

14.—NOTES ON THE FRESH-WATER SPECIES OF SAN LUIS OBISPO COUNTY, CALIFORNIA.

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The county of San Luis Obispo lies along the coast of California, midway between Monterey and Santa Barbara. It is composed of two or three isolated valleys opening out to the sea, and surrounded on all sides by high and barren mountains. These mountains have served as a barrier, shutting off all access of fishes to the streams of the region from the larger basins of the north and east. The valleys of San Luis Obispo are traversed by clear, swift, cold streams rising in mountain springs. In these streams very few species of fishes are found, and these few, except in one case (*Agosia nubila*), are species which have come into the fresh waters by way of the sea. None of the characteristic types of the San Joaquin and Sacramento valleys are found in San Luis Obispo County. This is evidently not due to any character of the waters, but simply to the fact that these fishes can not reach San Luis Obispo except by descent to the sea. The extreme paucity of species of fishes becomes a fact of some interest in connection with geographic distribution. In the investigations of these streams I received the efficient assistance of Mr. J. F. West, of Paso Robles.

The streams examined were San Luis Creek, Corral de Piedra Creek, and Arroyo Grande.

San Luis Creek is a clear, cold, swift stream which drains the valley of San Luis Obispo. It was examined near Avila, where it is deep and tortuous, with high banks covered with tangled vegetation. Here the following species were seen:

1. *Agosia nubila* (Girard). In springs among watercresses, rather common. A very widely distributed species, found in all springs of the Coast Range, northward. The California specimens may represent a distinct subspecies, but the characters need further comparison.
2. *Cottus gulosus* (Girard). Abundant and large.
3. *Eucyclogobius newberrii* (Girard). Common in the bottom of the stream, in quiet places.
4. *Gasterosteus microcephalus* Girard. Everywhere common, especially in pools away from the current and among weeds.

Corral de Piedra Creek is a clear, cold brook with muddy bottom, full of chara, watercress, and other plants, and reduced in summer to a succession of pools. It flows into a larger stream, Pismo Creek, which in turn runs into Arroyo Grande near its mouth on Pismo Beach. Here was found but one species, the stickleback, *Gasterosteus microcephalus* Girard, which was very common.

Arroyo Grande is a large stream, clear, cold, and rather shallow. It runs swiftly over a gravelly bottom. About the village of Arroyo Grande no fishes were seen.

Lower down in tributary pools and miry places were sticklebacks in abundance. Near its mouth one sculpin was seen.

In this stream and in the others trout are occasionally taken and sometimes salmon enter them from the sea. Lopez Creek, a mountain tributary of Arroyo Grande, is the best-known trout stream in San Luis Obispo County. It is said by anglers that the brook trout exist in the mountains and the salmon trout come up from the sea and "promiscuously mix with it." This seems another way of saying that the brook trout (*irideus*) and the salmon trout (*gairdneri*) are but forms or states of the same fish. The individuals which run to the sea grow larger and are more silvery in color than those which remain in the brooks.

The following is a list of the fishes of the streams of San Luis Obispo County so far as recorded:

1. *Agosia nubila* (Girard).
2. *Salmo mykiss gairdneri* (Richardson).
3. *Salmo mykiss irideus* (Ayres).
4. *Oncorhynchus tshawytscha* (Walbaum).
5. *Gasterosteus microcephalus* Girard.
6. *Cottus gulosus* (Girard).
7. *Eucyclogobius newberrii* (Girard).

In no other stream of the United States in which an equal amount of water flows has so short a list been recorded.