which he had caught at low tide near the end of the mill wharf at Point Hudson. I showed them to several Chinamen, who at once pronounced them to be the best quality of "whetong," one of the Chinese names for the trepang.

When properly cured they are a valuable food product, and will sell in Canton for about $45 per ton. This indicates that there may be a deal of money in the business, if rightly conducted, as a cargo of a hundred tons could easily be cured at some places in a few months with a sufficient force of Indians to collect them. The cost is simply to gather the trepangs at low tide, or have the Indians do so, and then have them properly dried, which is an easy process, though one requiring some care and skill. A few inexpensive experiments will enable one to ascertain the correct way of preparing these slugs, which will be likely to find a ready and lucrative sale to the Chinese merchants.

PORT TOWNSEND, WASH., *March* 19, 1884.

103.—SALMON IN THE McCLOUD RIVER DURING THE SEASON OF 1886.

By LOREN W. GREEN.

The first run of salmon for this season appeared at the mouth of the McCloud River on May 15. The run was comparatively small in number, and the fish were unusually bright and healthy. This was owing to the uncommonly high water, which continued till late in the spring, and gave the fish a much better chance to ascend the steep and rocky riffles, thus making their journey from the ocean a much quicker one than is usual at low water. It is well known that salmon take no food after leaving salt water, and the state of the water during their upward journey has much to do with their appearance on arriving at the headwaters. Nearly all of this run, which was about five days in passing, went up to the extreme limit of their spawning-grounds, where they deposited their ova.

About the last of May another small run arrived, and for some time salmon were abundant and much above the average in size. By the middle of June the water was muddy and the Indians were catching no fish. On June 20 a small run was passing up the McCloud, and another was just starting in from the ocean. On the 25th they were still coming in small numbers; and on July 5 a small run arrived, the fish being larger than any before known here. By the last of July there were no salmon, and the water was clear and low.

On August 21 a good run was reported at the mouth of Sacramento River, and on the 28th they arrived at the McCloud River Station in great numbers and excellent condition, some weighing as much as 45 pounds. By September 10 a considerable number of dead salmon were floating down the river; while by the middle of the month many salmon

were on the riffles, washing the gravel and spawning; and the two runs met here on the 17th,* the one coming up bright and fresh, the other falling back dead, or so nearly exhausted as to be unable to stem the current. On the 25th the fish were dying rapidly, and by the last of the month no salmon were in the river.

On October 6 a new run came on, large but few; and on the 15th another run arrived. On the 20th a large run appeared, many being in a spawning condition; and at the end of the month salmon were plentiful and spawning freely. Soon after they were dying in great numbers, while new runs were continually arriving.

On November 20 the largest run of the season (thus far) reached here, and were spawning freely. Nearly all were large fish, some dead and others dying, but the riffles were covered with fresh ones, and the bed of the river on the riffles was washed perfectly clean. By the 24th salmon were scarce, and considerable numbers of large dead ones were to be seen along the shore.

There is no doubt but that the large numbers of salmon which have visited the McCloud this season, and which are so much above the average of past seasons in size, are the salmon which were hatched at the McCloud Station by the U. S. Fish Commission and planted in the McCloud, Little Sacramento, and Pitt Rivers late in the fall of 1881. About 7,500,000 eggs were taken at this station during the season of 1881, and it is safe to say that more than 6,500,000 strong and healthy young salmon were planted in that year. The young fish were kept and well cared for until able to guard against their natural enemies; and the waters which carried them to the ocean were so favorable that nearly all must have reached it in safety.

The fish when planted, being strong and large, instead of sinking to the bottom and burying themselves in the gravel, as younger fish will do where numerous enemies are awaiting them, immediately began searching for food. For several days they kept together and took an upward course, searching along near the shore and gradually separating. By the following June many of them had reached points 10 or 15 miles above where they were planted. On August 23, 1882, using a handful of dried salmon eggs to entice them within reach, with a small dip-net I captured 48 at one dip, some of which would measure from 4 to 7 inches in length. This was at a point 8 miles above the place of planting. A few days afterwards there was a rise in the river which carried the young salmon out of the McCloud and on their way to the ocean, which they reached in safety, as the rise of water was not enough to overflow the broken levees.

In 1882 about 4,000,000 young salmon were planted at the McCloud Station; but owing to some trouble in the hatching-house they were planted somewhat younger than were those of the preceding year, and the water that carried them to the ocean was not so favorable and

* See Fish Commission Bulletin for 1886, p. 314.

many were carried through the broken levees, the percentage of loss being heavy. In 1883 about 1,000,000 were taken and hatched at the station and planted in the McCloud. Since then artificial hatching has ceased, and the number of salmon hatched from natural spawning in the river has been almost nothing. Never since 1882 could I call together more than three or four young salmon, and more often I would find none at all. Returns from the planting of 1881 have been beyond the most sanguine expectations, and millions of eggs could easily have been taken from salmon in the McCloud this season; but unless artificial hatching is again brought into operation in our rivers, our canneries must close, the Indians must suffer, and our beautiful mountain streams must soon have no salmon.

Comparatively few salmon have been up the Little Sacramento and Pitt Rivers this season. The blasting operations of the railroad along the line of the Little Sacramento have prevented the spawning salmon from ascending the stream as usual, quite a number having begun the ascent, but finding the gravel-beds covered and a general disturbance of the water, after a few days they turned back and came to the McCloud. The Pitt River received small runs late this fall; but for one salmon that goes up the Pitt a hundred ascend the McCloud.

Probably no salmon that deposit their eggs in the McCloud, Little Sacramento, or Pitt Rivers ever return to the ocean. On their arrival here they are generally of a silvery color, which soon deepens to a dark red; and after coming on the riffles and beginning to spawn, they fail rapidly. In washing the gravel their tails become white and thread-bare, so to speak; soon a fungus covers their fins, which become stiff and of little use to the fish; parasites collect in the gills and throat; their eyes sink deep into the head; and their whole appearance changes greatly in a few days. Even in this condition they seem to care for nothing but to remain near the bed of gravel where their eggs are deposited, which they do until driven back by stronger fish or the swift current. When unable to remain longer they slowly drift down the river, with their heads up-stream, sometimes making quick darts with the current for a short distance, and then again facing up-stream. Often when driven near shore they swim to quiet places where the water moves slowly, and remain sometimes for two or three days with very little movement. At last they will start suddenly, lash the water into a foam, and sometimes jump their length out of water; but soon sink to the bottom or float down the river dead.

It is possible that some of the smaller male salmon that milt near the ocean find their way back to it alive and are saved by the salt water. From the river here I have taken salmon that were badly diseased, and by a few applications of salt water they greatly revived.

UNITED STATES TROUT PONDS,
Baird, Shasta County, California, November 24, 1886.