# Commercial fishing and the study of marine fauna in Argentina, 1890-1930

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Abstract

This paper examines the relationship between the development of commercial maritime fishing and the study of marine fauna in Argentina between the end of the nineteenth century and the first decades of the twentieth century. It analyzes ichthyological research, the commercialization of fresh maritime products and the opportunities that urban markets offered for the creation of collections. It also focuses on the beginnings of deep-sea fishing, which would make it possible to capture and study new species as well as gather information about the marine environment.

Keywords: commercial fishing; ichthyology; creation of collections; fishing boats.

Despite their importance and extension, it took time for the marine space and its organisms to be included as subjects of scientific research in Argentina. To compensate for the lack of an specific infrastructure, naturalists relied on naval officials, seamen, fishermen and fish brokers to gather collections and information about marine animals. Because of that, we can say that the study of the sea emerged in a tangle of agents, institutions and facilities with very different priorities and interests. In recent decades, the emphasis on human networks that connect the work of naturalists to a variety of social worlds has generated an important body of literature about the communal nature of scientific work. As different historians of science have shown, access to information and study samples creates bonds between members of different social worlds, frequently linking scientific and commercial activities. In that sense, the history of objects and the spaces of science lead, on the one hand, to a relationship amongst those in the field, those in the laboratory and those that possess local knowledge (Kulick, Kohler, 1996), and on the other hand, to ways of ordering and placing things in a universal language through description and classification (cf. Podgorny, Lopes, 2008; Cook, 2007; Podgorny, 2011, 2013a).

At the end of the nineteenth century, thanks to urban markets, commercial routes and the development of commercial maritime fishing, scientists were able to access specimens of different fish and marine invertebrates that were unknown until then in Argentine museums. Modes of transportation played an important role in the commercialization of new marine products in Buenos Aires, where zoologists could buy fresh specimens for various studies and the creation of collections. As in prior centuries, nature's diversity appeared in the markets before appearing in museums; specimens were classified, named and exhibited in those urban spaces where products are concentrated and sold (Findlen, 1994: Cook, 2007). It can be said that objects of nature combine the characteristics of merchandise, scientific novelty and museum specimen. These matters are explored more deeply in the following pages, which examine the studies and publications about marine fauna in Argentina at the end of the nineteenth century and in the first decades of the twentieth. During this period, the inability to rely on a dedicated infrastructure for marine research was one of the factors conducive to the survival of collection practices for marine materials, such as the use of the markets, which generally are associated with the beginnings of the modern age.

This paper mainly attempts to analyze certain aspects of the relationship between the natural sciences and the beginnings of commercial maritime fishing. In particular, it focuses on the commercialization of fresh maritime products and the facilities that urban markets offered for the creation of collections and ichthyological research. Along with that, it explores the ways of attempting to compile and process the observations and empirical experience of fishermen and also the development of deep-sea fishing, which made new species visible to the public and Argentine science.

## What the fishermen brought in and was sold at market

In 1895, the director of the National Museum of Buenos Aires (Museo Nacional de Buenos Aires), the Russo-German zoologist Carlos Berg, published a list of 108 species of fish from the ocean and saltwaters of the Argentine and Uruguayan coasts.[1] This catalog included

life forms new to science and various species that, until then, had not been recorded in the south Atlantic or the mouth of the río de la Plata. This was the first effort up until that time to systematize the existing knowledge about the ocean fish of these coasts and to create a collection and exhibit it in the Buenos Aires museum, especially using fresh specimens that were being marketed in Buenos Aires. This increased the number of animals that would later be considered part of the "Argentine fauna."

In a parallel effort, at the La Plata Museum (Museo de La Plata), a French zoologist, Fernando Lahille, had been hired in 1893 to study aquatic animals and the marine environment (López, Aquino, 1996; García, 2009), which was beginning to be considered a potential source of wealth and part of the "private assets of the Nation." As Podgorny (2000) points out, the creation and exhibition of natural history collections, with their corresponding catalogs, would mean the "Argentinization" of the flora, fauna, minerals and fossils found in the territory. At the same time, various exhibitions, collection displays and museums open to the general public, were used to try to reinforce the idea of Nature as lavish (Podgorny, Lopes, 2008). But, prior to appearing in museums, a small sample of the diversity of marine fauna could be observed in the fish stands in urban markets. These places would be an important hub in the supply network of information and specimens to which not only Berg and Lahille, but also a later generation of Argentine naturalists turned.

In Berg's case, his interest in ichthyology and some marine invertebrates seems to have begun during his stay in Montevideo between 1890 and 1892 while he was running the National Museum of Natural History (Museo Nacional de Historia Natural) in that city (Lopes, Podgorny, 2000a, 2000b). It should be remembered that this naturalist had arrived in Argentina in 1873, summoned to work at the Buenos Aires Museum (Museo de Buenos Aires), where he would stay for three years, later working as a teacher at the National School (Colegio Nacional) and at the University of Buenos Aires (Universidad de Buenos Aires) (Gallardo, 1902). Even though he preferred entomological studies, Berg also published works on other zoological groups. During his stay in Montevideo, where certain facilities were available to him, he began to collect specimens of the ichthyological fauna. In the Uruguayan capital there existed a community of fishermen that supplied not only the local demand but also the city of Buenos Aires, sending the daily catch by the steamboat line that linked the two capitals in a trip of about ten hours. During the nineteenth century, what European or North American travelers and captains acquired from Montevideo's fishermen and sellers helped to expand the collections of various museums and the spectrum of fish known in this part of the Atlantic. In this way, some European catalogs of South American fish indicated the Montevideo market as their location, combining what was obtained from exact sites in the sea with what was purchased in urban spaces.

With the facilities offered by the Uruguayan capital, Berg began a study of the fish surrounding the río de la Plata, starting with the samples and reports provided by local fishermen and what the taxidermist and the zoology assistant at the Uruguayan museum had gathered. When Berg moved back to Buenos Aires, both employees continued to send him samples and news about finding certain species. In recognition of this help, Berg dedicated the name of a new ichthyological form to each of them. For similar reasons, he would baptize another species (*Pinguipes somnanbula*) with the name of the well-known

Buenos Aires restaurant Sonámbula, frequented by naturalists, professors and members of the Buenos Aires elite, and whose owners donated a rare fish to him (Berg, 1895). This would not be the only case of an elegant Buenos Aires restaurant satisfying not only the culinary and social tastes of the naturalists but also their scientific interests. Some restaurants, as well as fish market stalls, displayed curious specimens that attracted the attention of the public and the scientific sectors. According to commentaries at that time, seafood products were expensive in Buenos Aires, and their consumption was restricted to the wealthy classes and to some immigrant populations that maintained their dietary customs.

During the 1890s, along with the river fishery and preserved products imported from Europe, fresh marine specimens, brought in daily from Montevideo, were being marketed in Buenos Aires. Around that time, train shipments of fresh fish and shellfish began arriving in the federal capital from the Atlantic coast of the province of Buenos Aires, mainly from Mar del Plata, some 400km away or ten hours by train, or to a lesser extent from Bahía Blanca, more than 680km or 19 hours away. The extension of the railroad during the 1880s shortened the distance between the Argentine capital and the sea, making it possible for these new products to reach the Buenos Aires market, and from there, the naturalists' dissection tables. In September of 1886, the railroad line that linked Buenos Aires with Mar del Plata was inaugurated; the latter would become the first seaside resort in the country (Cacopardo, 1997; Pastoriza, 2002). There, summertime fishing was organized for the consumption of a budding tourist population with strong buying power. Initially, Italian fishermen would relocate temporarily from Buenos Aires to work the fishery during the summer season (Fermepin, Villemur, 2004). Some began moving to Mar del Plata permanently, forming a small community of fishermen that, with time, would become the most important fishing center in the country (Mateo, 2002, 2004). These first fishermen devoted themselves to traditional fishing, operating near the shore in boats and small sailing vessels, which were run aground on the beach after each trip due to the lack of an adequate port. In the resort's off-season, the catch was sent by train to Buenos Aires, the city that was the main venue for the consumption of this emerging fishing activity. During much of the year, whether or not to go out to sea was determined by the train schedule and the ocean conditions. The fishermen tried to get back four or five hours before the night train left; that way the product arrived early in the morning in Buenos Aires (Lahille, 1901). Since refrigerated cars or facilities were not available, as the Southern Railroad (Ferrocarril Sud) reserved those cars for other industries, it was essential to reduce the time between fishing and transportation of seafood products. For shipment to Buenos Aires, the delicate prawns, shrimp and crustaceans were submerged in boiling water to give them the consistency necessary for transport, while the fish were cleaned and often gutted. Then, they were sorted by species into baskets or boxes, and ice was added in the hottest months. These shipments had to arrive in Buenos Aires very early to be accepted in the markets, where municipal ordinances allowed the sale of fish until 10:00 in the summer and 12:00 in the winter. In these places, naturalists rummaged in the stands of small shops and display counters looking for rare specimens that would be more valuable to collect and dissect than to eat. During the early morning hours, in places like the Downtown Market (Mercado del Centro), one could observe a small sample of the marine world collected by fishermen the day before. Thus, the rhythm of the market was integrated

into the naturalists' pattern of activities: morning visits to these sites during different seasons of the year allowed them to deduce the abundance, seasonality or temporary appearance of certain species near the coast.

At the end of the nineteenth century, each group of fishermen from Mar del Plata had an agent in charge of sales in Buenos Aires. The fishermen would notify him of the railroad shipments by telegram, and every two or three days the agent would telegraph them back


Figure 1: Fish stand in a Buenos Aires market (c.1924; Archivo General de la Nación)

with the selling prices of the products (Lahille, 1901). The zoologists from Argentine museums would draw upon this communications and commercial network to supply themselves with samples and information (García, 2009). In particular, the fish stand owners at the Downtown Market, which was located a few steps from the Buenos Aires museum, played an important role as suppliers of specimens to that institution. Also, the zoologist from the La Plata Museum, Fernando Lahille, would turn to the same fresh fish purveyors to gather materials for study and for exchange with other institutions during the five years that he worked for the La Plata Museum.[2] Periodically, for more than three decades, Lahille continued to visit the places where fish were concentrated and sold in Buenos Aires. This naturalist would combine his observations in the urban markets with the inspection of different points along on the coast and his interactions with fishermen. For several years, he insisted on the necessity of organizing marine exploration along the Argentine littoral and in aquatic laboratories. However, during the period studied, the resources of the State and support from the government officials fluctuated and weren't sustained enough to develop a program for marine research. Later on, Lahille (1913, p.19) would acknowledge: "The slight interest given to the study of the seas' riches has not allowed me to undertake the fishing campaigns that I've been requesting for so many years … knowledge of almost all the new species for the country or for the sciences is owing to the benevolent competition of our few fishermen."

The markets in the center of Buenos Aires were fundamental sites for comfortably obtaining different marine animals and news about their origin and abundance. Nevertheless, cataloguing ocean fish and getting an idea as to their geographic distribution by this means were limited, in large part because so few fishing zones were exploited:

> So far the species of fish that are caught and sent to market, and that we become aware of mainly by that route, come from very few fishing stations. The waters of Mar del Plata and Montevideo are first in the supply line to the kitchen and scientific research for material of this type. Many times the former seizes even new species before they can reach the laboratory for study. On the other hand, they do not always catch all types of fish for market, but rather those that are in demand for the sake of gastronomy or the household budget (Berg, 1895, p.1-2).[3]

As was mentioned at that time, many species were not exploited. They were returned to the water or consumed locally, not shipped to urban markets because they didn't fetch a good price or didn't form part of local eating habits and cooks' know-how. For the benefit of science, culinary tastes and the acceptance of certain animals started changing, making possible the arrival and sale of new products in the Buenos Aires markets. The marketing of some species, as in the case of rays: "at the beginning of the exploitation of Mar del Plata's fishery, it was very difficult to get rays accepted in the Buenos Aires market. Now, on the contrary, they are very sought after. They sell easily, and the compensation is good" (Lahille, 1895, p.157). On the other hand, the sale of sea turtles, previously valued for their meat, started falling off in Buenos Aires at the turn of the twentieth century, and their price fell so much that some agents opted for giving some specimens to the Zoo (Zabala, 1910). In that sense, science was an alternative solution for strange specimens or those not valued by the public, finding consumers among the few naturalists interested in the different life forms that inhabited the sea.

The fresh fish suppliers in Buenos Aires quickly learned to satisfy the needs of the scientists, not only filling their orders, but also donating specimens and sending them rare or unknown samples that they received. The fishermen and market employees, accustomed to seeing and classifying hundred of examples of the same animals, could distinguish new forms or those that presented anomalies, which they sometimes offered to the naturalists for their analysis. Along with the specimens, they could offer details about the condition and color of those recently caught or about certain morphological features that would be lost or changed during transport to market. The fishermen also provided information about the time of year and the areas where they were caught or were more abundant. This way, the naturalists' interpretations and descriptions were being shaped based as much on their own observations and those of other researchers as on the comments of fishermen and sellers. In particular, Berg recognized the help given by the latter in the creation of the collections of the National Museum of Buenos Aires and the catalog of marine fish:

> It is my duty to show my gratitude to the owners of fish stands No. 77 and 78 in the Downtown Market, Mr. Juan Garillo, Mr. Antonio Rumi, Mr. Lucas Groppo, who, along with their sales clerks, have contributed with the utmost willingness not only to advancing the Museum's collections, but also to providing me with research material, thereby collaborating on the completion of this study (Berg, 1895, p.4).

Enjoying that help and that of other collaborators and some summer vacationers of Mar del Plata that sent him strange animals, between 1893 and his death in 1902, Berg published a series of ichthyological reports and some notes about marine crustaceans, among other zoological works. For the systematic description of fish, he followed the contemporaneous works of the North American ichthyologists and the rules of nomenclature adopted at the first international Zoology conventions held in Paris (1889) and Moscow (1892). Along with the scientific name in Latin for each species, he added the locally used common names and the different scientific terms given by other authors for what was considered the same species. The library of the Buenos Aires museum and his linguistic knowledge, of Greek and Latin in particular, allowed him to rectify several scientific names as well as doubtful or erroneous spellings, and to establish the correct etymology of technical terms. This job of classifying and determining synonymous names and the geography of the marine fauna would be justified as much for its scientific end as for its practical utility for the country:

> It will provide the foreigner with knowledge of our most common saltwater species, this way avoiding that businesses, with their sights set on Europe, where certain types of fish are scarce, have to go to the trouble of identifying them in the future. And, it will contribute to clarifying the geographical distribution of many species, showing that some that were believed to inhabit only northern seas are also found in southern ones, and that others live off our coasts as well as in the waters of New Zealand, the Cape of Good Hope, Peru, Chile, etc. (Berg, 1895, p.3).

The distribution of marine fauna exhibited global connections that challenged geographical and political boundaries, so that its study required gathering and comparing data on an international scale. As with the creation of other disciplines, this research would imply the establishment of networks beyond national borders and urban laboratories, for the exchange

of objects and information (Podgorny, Lopes, 2008). Furthermore, Berg's comment speaks to the notion of a universal nature that was linked with certain epistemological problems, but also with the appearance of a common space shaped by commerce and the markets. Like other naturalists, he recognized the necessity of inventorying and standardizing, according to international scientific nomenclature, the names of the species found in the local natural setting, in order to make this a more accessible source of materials for different commercial uses, for legislation concerning it and its promotion abroad. The local fauna needed to be described in a universal language in order to present the "Argentine" resources internationally and attract capital. Analogous to what had occurred in other disciplines, scientific classification would mean separating from the everyday local language of the fishermen and dealers and introducing a different order to the classifications they gave to the products they were selling. One of the problems was that each locale had a different name for the same type of fish. In addition, the fishermen might use different names for the same animal in its juvenile and adult form. In other cases, different fish were referred to with the same name, sometimes because of a similarity in their taste, or simply because using a name the public recognized facilitated its sale. For their part, the naturalists tried to homogenize the names through a universal technical language and helped to eliminate the confusion caused by the different vernacular terms. Nevertheless, catalogs and scientific papers show that in spite of those efforts, the scientific world did not escape from the problem of the proliferation of names and reclassification of samples, showing that scientific objects could lack stability.

## The use of steamships and deep-sea fishing

At the end of the nineteenth century, some businessmen asked the Argentine government for permission to operate with fishing steamships and trawl nets. The government authorized this fishing system in the río de la Plata and off the coast of Buenos Aires Province in a zone beyond ten miles offshore. This area, later reduced to five miles from the coast, was reserved for shore fishing and sailboats. A new state agency, the Office of Hunting and Fishing (División de Caza y Pesca), created at the end of 1898 under the Department of Commerce and Industry (Dirección de Comercio e Industrias) of the Ministry of Agriculture (Ministerio de Agricultura), was in charge of carrying out studies and writing reports relating to the issuance of those permits and the regulation of fishing nets. This office, lead by Fernando Lahille and later transformed into that of applied Zoology, worked on publicizing the potential marine resources of the Atlantic coast and creating collections for reference and different exhibits. To that end, Lahille continued to rely on the samples provided by the Buenos Aires fishmongers and the coastal fishermen of Mar del Plata, whom he would help in their dispute over the use of the beach in the face of growing tourist activity in that village. He also obtained the collaboration of the companies that began to use steamships and to explore new fisheries, establishing some clauses in the permits granted by the Argentine government:

> For each expedition, the permit holder shall be obliged to allow on board his ships an employee of the Department of Commerce and Industry responsible for inspecting the catch and carrying out whatever studies are ordered … of all the species unfamiliar to the fishermen that the permit holder should obtain, he shall deliver several samples

> to the Department of Commerce and Industry for the collections of the Office of Hunting and Fishing. He shall also keep statistics on the quantities of fish extracted by his ships, including identification of the different species and notes on the fishing locations and the migration of the most common fish, all of which information shall be communicated monthly to said Department (Argentina, 1899, p.95).

This rule would be partially carried out. Some of the first businessmen that requested permits to fish with steamships did not develop this activity in the end, or they did not last long. The first companies limited themselves to the mouth of the río de la Plata and primarily to the exploitation of the *corvina*,[4] the main fish introduced to the Buenos Aires market from Montevideo. Pedro Galcerán, a Uruguayan businessman engaged in sending fresh fish from Montevideo to Buenos Aires starting in the mid-1880s, owned the most important of these companies. At first, he was buying from the coastal fishermen. Later, he organized his own fleet, incorporating large nets dragged by motorboats, which caused complaints from the Montevideo fishermen.[5] In January 1899, the Argentine government allowed him to operate outside of the ten-mile limit off the Argentine coast, which would cause a problem with Uruguay over jurisdiction after the detention of some of this company's boats. That same year, Galcerán collaborated with the Office of Hunting and Fishing, providing costly trawl nets for a maritime expedition that Lahille and his helpers undertook. Around 1905, part of this company was transferred to the Buenos Aires shipping company of Ernesto Arana, who worked for a couple of years with two small steamships in the mouth of the río de la Plata, providing data about the catches and, on some of his voyages, allowing employees of Lahille's office on board. A short time later, other firms with fishing steamships would appear in Buenos Aires, incented by the benefits that the fresh fish business promised in the area. Around 1904, large transatlantic ships with refrigeration capability started to bring fresh salmon, hake and lobster from Southampton, and later, from the port of Vigo

> at such a price that only the well-off could afford it … Understanding the prospects this signified, we formed business Partnerships with the proposition of exploiting this industry, taking aim at our vast Atlantic, with all the prospects of an inexhaustible fish hatchery (Zabala, 1910, p.5).

In 1906, a partnership of ship owners, known as The Argentine Fishing Co. (La Pescadora Argentina), was formed and initiated large-scale fishing with steamships and trawl nets from the port of Buenos Aires. This company, with Francisco Dumas at its helm, supplied fresh fish to the Buenos Aires market for a decade and provided various specimens to the office of applied Zoology, the Museum of Buenos Aires and to some exhibits of that time. Its activity commenced in 1907 with the arrival of two 195-ton trawlers, built in the Scottish shipyards of Hall Russell and Co. Later they would acquire other vessels, eventually owning eleven trawlers by the outbreak of the Great War in 1914. These boats, also called *chaluteros* or *arrastraderos*, measured 35 meters in length, had metal hulls, holds with capacities of ninety to 130 tons of fish preserved in ice, and some had refrigeration machines. They were equipped with powerful engines for navigating at ten or 11 miles per hour and regulating the speed in order to drag the great net through the depths. The net was raised with motorized winches. With every cast, the net was dragged for two hours, obtaining "up to 4,090 kilos of fish. However, entire

days would go by without hauling them in, until they came upon a shoal of fish. If a shoal is found, the whole ship could be loaded in little time" (Zabala, 1910, p.7).

The contents of the net were dumped on the deck, where the specimens were washed and classified by species. Those that weren't being sold at market were thrown back into the water or consumed on board. As in the markets, the tasks of sorting and classifying the animals trained the eye of the fisherman to detect the varieties common to certain zones and the anomalous or rare specimens, some of which were saved for the scientists to identify. The voyages lasted between five and nine days, and close to 120 tons of fish were obtained monthly. The product was unloaded at the Dársena Sur (South Dock) or the Boca del Riachuelo (Mouth of the Riachuelo) in the port of Buenos Aires. Around 1909, sanitary inspections began in those places as well as in the Constitución train station, where the sea fish and lake fish from the Province of Buenos Aires arrived. During that time, two or three other fishing companies were operating out of the port of Buenos Aires. According to Villemur (1993), the commercial rivalry among these companies ended with the bankruptcy of some and the acquisition of others by the Argentine Fishing Co., which ended up dominating the venue. At the beginning of the world war it was the only fishing company in the country that operated beyond what were considered territorial waters.

Fishing with trawlers meant the exploitation of areas far removed from the coast and deeper than those reached by the coastal fishermen of Mar del Plata, who at that time did

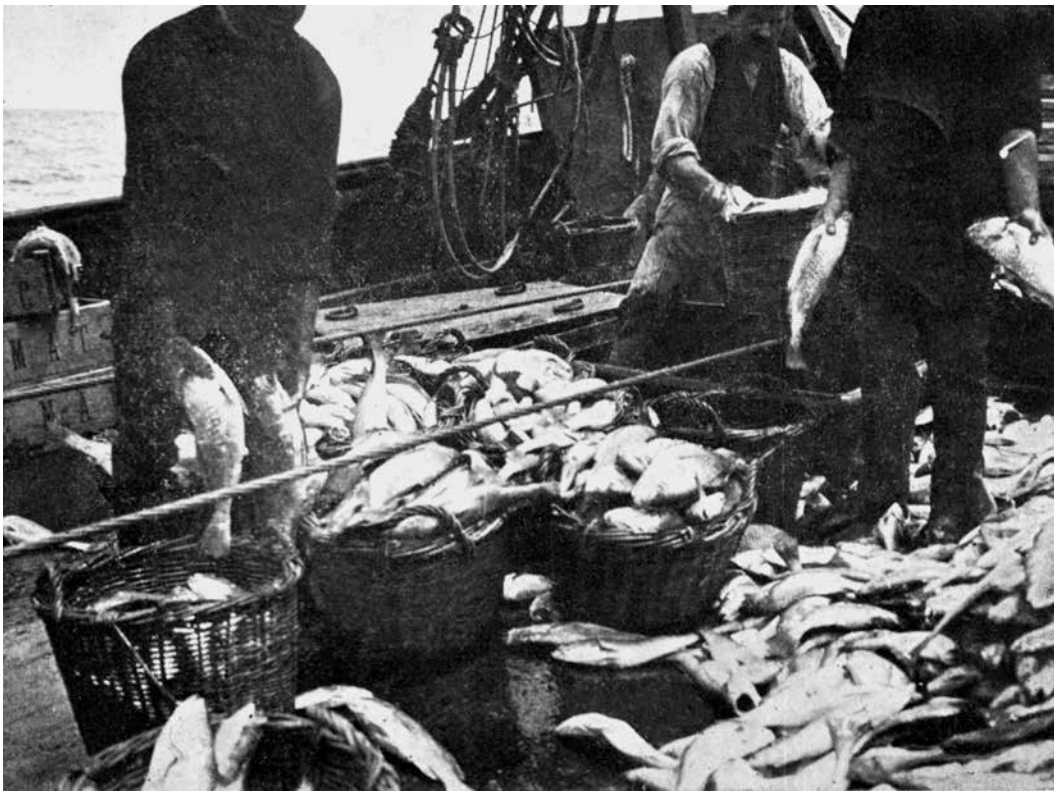

Figure 2: Classifying the catch on board a fishing steamboat (Zabala, 1910)

not fish in depths greater than twenty meters. The boats belonging to the Argentine Fishing Co. explored fisheries in different places in the Atlantic, such as off the coast of Buenos Aires Province, where they would find new varieties of fish, which were difficult to commercialize at first. To facilitate their sale, the new ichthyological forms were baptized with names familiar to consumers:

> Upon beginning its campaigns, the first fishing company found an abundance of fish that had not been encountered previously, no doubt because they lived at depths that were unreachable with the small nets used by the few Mar del Plata fishermen up until then. The fish I'm speaking of, with their bright red color and head armed with spikes, attracted great attention from the public; and since the public doesn't generally purchase fish it doesn't recognize or hasn't heard of, the fishing company baptized these with the name red mullet (rouget), even though the real red mullet belongs to a different family (Triglidae), which is represented in the country by the Atlantic searobin (Prionotus punctatus). I noticed immediately that it was a fish that was well-known in the Mediterranean … To Mallorcans it's the Seran Imperial, in Barcelona it's the Fanegal, and the administrator of the Zoology department, who lived in Logroño for a long time, says that there they call it Cabra. Finally, residents of the province of Niza give it the name Cardouniera. Much more interesting to us than these matters of popular names is the extremely vast geographical distribution of this species. It is found not only in the Mediterranean, but also in the deep waters of the Atlantic (Lahille, 1913, p.5).

This commentary shows how the naturalists discussed or compared their observations with the employees in their workplaces and with the identifications or names given by the fishermen from different regions, which allowed them to verify the wide distribution

Figure 3: Measuring the depth before casting the net (Zabala, 1910)

of some species and the links between the seas in different parts of the world. On another occasion, the Argentine Fishing Co. boats began to find a variety of the cod family, and the Downtown Market sellers quickly baptized that fish as the "royal forkbeard," while others would talk about the southern or "Patagonian cod." Some samples were sent to Lahille for his identification. Catches in deep waters off the coast of Mar del Plata of cold water species known to inhabit the Magellanic region showed that important resources could be found very nearby, and suggested certain characteristics of the deep seas of the region: "whose temperatures must be analogous to that of the southernmost waters. It goes without saying that the private interests of F. Dumas' fishing company – very respectable interests – will not allow for the disclosure of the exact location where these fish were found, or the nature of the relevant depths" (Lahille, 1909, p.10-11).

The president of the Argentine Fishing Co., Francisco Dumas, donated giant sea turtles to the Museum of Buenos Aires and sent unfamiliar fish and other ocean organisms to the Office of Zoology (Sección de Zoología) of the Ministry of Agriculture for identification and publicity. However, at first he avoided divulging the coordinates of the fishery locations out of fear of competition from the other companies that were appearing in Buenos Aires. In spite of that, at the time it was recognized that:

> The natural sciences should thank one particular company, 'The Argentine Fishing Co.,' for the gradually growing knowledge of the ocean fauna of the Southern Atlantic … Because of this company, Dr. Fernando Lahille … has been able to gather important elements for presenting, already classified and well-ordered, the very numerous species of fish, mollusks and crustaceans that live in our seas. But, more importantly, for a long time now Mr. Dumas, the president of this fishing company, has been gathering valuable data about the habitat of each species of the ichthyological fauna [sic] (Los peces…, 1910, p.187).

Part of these collections were exhibited at the Centennial Agricultural Exposition (Exposición de Agricultura del Centenario), in which this company participated, and its president showed the information and maps that he was compiling:

> Mr. Dumas let us see maps of the ocean and the neighboring Argentine coasts, where, by way of the data that informed the captains of the eight fishing boats on each short voyage, sufficient knowledge is gained about banks of various species of fish, the periodic migration of others, the influence of the warm currents from the North and the cold ones from the South on the movement of certain species, the different depths where different types of fish live, the nature of the depths of certain fixed fishing spots, the abundance and scarcity of plankton at specific points, spawning seasons and a thousand other details, at first obtained empirically by the ship captains, who were at times unaware of the importance of the details that they are obligated to record. Later these details are patiently and wisely checked and gathered by the company's management for utilitarian purposes, but they will be of great scientific interest for constructing a geographic map of the ocean fauna. Unfortunately, what still always happens will happen: instead of the sciences being the starting point for finding practical applications, rather it is these and empirical stories that drag the haughty sciences kicking and screaming behind them [sic] (Los peces…, 1910, p.188).

The observations and empirical experience that the captains were acquiring on each voyage, upon being recorded in fish diaries and logs provided by the company's management, then compiled and systematized on charts and maps, managed to transform the fishermen's reports into information with "great scientific interest." For historians of science, this touches on an important historiographical question: the collective and bureaucratic aspects of the gathering of data and the organization of knowledge. As Irina Podgorny (2013b) proposes, a bureaucratic history of science means an analysis of the protocols of record and ways of organizing knowledge, as well as shifting observational practices between activities and different knowledge bases. The organization of deep-sea fishing presents an interesting case for examining some of these questions, as well as the links between this activity and knowledge of the marine world. The interactions between the fishing companies and naturalists encompassed a variety of attitudes and collaborations, in many cases due to the personal relationships that scientists were able to develop with management personnel in the companies or with some captains. The Argentine Fishing Co. donated collections to scientific institutions and sent unfamiliar specimens to Lahille for him to identify, while the work of this naturalist, news in the press and exhibits of specimens would help to promote the products marketed by that company. With respect to the information and maps compiled by Dumas, we have not found records that allow us to know if they were published or incorporated into scientific works, as one is able to observe, years later, with the records of fishing boat captains from other companies. It should be pointed out that in 1916 a large fire destroyed the collections and files of the office headed by Lahille. That same year the Argentine Fishing Co. ceased operations; the company took advantage of the high prices for boats during the world war to sell its fleet to the Russian government.

In the 1920s, once again, some shipping companies and ship owners developed deep-sea fishing from the port of Buenos Aires, offering passage to naturalists and amateurs of marine biology and opportunities for expanding the collections of the Buenos Aires museum. Between 1920 and 1940, the Gardella Company (later called Pesgar S.A.) was the most important and ended up managing the other fishing companies of Buenos Aires (Cabeza, 1938).[6] It had a branch office in the Uruguayan capital, whose manager, Luis Galcerán, was an "enthusiastic collaborator" with the Museum of Natural History (Museo de Historia Natural) in Montevideo. He sent different specimens obtained by the fishing steamships and contributed to the systematic catalog of Uruguayan fish, developed by the museum director at the time, Garibaldi Devincenzi. During those years and in that way, the scientific institutions on both sides of the río de la Plata enjoyed the help of the same company and specimens obtained by the same boats. Once these specimens were incorporated into the collections and the catalogs published by each museum, they became part of the fauna of each country.

Not many deep-sea fishing vessels operated from the port of Buenos Aires. In 1928 seven trawlers were registered (Carpio, 1928), and around 1934, fifteen boats were counted, although nine or ten were working regularly: three in the area of the confluence of the río de la Plata and the Atlantic and the rest on the high seas, devoted mainly to catching hake (Cabeza, 1938). At that time, the catch was commercialized in its fresh state, mainly for domestic consumption through the "Intendente Bullrich" Market of Buenos Aires, the "commercial emporium where all the country's marine, river and lake fish are concentrated." In this setting,

at the beginning of the 1920s, marine fauna and fishing industry exhibits were held. In those years, and until it was replaced in 1935 by a new market with refrigeration facilities, it was the market most visited by Argentine naturalists and foreigners, including the zoologists from the first campaigns of the English commission of the *Discovery*. With the increase in fishing activity, especially with what the trawlers caught, the market space continued to offer "discoveries" and opportunities for observing the morphological variability and the sexual dimorphism of the species for sale or for choosing the typical forms of some animals among hundreds of specimens. In papers by various Argentine naturalists and visiting foreigners, visits to these places would be mentioned up until the 1930s, when the development of chilling and freezing technologies introduced certain changes in the marketing of fish. One aspect to continue exploring in more depth is the impact the different methods of capture, transportation and commercialization of the specimens had on the history of scientific practices and the creation of knowledge.

Publications by Argentine naturalists from the period studied account for the places and the manner of gathering material for study, showing the combination of different observation sites and the importance of commercial fishing to research into the marine fauna. Thus, for example, the zoologist Tomas Marini (1928, p.274), pointed out:

> Pursuing my research into the genus Raia in Argentine waters, I have continued my periodic visits to the Bullrich market in this Capital, and I have been fortunate to find specimens of species that were not included in the collections of the National Museum of Natural History of Buenos Aires (Museo Nacional de Historia Natural de Buenos Aires) and that are, also, new to our fauna. At the same time, I have happened to collect some novelties on various voyages made aboard the Angélica, a fishing boat belonging to the firm Gardella and Company. In addition, captain Mr. Carlos Alexandersson of the same company, a person with considerable observational spirit, had the opportunity to favor us with numerous pieces of utmost interest, in addition to very important data for knowledge of our marine fauna and its geographical distribution … in the month of March, I visited the port in the Capital at a time when fish was being unloaded from a Atlantic voyage made by the steamship Maneco; at this time I observed several boxes of rays. These were obtained east of Cape San Antonio at a depth of 100 to 150 meters. I took three specimens, a well-developed male, and a male and a female of smaller size, all of which are being housed in the collections of the National Museum.

In order to collect novelties in this way, naturalists could engage in early morning walks through the market and dig through the stands of fish for sale; board fishing steamships and take advantage of the chance to collect those animals with no commercial value that appeared in the net and were generally thrown back; or visit the port when the fishermen were unloading the catch that had been classified by species. In the ports, they could also contact captains and fishermen and ask them to collaborate by looking for specimens of certain biological groups. Some fishing steamship captains, like the Swede Oloff (in Argentina, Carlos) Alexandersson, accumulated years of experience and observations about the conditions, zones and times of year when the fish with the most commercial value were found, and other species without any economic important appeared in the trawl net. Alexandersson, for example, fished in this part of the Atlantic from 1908 on for at least three more decades, training his son in the same trade (Reel, June 16, 1934). He was the captain of the fishing boats Undine

and Maneco, belonging to the Gardella Company, where employees and collaborators from the Buenos Aires museum, as well as journalists and other people, rode along onboard. In several scientific papers, thanks are given for the information and specimens provided by this captain, who also donated and sold collections of marine invertebrates and fish to the Buenos Aires museum. Frequently, the depth and coordinates of the fishing location of the specimens were given.

In the 1920s, the fishing zones were no longer kept secret. The boats met each other in these areas and remained in plain sight of each other for several days. Generally, they would park some two hundred to three hundred miles from the coast (a voyage of some thirty hours from Buenos Aires), in locations where marketable fish were plentiful, especially hake. By then, two catching zones, migrations, times of day, depths and water temperatures where the hake moved were all known. Fishing captains were accumulating observations and experience for spotting the best places to cast the net, associating the greater presence of these fish with certain temperatures and depths (Carpio, 1928). They also possessed practical knowledge of meteorological conditions and currents in the area and some information about the configuration and nature of the marine floor, elements that they kept in mind for throwing the net and avoiding its deterioration. Before casting the net, the depth of the area was sounded, since the length of the drag cables was related to the depth and the animals that were procured. Measuring the water temperature with bottom thermometers that some boats had available, and detecting the type of bottom could help find schools that were not visible simply by observing from the deck. Part of this data was recorded in fish logs, where for each cast of the net one wrote down the position of the boat (using the sextant to measure the height of the sun and determine the latitude and/or estimating the geographic coordinates), the hour, the temperature, the depth in fathoms and the quantity of fish obtained in kilos (cf. Carpio, 1928).

The references to geographic coordinates and fishing depths for fish, mollusks and other marine invertebrates sent by the captains or the Gardella firm to the Buenos Aires museum were considered "estimated" data, but sufficient for general studies. Those indications were checked and compared to other sources of information at the museum:

> In each case we have checked with nautical charts in order to ascertain if the positions indicated match up with the depths. In addition, it should be kept in mind that the position the boats record is where they spend several hours casting the nets and hauling them in, in the meantime navigating several miles at slow speed in one direction or another; so that, the points marked by geographic coordinates should be taken as average positions around which the trawling has been done, and therefore, could vary by fractions of degrees toward one side or the other. On the other hand, this is the usual way that fishing boats carry out their operations, and that is how, in many parts of the world, they have contributed so effectively to the progress in marine biology. In those cases where the boats have indicated their position but not the depth, this has been deduced from the nautical charts, and the respective data is recorded in parenthesis (Doello Jurado, 1938, p.281).

In this way, reports from captains and fishermen could be combined with various sources of information and with the data gathered by naturalists on board, as Antonio Pozzi (1945, p.367), head of the Office of Fish (Sección de Peces) of the Buenos Aires Museum, would mention:

> In the successive voyages that I have made on board the oceanographic ships of the Argentine Navy and in the fishing boats 'Trawlers' of the Pesgar company; and at the same time as the comparative study of the results obtained by the fishing boats Maneco and Undine, in more than eighty voyages made from 1925 to February 1934, the extension of the hake's migratory shifts or movements has been established (emphasis in the original).

The captains of the fishing steamships were accumulating observations about the type of bottom and temperature in which the commercial fish abounded, especially about the fishing zones, migrations, feeding and behavior of hake, the main product exploited by these companies. The logs and records of these sailors, even if they were not as precise as the data obtained on hydrographic expeditions and by the Navy ships, offered information about areas not frequented by merchant or military ships and observations gathered over several years and dozens of voyages. Interestingly, although the naturalists of the time recognized the contributions of those involved in fishing activities, these relationshipshave not been studied much in the historiography of marine sciences.

## Final considerations

This paper has explored some aspects of the relationship between the natural sciences and the emerging development of maritime commercial fishing.This activity provided opportunities for initiating the scientific study of fish and other marine species and introducing them to the general public through different exhibits. The specimens marketed in Buenos Aires contributed to the expansion of museum collections and the identification of new species for the "Argentine" fauna. Trawlers, dedicated to deep-sea fishing off the coast of Buenos Aires Province and working out of the port of Buenos Aires, also facilitated the creation of collections and the "discovery" of new species. Additionally, they offered naturalists the possibility of going out to sea and having access to records gathered over years of soundings and fishing in the epicontinental ocean. The scientific sectors generated other interactions, sometimes of an occasional nature and other times more long-lasting, with the fish dealers of Buenos Aires, the fishermen of Mar del Plata and, later, with those from other locations on the Atlantic coast of Argentina. The relationships among these sectors, far from being a utopian collaboration, included a wide range of behaviors, attitudes and interests.

Scientists not only received specimens from the fishermen, but also information about life cycles, reproductive periods, migration and fishing zones, as well as about color and other characteristics present in the specimens recently removed from the sea and that frequently changed with transportation and the passage of time. The naturalists discussed with them their interpretation of each one; they compared knowledge and species identification. As this work attempted to show, the market stands, fishermen's harbors and fishing boats can be considered places of cognitive impact that mediated nature and museum, different cultures and types of knowledge. These "spaces in between" (Klemun, 2012) form part of network of aquisition and circulation of objects and interpretations, where a variety of participants, abilities, knowledge and technology took part. Knowledge about the Argentine marine fauna started taking shape in the intercession of these spaces and among the scientific practices,

access to the sea and the exploitation of resources. In this way, what was seen, heard and collected in the markets, on fishing wharfs, beaches and decks of ships, was added to the catalogs and scientific publications of different institutions in the world, all helping to shape the scientific descriptions of the inhabitants of the sea.

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## NOTES

[1] To create that catalog, Berg combined the study of the specimens caught by the fishermen of Montevideo and Maldonado on the Uruguayan coast, and Mar del Plata and Bahía Blanca on the Argentine coast, with the observations that he had made on an ocean voyage to Patagonia in 1874, and the results published by various nineteenth century voyageurs and expeditions.

[2] Archivo de la Provincia de Buenos Aires, Tribunal de Cuentas, Legajos del Museo de La Plata.

[3] In this and other citations of texts from non-English languages, a free translation has been provided.

[4] At that time, the term *corvina* included several species of fish, such as white croaker and black drum.

[5] Following a strike in 1898, Uruguayan fishermen got the government to respond to their request to ban the Galcerán Company's fishing method, claiming that it was harming the small boat fishermen and destroying enormous quantities of fish and their offspring (Pescado…, 14 oct. 1898). In order to continue its activities, Galcerán requested permission from the Argentine government to fish in the estuary of the río de la Plata and the Atlantic coast.

[6] The Gardella Company ceased operations in 1942. Upon falling into receivership, the company was nationalized, and part of its fleet was integrated into the Fishing Department of the National Merchant Fleet (División Pesca de la Flota Mercante del Estado) (Fermepin, Villemur, 2004).

## REFERENCES

ARGENTINA
*Registro Nacional de la República Argentina*, Buenos Aires, Talleres gráficos de la Penitenciaría Nacional, v.2. 1899.

BERG, Carlos.
Enumeración sistemática y sinonímica de los peces de las costas argentina y uruguaya. *Anales del Museo Nacional de Buenos Aires*, t.4, p.1-120. 1895.

CABEZA, Félix.
Métodos y medios de pesca en la Argentina. Su importancia sanitaria e industrial (año 1934). *Anuario de la Facultad de Medicina Veterinaria*, v.2, n.1, p.143-175. 1938.

CACOPARDO, Fernando (Ed.).
*Mar del Plata.* Ciudad e historia. Buenos Aires: Alianza-UNMDP. 1997.

CARPIO, Pedro.
La pesca de altura en la Argentina. *Boletín del Centro Naval*, t.46, n.470, p.103-114. 1928.

COOK, Harold.
*Matters of exchange*: commerce, medicine and science in the Dutch golden age. New Haven: Yale University Press. 2007.

DOELLO JURADO, Martín.
Nuevos datos sobre fauna marina continental de la Argentina y del Uruguay. *Physis*, t.12, n.44, p.279-292. 1938.

FERMEPIN, Raúl; VILLEMUR, Juan.
*155 años de la pesca en el mar argentino*. Buenos Aires: Instituto de Publicaciones Navales. 2004.

FINDLEN, Paula.
*Possessing nature*. Museums, collecting, and scientific culture in early modern Italy. Berkeley: University of California Press. 1994.

GALLARDO, Ángel.
Carlos Berg. Reseña biográfica. *Anales del Museo Nacional de Buenos Aires*, t.7, p.IX. 1902.

GARCÍA, Susana.
El estudio de los recursos pesqueros en la

Argentina de fines del siglo XIX. *Revista Brasileira de História da Ciência*, v.2, n.2, p.202-221. 2009.

KLEMUN, Marianne.
Introduction: "Moved" natural objects – "Spaces in between". *HOST, Journal of History of Science and Technology*, v.5, spring, p.7-16. 2012. Disponible en: http://johost.eu/vol5_spring_2012/johost_vol5_2012.pdf

KUKLICK, Henrika; KOHLER, Robert.
Introduction. *Osiris,* v.11, p.1-14. 1996.

LAHILLE, Fernando.
Nota sobre siete peces de las costas argentinas. *Anales del Museo Nacional de Buenos Aires*, t.24, p.1-20. 1913.

LAHILLE, Fernando.
Peces criollos. *Boletín del Ministerio de Agricultura*, t.9, n.1-3, p.10-11. 1909.

LAHILLE, Fernando.
Apuntes sobre la industria de la pesca en Mar del Plata. *Boletín de Agricultura y Ganadería*, v.1, n.8, p.3-18. 1901.

LAHILLE, Fernando.
Notas sobre la industria de la pesca en la Provincia de Buenos Aires. *Revista del Museo de La Plata*, v.7, p.157-168. 1895.

LOPES, Maria Margaret; PODGORNY, Irina.
Caminos cruzados: el Museo Nacional de Historia Natural de Montevideo en la documentación del Museo Nacional de Buenos Aires. *Ciencia Hoy*, v.10, n.57, p.15-20. 2000a.

LOPES, Maria Margaret; PODGORNY, Irina.
The shaping of Latin American museums of natural history, 1850-1990. *Osiris*, v.15, p.108-118. 2000b.

LOPEZ, Hugo; AQUINO, Adriana.
Fernando Lahille. Ictiólogo. *Museo*, v.2, n.8, p.19-24. 1996.

LOS PECES…
Los peces argentinos en la exposición de agricultura. *Revista del Jardín Zoológico de Buenos Aires*, v.6, n.23, p.187-188. 1910.

MARINI, Tomás.
Sobre tres especies del género "Raia", nuevas para las aguas argentinas. *Physis*, v.9, n.33, p.274-282. 1928.

MATEO, José.
Gente que vive del mar. La génesis y el desarrollo de una sociedad marítima y una comunidad pescadora. *Prohistoria*, v.7, n.8, p.59-86. 2004.

MATEO, José.
La pesca en la Argentina agroexportadora. *Nexos*, v.9, n.15, p.21-26. 2002.

PASTORIZA, Elisa (Ed.).
*Las puertas al mar.* Consumo, ocio y política en Mar del Plata, Montevideo y Viña del Mar. Buenos Aires: Biblos. 2002.

PESCADO...
Pescado de Montevideo. *La Nación*, Buenos Aires. 14 oct. 1898.

PODGORNY, Irina.
Fossil dealers, the practices of comparative anatomy and British diplomacy in Latin America, 1820-1840. *British Journal for the History of Science*, v.46, n.4, p.647-674. 2013a.

PODGORNY, Irina.
Hacia una historia burocrática de la ciencia. In: Sanhueza, Carlos (Ed.). De idas y vueltas. Transferencia de saberes entre Europa y las Américas. Coloquio Internacional Abate Molina, 2. Universidad de Talca. 2013b.

PODGORNY, Irina.
Mercaderes del pasado: Teodoro Vilardebó, Pedro de Angelis y el comercio de huesos y documentos en el Río de la Plata, 1830-1850. *Circumscribere. International Journal for the History of Science*, v.9, p.29 -77. 2011.

PODGORNY, Irina.
*El argentino despertar de las faunas y de las gentes prehistóricas*. Coleccionistas, museos, estudiosos y universidad en la Argentina, 1875-1913. Buenos Aires: Eudeba/Libros del Rojas. 2000.

PODGORNY, Irina; LOPES, Maria Margaret.
*El desierto en una vitrina*. Museos e historia natural en la Argentina, 1810-1890. México: Limusa. 2008.

POZZI, Aurelio.
El problema de la carta pesquera. *Anuario Rural*, ano 13, n.13, p.366-368. 1945.

REEL, Capitán (pseudónimo de Carlos E.M. Manguno Escalada).
La vida heroica de los trabajadores del mar. *Caras y Caretas*. 16 jun. 1934.

VILLEMUR, Juan.
Evolución de la actividad pesquera en la República Argentina. In: Argentina. Armada. Departamento de Estudios Históricos Navales. *Historia marítima argentina*, t.10. Buenos Aires: Departamento de Estudios Históricos Navales. 1993.

ZABALA, Joaquín.
La industria de la pesca en la República Argentina considerada bajo el punto de vista económico e higiénico. *La Semana Médica*. 1910.