata* (in chronological order of collection) in museums around the world.

Catalogue #	Locality	Collector	Collection Date
MCZ 32329	Cuba: Cuevas en San Antonio	F. Poey et al.	?
MCZ 12415	Cuba	F. Poey	1861
MNHN A-5232 *	Cuba	Valenciennes	1865
MNHN A-5233	Cuba	Valenciennes	1865
FMNH 3933	Cuba: Cave near Alacranes	C.H. Eigenmann & O. Riddle	March 1902
CAS 6714	Cuba: Cañas	C.H. Eigenmann	March 1902
CAS 30437	Cuba	C.H. Eigenmann & O. Riddle	1902
FMNH 112219	Cuba	C.H. Eigenmann	ca. 1902
CAS/SU 8511	Cuba: Cave near Pedregales	C.H. Eigenmann	ca. 1902
FMNH 96223	Cuba	H.B. Ward	25 August 1904
BMNH 1904.1.28.132-134	Cuba: Cueva Tranquilidad	?	1904
MCZ 29903	Cuba: Matanzas: Cañas	C.H. Eigenmann	1910
FMNH 33084	Cuba	Eigenmann?	2 November 1936
MCZ 36166	Cuba: Pinar del Rio	L.R. Rivas	1940
BMNH 1981.10.27.1-4	Cuba	?	1981
FMNH 52595	Cuba: Cañas	?	?
AMNH 1537	Cuba: Pinar del Río: Cueva Modesta	B. Dean	?
AMNH 10143	Cuba: Pinar del Río: Rio Taco Taco	?	?
MCZ 30615	Cuba: Finca La Carbonera	Thomas Barbour	?
MCZ 30616	Cuba: Matanzas: Alacranes: Cueva del Mar	T. Barbour	?
MCZ 30617	Cuba: Matanzas: Alacranes: Cueva del Mar	T. Barbour	?
MCZ 31212	Cuba: Matanzas: Alacranes: Cueva del Mar	Carlos de la Torre	?
MCZ 31213	Cuba: Guira de Melena	Carlos de la Torre	?

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