

selected for incorporation in this report because some of the topics discussed are now the subjects of much attention in the Pacific States, while others have not before been considered and are legitimate news outside of circumscribed geographical limits.

A special object in view in visiting this region was an investigation of the fisheries for shad, striped bass, black bass, catfish, carp, and eel, which have been artificially introduced. A discussion of this important subject, to which much attention was devoted, is, by permission, reserved for a separate report.

SARDINES, ANCHOVIES, AND SARDINE-CANNING.

Notes on the sardine and anchovy of the Pacific coast.—The California sardine (*Clupea sagax*) is very closely related to the sardine of Europe (*C. pilchardus*), from which it chiefly differs in having no teeth and less strongly serrated scales on the belly. It attains a length of nearly a foot. It is found along the entire Pacific coast of the United States. The fish is, however, most constant in appearance and most abundant on the southern part of the coast, and it is doubtful if it exists in sufficient numbers to maintain a regular fishery north of San Francisco. Even at that place the supply is uncertain. While there have been periods of years in which the sardines were found in San Francisco Bay in large quantities, and for a considerable time in each season, for the past five years they have been very scarce.

The distribution of the anchovy (*Stolephorus ringens*) is similar to that of the sardine. It occurs in abundance along the entire coast, and is often found in enormous quantities in Puget Sound, San Francisco Bay, and elsewhere. It reaches a maximum size of about 7 inches. In most places it is known as the anchovy, but in Puget Sound, according to Swan, it is called "sardine."

Prospects and desiderata for sardine-canning.—With the exception of salmon, practically no attention has been given to the canning of fish on the Pacific coast. The packing of salmon has up to this time absorbed nearly all the interest in fish prepared in this way. The question of canning other kinds of fish has, however, been considered; the prospects for the inauguration of profitable work of this kind have been discussed, and, as will hereafter be shown, several factories for the canning of small fish have been built.

The natural advantages which the west coast possesses for the canning of sardines and other similar fish are unusually good, and are superior in some respects to those of the east coast. At least the two fishes named, the sardine and the anchovy, suitable for canning as "sardines," occur in large quantities, the first named very closely resembling and being an excellent substitute for the sardine of southern Europe. The dry atmosphere and other climatic conditions of the southern coast of California are very favorable for the preparation of a good grade of canned fish. The culture of the olive supplies a native oil of superior quality, which is essential in the canning of the best goods. Another item of importance to canners in this connection is the abundance of cheap labor.

The chief desideratum in the establishment of a factory for the canning of sardines (and other similar fish) is a regular supply of fish during a certain period. This is thought to be of greater importance than an abundance of fish at uncertain or irregular intervals.

While the sardine ranges along the whole western coast of the United States, and is at times very abundant even as far north as Puget Sound, it is doubtful if in Washington or Oregon a supply sufficiently large and regular exists to warrant the