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The Fishes from the lagoons of Buenos Aires

by

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The plan that guided my studies of the freshwater Fishes in the Buenos Aires province was the completion of the facts assembled by Holmberg, Berg, Perugia und Eigenmann but which had not given a thorough notion of the zoogeography and ecology of the region involved.

I can now state that the southern limit of the distribution of the Fishes of the Family Characidae is the Cochicó lagoon and the Sauce Grande river, which forms the lagoon of the same name. This changes completely the notion repeatedly published by Eigenmann whose maps in the famous Princeton University Expedition Report marked the Rio Salado as the limit.

The Nematognaths are also found in the same places; after, following towards the southern and Patagonian regions new families appear, namely Diplomystidae and Pigydidae; that means that the limit is for the Pimelodidae and Callichthyidae, or, in other terms, for the Paraná-La Plata fauna. There is a notorious predominance of the lagoon feature in this limit of the brook or river course.

The Cichlids seem to be more restricted, and have not been found to the south of the Chascomús lakes.

The Atherinids, with their famous species the *pejerrey*, are ubiquitous and evidently have not followed the same migration lines of the former.

The Poeciliids overlap all other distribution limits on account of their extreme adaptations; zoogeographically the facts concerning them are of significance, ecologically of greater significance.

I have studied several lagoons on account of the particular life conditions of Fishes, sometimes brought to notice on account of menaced prosperity of fisheries.

In the district of Guamini there are several lagoons more or less united according to the level of their waters. In the La-

guna del Montepejerrey fisheries had attained in 1920 and 1925 a maximum prosperity. In 1927-28 conditions of fish were quite different. Monte had only pejerrey, a dwarfed form as it was shown by lepidological examination. Still fishing was plentiful although scarcely productive on account of the depreciate short fish. The neighbouring lagoon of Cochicó harboured also pejerrey, that is *Basilichthys bonariensis*, associated with *Acestorhamphus jenynsi*, *Pimelodus clarias* and *Rhamdia sapo*; the former was not dwarfed, but in average growth. Scales showed an unusual percentage of latinucleate or regenerative ones, the cause remaining unknown but perhaps on account of exhaustive fishing in previous years, the fish at the time being quite scarce.

A comparison of the somatic proportions of the pejerrey in the three related lagoons namely, Monte, Cochicó and Alsina, shows a progressive shortening of the trunk which culminates in Monte; this pejerrey has also a longer snout. The form from the three above mentioned lagoons shows in common a larger head than the typical subspecific form from the Chascomús lagoon. The shortening of the trunk is thus a consequence of the proportional enlarging of the caudal region. At the same time the first dorsal fin migrates forward. Also, there is a proportional reduction in height. The length of the eye shows characters of adaptation; thus, in all it is large; in Monte, in the specimens with a double number of years of age than the ones from Cochicó, it is about the same length; on the contrary, a specimen from Alsina, still older but far larger, the centesimal proportion is normal, showing a reduced development corresponding to age and not to abnormal habitat. The study of the perforated scales (these genera having a broken lateral line) shows particular variations.

After a detailed consideration of the facts of physiography and meteorology, especially as to the more or less cyclical changes in salinity, I was forced to adopt as an explanation professor Cuén ot's too well known theory of preadaptation. From East to West the migration of the pejerrey is obvious, and the same line shows a progressive shortening of the trunk. About 1915 the Monte lagoon, formerly devoid of fishes, came to be what Cuén ot calls a „void place in Nature“ owing to a sudden invasion of waters of less saline concentration; they diluted Monte waters and brought large numbers of fish which reproduced. The pejerrey, already adapted

to Cochicó, attained in Monte its maximum prosperity but exaggerated the characteristics that marked it in Cochicó as compared with Chascomú, Alsina, and others.

In the Mar Chiquita (southern) lagoon a case of special interest is considered, as it consists in a litoral lagoon separated from the sea by a stretch of land, with dunes, something like the coast features found in Danzig, but quite peculiar. A marine fauna is found in the great part of the lagoon but in its northern side two freshwater rivulets empty into it and the fishes are of the La Plata fauna. Also, in the western shore another river empties into the region of the mouth which has the ubiquitous Characid genus *Astyanax*. Of special significance is the abundance of a Flatfish *Paralichthys brasiliensis*, studied at length systematically, and which has in the lagoon a place for breeding; this is found also in the estuarine waters of the La Plata, where they start to be brackish, and on the contrary, in San Blas (see my other paper) where the marine waters are in the limit of concentration. Mar Chiquita has changed greatly in dimensions and physiography in general since known times, as the author perused many historical data since the commencement of the last century which prove that even the two western small rivers that now empty into the lagoon formerly emptied into the sea, and that change has taken place in some fifty years.

This, and the general physiography of the zone has a bearing on von Thering's theory as to the origin of the freshwater fishes of South America.

Laguna Los Talitas is a marsh, in the neighbourhood with open channels where real freshwater fishes are abundant, but with few species. The Nematognath *Rhamdia sapo* studied especially and comparing it with the same species from Laguna Brava.

The Brava lagoon is a quite different lake, alpine in character with clear waters. Its fishes are Pejerrey, *Rhamdia sapo* and *Acestrokrampus* spec. Also of clear waters is Laguna Alsina, at least near its south-western shore. In 1929 it exhibited a peculiar phenomenon as the Nematognath *Ramdia quelen* was exterminating the prosperous pejerrey *Basilichtys bonariensis*, a most reputed food-fish. The process could not be followed for a close study on account of the progressive drying up of the lagoon, a fact not unusual in the pampean lakes, notwithstanding that it is many miles long.

In the northwest of the province of Buenos Aires there are other lagoons of the shallow type with muddy waters, namely Mar Chiquita (northern), Gómez and Carpincho. I made an extensive study of their conditions but especially considered the cyclical changes which follow the rainy and dry years. In some years Laguna Gómez dries up entirely, exterminating all the fish. Mar Chiquita, though larger, has suffered the same phenomenon two or three times since records are kept. The problem as to its repopulation is most interesting. Carpincho is quite small and still it exhibits the greatest variety of fish, which are of the Paraná-La Plata fauna. This is interesting as there exists a brief „divortium aquarum“ separating it from the tributaries of the Paraná, and as to the River Salado which has there its origin, and empties into the La Plata, at its mouth it is brackish, so freshwater fishes of the Paraná fauna can not live in it.

Laguna Salada del Cristiano Muerto is a most interesting and little known lagoon, brackish, which runs in the southern part of the Buenos Aires province parallel to the sea, but with no open communication with it. The fish are pejerrey, *Ramdia sapo* and *Jenynsia lineata*, and although there is a river near, it has only communication with the lagoon in exceptional floods. Small rivulets empty into it. It appears thus as a litoral lagoon according to its situation but its waters are not marine and its fauna, although more isolated than is usual in the pampean lakes, is really of freshwater character.

In conclusion we see that the fauna of the rivers and lagoons of the pampas of Buenos Aires is of the Paraná-Rio de la Plata type, a fact partly ignored, partly overlooked in previous general accounts and maps of distribution.

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