

## XX.-REPORT OF OPERATIONS IN CALIFORNIA IN 1873.

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BY LIVINGSTON STONE.

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### A—CLEAR LAKE.

#### 1.-FIELD-WORK IN THE WINTER OF 1872-'73.

On the 1st of January, 1873, at which date my last report closes, I was at San Francisco, making observations in regard to the fish and fishing of the Sacramento, and intending, in a few days, to go to Oregon to look for a suitable location on the Columbia River for obtaining a supply of eggs of the salmon of that river.

A succession of storms on the Pacific coast deferred my departure from San Francisco for this purpose, and, while waiting for fair weather and an outward-bound steamer, advices were received by telegraph, stating that a large number of white-fish eggs were on their way to California from the great lakes.

At the same time, Mr. S. R. Throckmorton, the chairman of the California fish-commission, requested me to assist Mr. John G. Woodbury, then in the employ of the State commission, in selecting a favorable site for hatching the white-fish eggs on their arrival, and for depositing the young fish when hatched.

In compliance with the requirements of this new turn of affairs, I abandoned my plan of going to the Columbia, and, on the 10th of January, took the cars for Clear Lake, Lake County, California, one hundred and twenty miles north of San Francisco, having in view the objects just mentioned.

#### 2.-CHARACTER OF CLEAR LAKE.

After two or three days spent in examination of various waters, it was decided, on the 15th of January, to locate the hatching-works for the white-fish eggs at Kelsey Mills.

These mills are situated on Kelsey Creek, a tributary of Clear Lake, and are three miles above Kelseyville, Lake County, and six miles from the outlet of Kelsey Creek into Clear Lake.

The water-supply was taken by a pipe from the flume of the mill, and was ample. The hatching-works were in every way satisfactory.

Owing to the difficulty of obtaining moss in the Eastern States in midWinter, the first lot of white-fish eggs forwarded from the East were packed in sponges.

This kind of packing, though suitable for short trips, was not adequate to the requirements of the long journey across the continent, and the eggs were all dead when they arrived at Clear Lake. A second lot, sent on afterward, to take the place of those which were lost, arrived in good condition, and from them 25,000 white-fish were hatched under the charge of Mr. J. G. Woodbury. About the time of the absorption of the yolk-sac, the young fish were placed in various portions of Clem Lake. This was the first introduction of the whitefish (*Coregonus albus*) into the waters of the Pacific slope.

While stopping at Clear Lake, I gathered the following items in regard to its waters and the fishes that inhabit them.

It is a singular fact, illustrating the inaptness with which names are often given to natural objects, that the water of Clear Lake is never clear. It is so-cloudy, to use a mild word, that you cannot see three feet below the surface. The color of the water is a yellowish brown, varying indefinitely with the varying light. The water has an earthy taste, like swamp-water, and is suggestive of moss and water-plants. In fact, the bottom of the lake, except in deep places, is covered with a deep, dense moss, which sometimes rises to the surface, and often to such an extent in summer as to seriously obstruct the passage of boats through the water.

There are large soda-springs boiling up at various points in the bed of the lake, which discharge into it vast quantities of soda-water daily. A reddish-brown, frothy substance is produced in such abundance by the natural evaporation of the soda-water that the lake in places seems to be full of it.

In winter, the water is cool and not disagreeable, in spite of its earthy taste; but, in summer, it grows warm, the swampy flavor becomes intensified, the frothy substance from the soda-water increases, the plants and moss from the bottom float in great quantities in the water, and it becomes unfit to drink.

These conditions would seem to be unfavorable to fish-life in the lake; but, by another of those numerous contradictions for which California is noted, this lake seems to be particularly adapted to fish, and the water teems with them. In the spring, when they run up Kelsey Creek, Cold Creek, and other tributaries, to spawn, they swarm in these streams by millions, forming an almost solid mass, so that it is even difficult to cross the fords with a horse on account of them.

### 3.-LIST OF FISHES INHABITING THE LAKE.

The local names of the fish are as follows:

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|---------------|-----------------------------|-----------------------|
| 1. Perch.     | 5. Chy.                     | 9. Black-fish.        |
| 2. Shapaulle. | 6. Roach.                   | 10. Trout.            |
| 3. Hitch.     | 7. Spotted sun-fish.        | 11. Bull-heads.       |
| 4. Suckers.   | 8. Mud-fish, (mud-suckers.) | 12. Viviparous perch. |

*Perch*, (Smithsonian Collection, No. 146.\*)—The perch is very abundant, indeed. It resembles in color and shape the white perch of the Potomac, but is rather deeper and shorter. Those that I saw in February were about six inches long by three inches in depth. Their flesh is excellent, and they are highly prized as food both by white men and Indians. The perch spawn in May around the margin of the lake. Millions of young perch are seen in June.

*Shapaulle*, (Smithsonian collection, No. 152.)—This fish is a cyprinoid, and is the same as the Sacramento pike, or the California white-fish, of which several specimens have been forwarded to the Smithsonian Institution in my collections on the Sacramento and McCloud Rivers. It averages in weight about five or six pounds, though some have been caught as heavy as thirteen pounds. Their flesh is white, soft, and bony, and they are only a medium table-fish. I was told that they spawn in the sand and gravel in the creeks in May ; but, from the fact that they are caught in great quantities during this month with the hook and line, I am inclined to think they spawn earlier, perhaps as soon as the beginning of March.

*Hitch*.—This is a small, light-colored, and slender fish, about a foot in length, and very full of bones. The whites do not consider them fit to eat. The Indians eat them, bones and all, and appear to like them. They run up the streams in the spring to spawn in countless numbers. It is not unusual to see one or two acres of ground covered with hitch, which the Indians have dried for food.

*Suckers*, (Smithsonian collection, No. 152.)—These resemble the common suckers of other localities. They are poor food, except the large red-finned suckers, which are esteemed tolerably good eating. They spawn on the sand-beaches of the lake and also in the tributary streams. They dig holes for their nests as large round as a bushel-basket and from six to twelve inches in depth. They run up the creeks in March, and probably spawn about that time.

*Chy*, (Indian name;) *silver sides*, common name; (Smithsonian collection, No. 148.)—This fish is quite small, and is said to be all bones. They run up the creeks to spawn in May and June in vast numbers. The Indians eat them, but they are not valued by the whites.

*Roach*, *spotted sunfish*.—These fish are edible, and are seen in vast quantities around the sand-beaches in May, when they probably spawn. They are not of much account.

*Mud fish*, or mud-sucker.—This fish is a short, thick fish, of a bluish color. Its flesh is soft, and is of no value. It is supposed to spawn in May around the beaches and among the tules.

*Black-fish*.—I could not obtain a specimen of this fish to examine, but I heard different persons say that it was a very excellent fish for the table. Some ranked it next to the trout, while others placed it below

\* The numbers attached to the names of the fishes refer to my catalogue of the specimens collected for the Smithsonian Institution.

the shapaulle. It grows to a considerable size, the full-grown fish weighing three or four pounds. It is not abundant as a rule, although large quantities of the black-fish collect in the tules in May, when many are killed with clubs. This is undoubtedly their spawning-season.

*Salmon-trout*, (Smithsonian collection, No. 151.)—This is the local name of a fine, large trout which inhabits the lake, and runs up the tributaries to spawn in the latter part of the winter. It is highly prized for the table. In summer, when the water is warm, the trout collect around the cold springs of the lake, and seem to live there exclusively ; the water of the rest of the lake probably being too warm for them. The Indians fish them very regularly and steadily. These trout used to be very abundant in the lake, but the whites have pursued them so unrelentingly on their spawning-grounds that they are rapidly diminishing. It is difficult to find one now where hundreds used to come to spawn. Those that I saw in February, 1873, were about eighteen inches long, and averaged nearly two pounds in weight.

The common California trout is also abundant in the brooks and streams in the vicinity of Clear Lake, but cannot properly be called one of the fishes of the lake.

*Bull head*.—I did not learn much about this fish, except that it like's the mud and is an inferior fish. It is not the bull-head, (*Pimelodus*), or horn-pout, of the Eastern States.

*Small perch*, (see Nos. 244-250, Smithsonian collection ;) (*viviparous perch*.)—This is a beautiful little fish, quite small, but very good eating. It is the same as the viviparous perch of the Sacramento, specimens of which are included in my Smithsonian collection of 1873. As its name implies, it brings forth its young alive. It is quite abundant in Clear Lake.

#### 4.—THE CONDITION OF THE FISH IN CLEAR LAKE AT DIFFERENT SEASONS.

*January*.—In January, the lake rises somewhat, the tributary streams are full and high, and the trout of the lake run up the streams to spawn. A few suckers are also found in the creeks when they are roiled by the rains. It is said that black-fish are caught with the hook at this time, but I did not hear of any being taken during my stay in January. The Indians fish with a sweep-seine during this month, and catch various kinds of fish. They also catch the lake-trout with hook and line, and the perch with nets.

*February*.—In February, the shapaulle run up the streams, and are caught in considerable quantities. The lake-trout return to the lake. Black-fish are caught this month. The tributary streams are very high.

*March*.—Suckers and shapaulle abound in the creeks. The shapaulle bite somewhat in the lake. Black-fish are more abundant and more easily caught.

*April*.—Hitch, chy, shapaulle, and suckers abound in the creeks.

This is the best month for catching shapaulle. Perch, shapaulle, hitch, and chy are caught in the lake with hook and line this month. Black fish are abundant.

*May.*—The first of May is about the best time for catching perch. In respect to the other fish, this month is very much like the last.

*June.*—The larger part of the fish which have gone up the creeks in such vast numbers have returned to the lake by this time. They have also left the sand-beaches and tules where they have been spawning, and have returned to deep water. Most kinds of the Clear Lake fish can be caught in the lake during this month with hook and line ; more perch being caught, however, than any other species. The Indians go this month to the cold feeding-springs of the lake to catch trout with the nets.

*July.*—This month does not differ much from the last in respect to the fishing; but the water during this month becomes warm, and the fish get soft, and are not good.

*August.*—The lake is not fished much this month, the water being warm and the fish soft and inferior. The Indians, however, continue to fish for trout around the cold springs which feed the lake. There is one spring in particular fished by the Indians, two miles east of Morgan Young's, which is forty feet in diameter, and which boils up so that one cannot row a boat across it. This spring would make a small river if confined. It is thought that it furnishes the chief water-supply of the lake in the summer. It is, of course, cold all the year round.

A great number of dead black-fish are seen about the lake this month, • and some dead perch and roach around the shores and among the tules, which, in many parts of the lake, line the edges densely to a depth of twenty or thirty feet.

*September.*—Fish and fishing are about the same as in August. The weather is a little warmer. No one fishes during this month except the Indians, who still keep after the trout. The water this month is in its worst condition. It is full of the frothy product of the soda-springs. A green scum covers a large part of the surface, and it is not only uncleanly to look at, but unfit to drink; and yet, strangely enough, this lake, which one would think uninhabitable by fish, fairly teems and swarms with them.

*October.*—In October the water begins to cool a little, but as yet there have been no rains, and there is no other improvement in the water except the cooling of it. There is no more fishing done this month than in September.

*November.*—The water is colder this month. The wind and rain clear off the stagnant scum which collects on the surface in the summer. The fish are better, but there is no fishing done.

*December.*—The lake is clear again on the surface, and begins to rise with the rains. The water continues to grow cooler, and the fish improve; but there is no fishing of any consequence done before the new year.