

XI.—REPORT OF OPERATIONS AT THE SALMON-HATCHING STATION ON THE CLACKAMAS RIVER, OREGON, IN 1877.

BY LIVINGSTON STONE.

On the 15th of May, 1877, I received a telegram from Prof. Spencer F. Baird, United States Commissioner of Fish and Fisheries, requesting me to proceed with all possible dispatch to the Columbia River to report to the Washington and Oregon Fish Propagating Company* for the purpose of conducting operations, under their auspices, in hatching salmon on that river or its tributaries. I had had during the previous winter some correspondence with Mr. J. W. Cook, of the Oregon Packing Company, at Clifton, in regard to going to Oregon with this object in view, but owing to a want of sufficient local interest in the subject the matter was dropped until the very marked falling off of the spring catch of Columbia River salmon called the attention of the cannery men to it again and led to the formation of the above-mentioned company and the dispatch just referred to.

In pursuance of Professor Baird's instructions I left the East as soon as practicable and arrived at Portland, Oreg., on the 11th of June, having spent a short time *en route* at the McCloud River, California, a notice of which will be found in my report of operations at that point. On the 13th of June I met the directors of the Washington and Oregon

*Articles of incorporation and by-laws of the Oregon and Washington Fish Propagating Company. Principal office at Portland, Oreg. Incorporated April, 1877.

Directors.—John Adair, jr., J. W. Cook, J. G. Megler, J. West, C. H. Lewis.

Officers.—John Adair, jr., president; Joseph G. Megler, secretary; Henry Failing, treasurer.

ARTICLES OF INCORPORATION.

Know all men by these presents that we, C. Leinenweber, James W. Cook, John West, Joseph G. Megler, John Adair, jr., and J. P. Bannan, citizens of the State of Oregon, do by these presents associate ourselves together as a corporation under and by virtue of the general incorporation laws of the State of Oregon, and for such purpose we do jointly and severally hereby agree to and with each other to the following articles:

ARTICLE 1. The name assumed by this corporation and by which it shall be known is the Oregon and Washington Fish Propagating Company.

ARTICLE 2. The duration of this corporation shall be unlimited.

ARTICLE 3. The enterprise, business, pursuit and occupation in which this corporation proposes to engage, is to propagate, breed, and multiply salmon and other species of fish in the waters of the Columbia River and its tributaries, and to do a general fish-culture business; to purchase, own, hold, occupy, and dispose of real estate, and

Fish Propagating Company at Astoria, and there received instructions to proceed up the Columbia River and find, if possible, a suitable place for erecting a large and permanent salmon-hatching station.

I had, two years ago, gone to the Columbia in compliance with instructions from Professor Baird for the same purpose, and had at that time reported to him in favor of the Clackamas River, which I then made up my mind was the best location in the Columbia River Valley for a hatching establishment for salmon.

On expressing this opinion on my second visit to the Washington and Oregon Fish Propagating Company it was met by the statement that the salmon of the Clackamas were not the right kind, being Steel-heads (*Salmo Gairdneri* ?) instead of Chenook salmon (*Salmo Quinnat*), which is the kind used for canning. This proved ultimately to be a mistake, but at the time it appeared a sufficient reason for abandoning the Clackamas River, and I spent the next five weeks, from June 13 to July 16, in examining different points on the tributaries of the Columbia. The result was that almost every tributary between the sea and Walla Walla River was investigated and all with unfavorable results. Some, like the Des Chutes, had plenty of salmon in them, but were unmanageable. Others, like the Umatilla, were easily controlled, but deficient in salmon.

erect such necessary buildings and improvements thereon, and to purchase, erect, and maintain all necessary furniture, &c., for hatching salmon and other fish.

ARTICLE 4. The principal office and place of business of this corporation shall be at the city of Portland, in the county of Multnomah, and State of Oregon.

ARTICLE 5. The amount of the capital stock of this corporation shall be the sum of \$30,000, United States gold coin.

ARTICLE 6. The amount of each share of such capital stock shall be the sum of \$50, United States gold coin.

In witness whereof we have hereunto set our hands and seals in triplicate this 6th day of April, 1877.

C. LEINENWEBER.	[SEAL.]
J. W. COOK.	[SEAL.]
JOHN WEST.	[SEAL.]
JOSEPH G. MEGLER.	[SEAL.]
JOHN ADAIR, JR.	[SEAL.]
J. P. BANNAN.	[SEAL.]

In presence of—

C. A. DOLPH.

JOSEPH SIMON.

STATE OF OREGON,

Multnomah Coun'y, ss :

This certifies that on this 6th day of April, 1877, before me, the undersigned, a notary public in and for said county and State, personally appeared C. Leinenweber, James W. Cook, John West, Joseph G. Megler, John Adair, jr., and J. P. Bannan, to me personally known to be the identical persons described in and who executed the foregoing articles of incorporation, and acknowledged to me that they executed the same.

Witness my hand and official seal the date above written.

JOSEPH SIMON,
Notary Public, Oregon.

Others still, that were both manageable and abounded in salmon, were too distant or inaccessible to be utilized. So all the spawning-streams up to the Walla Walla River, one after another, had to be given up in consequence of some fatal objection which made them unavailable.

Owing to the Indian troubles, which were then very serious, it was unsafe, and in fact wholly out of the question, to go to the Clearwater or Salmon River, or to the Yakima or any of the tributaries of the Upper Columbia.

Although the prospect was so discouraging, I nevertheless left Mr. Hubbard at Umatilla to put a rack across the Umatilla River to obstruct the ascent of the salmon in case they came up; and later in the season, hearing that salmon were expected in large quantities in the river, I sent Mr. Richard Hubbard to the Umatilla on the 19th of September to make an examination of the river. He found no salmon there, and having reported unfavorably on the place it was given up.

On the 16th of July, while the proposition was being discussed by the directors of the Oregon and Washington Fish Propagating Company of postponing all operations till another year, I suggested to them to make an examination of the Clackamas River before abandoning the enterprise entirely for the year.

The result was that the Clackamas was examined and found suitable for the purpose in every respect, and on the 18th of July I received by telegraph the following authorization to proceed with operations on the Clackamas River:

"ASTORIA, OREG., July 16, 1877.

"To LIVINGSTON STONE,

United States Fish Commission:

"You are hereby authorized to take such action and make such arrangements as you think necessary and expedient in the matter of salmon hatching.

"JOHN ADAIR, JR.,

President Oregon and Washington Fish Propagating Company."

Having examined the river, first by traveling along the bank for 25 miles, and afterward going up the stream 20 miles in an Indian canoe, I decided upon locating the hatching-works on the south bank of the Clackamas, just above the mouth of Clear Creek.

As soon as this decision was made, I telegraphed to Mr. Waldo Hubbard, at Umatilla, to come to the Clackamas River, and having communicated my plans to him for a hatching-house, a dwelling-house, water-supply, &c., returned to the McCloud River reservation in California. I remained there until the operations of the United States Fish Commission at that point had been placed in good running order, when I returned to the Clackamas River. On arriving at the hatching-station, on the 10th of August, I found that the work had been pushed with vigor by Mr. Hubbard, and had made very satisfactory progress. The mess house was finished, the hatching-house was nearly completed,

a rack had been built across the river, and the dwelling-house had been begun.

A large amount of work had been done also toward obtaining a water supply by placing a dam across Clear Creek, 100 rods from its mouth. The original intention was to lay the foundation of the dam on bed-rock, and then to build up to the height required to convey water to the hatching-troughs.

It soon became evident, however, that the bed-rock lay deeper than was supposed. Two gangs of twenty men each—a day gang and a night gang—were put on the work, and a great effort was made to reach the bed-rock, but without success, and on the 18th of August it was found necessary to abandon the place altogether and to resort to some other method of raising the water.

On the 29th of August, Mr. Adair, president, Mr. J. W. Cook, vice-president, and Mr. Megler, secretary of the Oregon and Washington Fish Propagating Company, visited the place, and authorized the building of a dam by contract and the purchase of steam-pumps to furnish a reserve supply of water in case of emergency. It was ultimately found, however, that these could not be furnished for less than \$5,275, and such an expenditure not seeming to be warranted by the circumstances, I was then authorized to raise the water by a current-wheel. Work was immediately begun on the wheel, which was finished on the 22d of September. It was several days before the elevator and shore attachment were completed, so that it was not till the 25th of September that the wheel-work was complete, and a permanent supply of water furnished for the hatching-house. In the mean time, work on the other departments had been prosecuted with energy; the hatching-house was fitted up with eight lines of troughs and wire baskets, each line having a hatching capacity of a million eggs. A substantial flume had been built from the wheel to the hatching-house, and everything put in readiness for the transfer of the salmon-eggs from their temporary position in the river to the regular hatching-trays.

We will now go back to the middle of August, in order to get a thorough comprehension of the progress of the season in regard to the salmon and salmon eggs, which, of course, are the central objects of the whole work. Up to that time no salmon of any consequence had made their appearance in the river in the vicinity of the hatching-works. Occasionally a straggler had been seen below the rack, and that was all; but after this time more and more appeared every day, though still in very small numbers. There were, nevertheless, enough to show that the movement of the salmon which immediately precedes the spawning-season had begun. Accordingly, on the 1st of September we made a haul with the seine a short distance below the rack. A few salmon were caught, but they appeared to lack a week or two yet of being ripe. The salmon caught at intervals during the next ten days presented the same appearance, though we, of course, naturally enough

expected that the later-caught ones would be riper. This led to quite an important discovery, viz, that the unripe salmon coming up the river to spawn proceeded directly up as far as the rack, and then, not finding a passage through or a suitable place where they were, fell back to a spawning-ground that lay about 80 rods below. This accounted for our always catching green or unripe salmon at the rack. Upon this discovery being made we abandoned fishing at the rack, and began drawing the seine at the spawning-ground just mentioned, where we found ripe salmon the first time we fished, which was on the 12th of September.

In the mean time I had begun catching salmon and taking eggs a few miles up the river. A double purpose was accomplished by this step. In the first place, persons acquainted with the river assured me that a considerable number of eggs could be procured there from the salmon, which were then spawning; and in the second place, and what was a far weightier consideration, it had become absolutely necessary to get rid of some Indians who were trap-fishing for salmon a few miles below us. As long as their trap remained in the river below, it was useless, of course, to expect salmon to reach our seining-grounds at the fishery. I accordingly arranged with the Indians through Mr. Louis Barin, mayor of Oregon City, of whose invaluable assistance more will be said hereafter, to take up their trap below us and place it at a spawning-ground six miles above the fishery, and for a suitable compensation to catch salmon there for us to spawn. This served the double purpose of getting additional eggs for the hatching-house, and, what was of the utmost importance, of ridding the river below us of the trap-fishing, which was proving fatal to our salmon-hatching operations.

The Indians were a poor lot, and did almost nothing, but between them and the regular seining at the fishery we caught enough salmon by the 15th of September to yield nearly 200,000 eggs, which were placed in river-boxes under a temporary brush covering near the shore.

On the night of this day, which will be always known at the Clackamas fishery as *Black Friday*, and which well deserves that name, the river rose very suddenly and poured down such a rapid and resistless torrent that it swept away everything we had in the river, including the rack across the Clackamas, the Indian trap above, the corral for confining the parent salmon, and the 200,000 salmon eggs which had been collected in the river-boxes. The mischief caused by this rise in the river might have been averted had we been able to procure definite information regarding the time when the salmon spawned and the character of the September rise in the Clackamas; but information in a new country like this, where no careful observations have been made and no record kept, it was impossible to get. Hence the accident. Enough was learned about the river this year, however, to prevent a similar occurrence in future. A day of gloom and depression succeeded this disaster. With the rack and trap gone, the season's harvest and

the reserve of spawning salmon lost, and no time left to retrieve, things had a very gloomy outlook.

Several other circumstances added to the general discomfiture. It was reported that the mouth of the Clackamas was entirely closed by a trap which had been put in to catch the fall salmon ("Silversides"). The roads had been made so bad by the heavy rains that every one of the lumber-teams had broken down, and an entire embargo from this cause placed on our lumber supply. Lumber was still wanting to finish the flume and boats, without which, of course, the hatching-house was useless, and that portion of the flume which was completed was so soaked by the incessant rains that it could not be covered with the indispensable coating of asphaltum. The prospect was disheartening enough, but before night I resolved to redouble my exertions to secure spawning salmon and to push the general work forward regardless of discouragements.

I sent to the United States salmon-breeding station in California for eggs enough to replace those that were lost. I hunted up the corral containing the reserve of spawners and found it on a bar a mile and a half below, with the fish in it all alive and well. I detailed seven men to run the seine, with instructions to spare no pains, day or night, to secure all the spawning salmon possible. Agreeably to the proverb "*Fortuna juvat fortes*," circumstances seemed to favor our unequal struggle with misfortunes. My men, when they ascertained my determination to push forward, took hold, much to their credit, with an enthusiasm which, I believe, was entirely independent of their compensation. Before night the rains ceased, and the sun came out for the first time in fifteen days. The roads soon improved; the lumber-teams started up again; the flume became dry enough for the asphaltum; the spawning salmon seemed to remain about where they were, though they were now free to ascend the river. In two days we began to take more eggs, and in less than a week affairs at the fishery wore an entirely different aspect, and there seemed to be a chance left yet of hatching some salmon on the Clackamas.

The general work being now well under way again, my special anxiety was concerning the wheel and the elevator for raising the water, which were being built on flat-boats opposite the upper end of the flume. The wheel furnished the power for raising the water, but being only 12 feet in diameter could not raise the water to the height of the flume on shore, which was 26 feet above the low-water level of the river. An elevator consequently had to be attached to the wheel in order to lift the water to the flume. This elevator had at first nineteen buckets, holding five gallons each, and was geared on to the wheel by an 8-inch rubber belt. On the 23d of September the work was sufficiently advanced to start the wheel, which was done; but before a single revolution was made, the belt flew off the drum, showing that although the wheel had power enough to lift the water the belt had not sufficient

capacity to match. Some of the buckets were then knocked off the elevator and the wheel started again. This time it revolved successfully and was found to be lifting to the flume 8,000 gallons of water an hour, which was quite sufficient for this season's operations, and so another anxiety dropped off, and another forward step was accomplished. Before trusting the eggs to the water-supply now furnished by the wheel, I had the lifting apparatus watched two days and nights to make sure that the supply would be continuous. All doubts were removed at the end of forty-eight hours, and at noon on the 25th day of September, 1877, the water was turned regularly through the hatching-house and the salmon eggs brought up from the temporary hatching-boxes in the river and placed in the hatching-troughs. This inaugurated the regular work of the Columbia River salmon-hatching establishment on the Clackamas, which is probably destined to be, for the present at least, the largest in the world, and to exercise a very important influence both on the salmon fisheries of the Columbia and on the world's supply of canned salmon.

Having now succeeded in placing the hatching establishment in successful running order, the next thing was to make it safe. This was a more serious and difficult matter than one would naturally suppose. The Clackamas River, in the dry season, is a pleasant and quiet though somewhat rapid stream, and looking upon it at that season an uninformed person would never suppose it could prove dangerous to such staunch and substantially-built boats as those upon which our water-lifting apparatus rested. But in the wet season the Clackamas becomes a furious and terrible river, bringing down in its current immense trees, root, trunk, and branches, the smallest of which would wrench our boats from their moorings, or, if they remained stationary, would crush them in pieces. Consequently, to make the boats safe became as difficult as it was indispensable. It was accomplished, however, by the joint help of a breakwater and an enormous boom. The breakwater was built of 3-inch plank, resting on heavy timbers, and so placed as to form a convenient and perfectly safe harbor for the boats to retire to when required. The breakwater is nearly 100 feet long and is built up so as to reach above the extreme limits of high water. This protects the boats when moved into the harbor, but of course does not save them from drift-wood when they are stationed in the current. To accomplish this latter result is the object of the boom. This is an immense floating barrier 30 inches square and nearly 100 feet long, weighing over ten tons, made of four single squared timbers firmly bolted together. The upper end is chained to a rock in the river, which forms the outside abutment of the barricade, and the lower end extends just outside the boats, forming a complete safeguard against drift-wood coming down with the current. As above mentioned, the drift-wood is very formidable when the river is high, entire trees, roots and all, with trunks not less than 6 or 8 feet in diameter, not being an unusual sight in the river after heavy

rains. A boom twice as strong as ours would, if placed at right angles with the current, be broken like a pipe-stem by this drift when the river is high and rapid; but to obviate this our boom is kept, by spars extending from the shore, at an angle of not over 20° with the current, in consequence of which, whatever drift strikes it simply slides by outside of the boats and goes on down the river without doing any harm.

The water-supply for the hatching-house having been made secure by these expedients, it only remained to finish the dwelling-house and stable connected with the fishery, and the season's work was done, with the exception of placing the young salmon in the river.

When I left Oregon, the latter part of November, about half of the fish had been deposited, and the balance, in charge of Mr. Waldo F. Hubbard, were likely to be ready some time in December. The total number of young salmon, including both those placed in the river and those still remaining in the hatching-house, was nearly a million.

Considering the late day at which the undertaking was commenced, and the great and numberless difficulties which attended it from the beginning, it seems to be doing as well as could be expected to even place the establishment the first year in successful working order; and to actually succeed in hatching and turning out nearly a million salmon is, I confess, more than I thought it possible to do this year. Indeed, it was nearly all that it was possible to do. There were over a thousand drift-nets in the Columbia, each 1,200 feet long, running all summer; there were drift-nets and two traps on the Clackamas, and in September a trap reaching nearly across the mouth of the same river, and how could we expect to get many parent salmon to take eggs from at the terminus of a gauntlet like that? The fact was that nearly every salmon that entered the mouth of the Columbia was trapped, netted, seined, speared, or otherwise destroyed before it reached our fishery.

If every salmon which reached the hatching-station after the river was low enough to permit fishing had been caught and spawned, the yield of eggs would not have been very great. This is owing not to the natural scarcity of salmon in the Clackamas, but to the excessive fishing in the waters below, especially at the canneries on the Columbia. This leads me to say that the drift-net and trap-fishing at the canneries of the Columbia are at present pushed to such an extreme degree that unless some restriction is imposed, even artificial hatching cannot be carried on at any point on the Columbia or its tributaries to a sufficient extent to replace the vast number of fish destroyed.

The Clackamas River is undoubtedly the best location there is for hatching the Columbia River salmon in large quantities, and we have just seen how meager the results must be, even there, without some restriction on the fishing below. Without such restriction the Columbia River salmon is doomed, and his days will soon be numbered. But with suitable protection, and with the assistance of the Clackamas

hatching station, the Columbia River salmon fishing has yet a great career before it.

The Clackamas River is one of the great natural spawning grounds of the Chenook salmon (*Salmo quinmat*). Probably no tributary of the Columbia has abounded so profusely with salmon in past years as this river. A high natural fall on the Willamette at Oregon City, just above the mouth of the Clackamas, forces all the salmon of the Willamette up the Clackamas, and vast hordes of them have consequently been in the habit of crowding into that river to spawn. The only thing needed now to make the salmon fishing of the Columbia equal to the best days of its past history is to so protect the salmon that a small percentage of them can ascend the Clackamas. Only a very small percentage will be enough. One-half the salmon that are canned on the Columbia in a single day, if we had them at the hatching station, would give us eggs enough to hatch 50,000,000 young salmon. It is obvious, therefore, that a very moderate restriction of the fishing will answer the purpose. I am happy to say that steps have already been taken toward furnishing such protection, and the Washington Territory legislature, with that object in view, passed a bill last summer, the text of which is given below, and which appears to be entirely satisfactory.

The following is a full copy of the bill, which is entitled "An act regulating salmon fisheries the waters of the Columbia River":

"SECTION 1. *Be it enacted, &c.*, That it shall not be lawful to take or fish for salmon in the Columbia River or its tributaries by any means whatever, in any year hereafter, during the months of March, April, August, and September, nor at the weekly closetimes in the mouths of May, June, and July, that is to say, between the hours of six o'clock in the afternoon of each and every Saturday, until six o'clock of the afternoon of Sunday following. And any person or persons catching salmon in violation of the provisions of this section, or purchasing salmon so unlawfully caught, shall, upon conviction thereof, be fined in a sum of not less than five hundred dollars nor more than one thousand dollars for the first offense, and for each and every subsequent offense, upon conviction thereof, shall be fined not less than one thousand dollars, to which may be added, at the discretion of the court, imprisonment in the county jail for a term not exceeding one year.

"SEC. 2. It shall not be lawful to fish for salmon in the said Columbia River or its tributaries during the said months of May, June, and July, with gill-nets, the meshes of which are less than four and one-eighth inches square, nor with seines whose meshes are less than three inches square, nor with weir or fish-traps whose slats are less than three and one-half inches apart. Nothing herein contained shall prevent fishing in said river or its tributaries with dip-nets, during the fishing season as established and defined by section one of this act. Every trap or weir shall have, in that part thereof where the fish are usually taken, an opening at least three feet wide, extending from the bottom to the top

of the weir or trap, and the netting, slats, and other material used to close such aperture while fishing shall be taken out, carried upon shore, and there remain during the said months of March, April, August, and September, and the weekly closetime in the months of May, June, and July, as prescribed in section one of this act, to the intent that during said closetime the salmon may have free and unobstructed passage through such weir, trap, or other structure, and no contrivance shall be placed in any part of such structure which shall tend to hinder such fish. In case the inclosure where the fish are taken is furnished with a board floor, an opening extending from the floor to the top of the weir or trap shall be equivalent to extending the said opening from bottom to top. Any person or persons violating the provisions of this section, or encouraging its violation by knowingly purchasing salmon so unlawfully caught, shall be deemed guilty of misdemeanor, and, upon conviction thereof, shall be fined for the first offense not less than five hundred dollars nor more than one thousand dollars, and for each subsequent offense shall on conviction be fined not less than one thousand dollars, to which may be added imprisonment in the county jail for a term not exceeding one year.

“SEC. 3. It shall not be lawful at any time during the year, nor by any means whatsoever, to fish for salmon for the purpose of trade, barter, or sale, on the waters of the Columbia River, west of a line drawn southerly from Scarborough Hill, in Washington Territory, to Tansey Point, in the State of Oregon. And any person or persons bartering, selling, or otherwise disposing for purposes of gain, any salmon so unlawfully caught below the line herein established, or any person or persons knowingly purchasing such salmon so unlawfully caught, or otherwise unlawfully encouraging salmon fishing in such prohibited limits, shall be fined in any sum not less than fifty nor more than one hundred dollars; and justices of the peace shall have jurisdiction to try and determine all complaints for the violation of the provisions of this section.

“SEC. 4. The person or persons making complaint of any violation of the provisions of this act shall, upon the conviction of the offender, be entitled to one-half of the fine recovered; and any prosecuting attorney who shall, upon complaint being made to him of the violation of this act, fail to prosecute the party accused, shall be deemed guilty of a misdemeanor in office, and, upon conviction thereof, be fined in the sum of five hundred dollars for each and every such offense.

“SEC. 5. This act shall not be so construed as to interfere in any way with any establishment or enterprise for the propagation of salmon, whether by the United States Government or any regularly organized company or society for that purpose, located or operated upon said Columbia River or any of its tributaries.

“SEC. 6. It shall be unlawful for the proprietor of any saw-mill on the Columbia River or any of its tributaries, or any employé therein, to cast the sawdust made by such saw-mill, or suffer or permit such sawdust to

be thrown or discharged in any manner into said river or its tributaries. For each and every willful violation of this section, the party guilty of such violation shall be liable to a fine of fifty dollars for each and every such offense, to be recovered before a justice of the peace of the proper county.

"SEC. 7. Any party convicted of any violation of the provisions of this law shall be sentenced to pay the fine and costs adjudged, and in default of paying or securing the payment thereof, he shall be committed to the county jail until such fine or costs shall be paid or secured until he shall have been imprisoned one day for every two dollars of such fine and costs. But execution may at any time issue against the property of the defendant for whatever sum may be due of such fine or costs. Upon payment of such fine and costs, or the balance after deducting the commutation by imprisonment, or securing the same, the party shall be discharged. All fines and penalties collected for violation of this act shall constitute a fund for the maintenance of hatching-houses for the propagation of salmon, and be disbursed in accordance with the provisions of an act entitled 'An act to encourage the establishment of hatching-houses for the propagation of salmon in the waters of the Columbia River.'

"SEC. 8. No section, proviso, or part of this act shall be considered as valid or operative until the legislature of the State of Oregon shall enact a similar section, proviso, or act, in whole or in part; and from and after the passage of such a law by the State of Oregon, such parts hereof as shall be so enacted shall immediately go into full force and effect, and the governor of this Territory is hereby requested to transmit an attested copy of this act to the governor of the State of Oregon, requesting him to submit it to the legislature of that State."

When this legislation has been supplemented by similar action on the part of the Oregon legislature, which will probably be done next fall, operation at the Clackamas River salmon-hatching station will begin on a very large scale, and a few years will see it, without doubt, the largest establishment of its kind in the world, with a yearly yield of young salmon entirely unprecedented.

The extremely intricate but equally interesting subject of the natural history of the Columbia River salmon would find a legitimate place here, but I forbear to venture upon a discussion of it until my observations up to the present time have received further confirmation. I feel quite free to say, however, that I am satisfied that the number of varieties of the *Salmo* family which have been attributed to the Columbia River will experience considerable shrinkage when the bottom facts come to be known. As a case in point, I think it now safe to state that the *Salmo Gairdneri* and the *Salmo truncatus*, hitherto supposed to be two most unmistakably distinct species, will be found to be one and the same variety—the *Salmo Gairdneri* being the *Salmo truncatus* when prime, and *vice versa*, the *Salmo truncatus* being the *Salmo Gairdneri* at the spawning

season. Other synonyms equally startling will, I think, be established as the study of the Pacific coast salmon progresses.

I must not close this report without expressing my appreciation of the invaluable assistance which was rendered this enterprise on the Clackamas River by *Louis Barin, esq., mayor of Oregon City*. From the beginning of the work to the end Mr. Barin has been a staunch and efficient friend of the undertaking, and has spared no pains and no exertion to help it on, and it is hardly overstating the matter to say that without his very efficient help our operations on the Clackamas could not have been made nearly as successful as they were this season.

The Oregon and Washington Fish Propagating Company intend to resume their labors next year at the Clackamas hatching-station, and to continue them indefinitely. This they will undoubtedly be able to do by means of the revenue which they expect to derive from State licenses of seines, drift-nets, traps, boats, and other implements used for the capture of salmon in the Columbia River. Washington Territory, which borders on the north bank of the Columbia, has already passed a bill providing for such licenses, a copy of which is here presented, and without doubt the legislature of Oregon will pass a similar bill at its next session this fall (1878).

The following is the act passed by the legislature of Washington Territory to encourage the establishment of salmon-hatching houses on the waters of the Columbia River:

[H. B. 118, substitute for H. B. 107.]

“SECTION 1. *Be it enacted, &c.*, That a fish commissioner for the Columbia River and its tributary waters be appointed by the governor, by and with the advice and consent of the council, who shall hold his office for two years, and until his successor is appointed and qualified, who shall be a resident of one of the counties bordering upon the said river. Said commissioner shall exercise a general supervision over the fisheries of said river within this Territory, consider and report upon the introduction, production, and culture of food-fish, especially the salmon, co-operate with the fish commission of the State of Oregon, make report to the legislative assembly at each biennial session thereof, as hereinafter more particularly prescribed, and perform such other duties as may be hereinafter imposed. Before entering upon his duties he shall execute a bond to the Territory of Washington, with two or more sureties, to be approved by the judge of the second judicial district, in the sum of \$10,000, conditioned for the faithful performance of his official duties and the disbursement according to law of all money coming into his hands. Said commissioner may appoint deputies, not to exceed one for each county bordering upon said Columbia River, for whose action he shall be responsible upon his official bond.

“SEC. 2. It shall not be lawful to take or fish for salmon for traffic, barter, or sale in the waters of the Columbia River and its tributaries

with either of the appliances regulated and prescribed by the act entitled 'An act regulating salmon fisheries in the waters of the Columbia River,' without first having obtained a license therefor. The rates of said licenses shall be as follows: The owner or owners of each and every boat engaged in taking or catching salmon upon said river and its tributaries with a gill-net shall pay ten dollars for a license for one season. For each and every seine used in fishing for salmon upon said waters, the owner or owners shall pay for such license for one season ten dollars. For every weir or trap used in catching or taking salmon on said river or its tributaries, the owner or owners shall pay for a license for a season fifty dollars. For each and every dip-net used for fishing for salmon in said river and its tributaries, the owner or owners shall pay an annual license of two dollars. Each and every net-tender or fisherman fishing or taking salmon with a gill-net shall be required to pay five dollars for a license for the season. Licenses issued under this act shall be untransferable, and shall be good for the whole season upon any of the waters of the said Columbia River.

"SEC. 3. The licenses aforesaid shall be prepared by said fish commissioner, attested by his official seal. The commissioner shall register the number thereof, to whom issued and for what purpose. Owners of boats receiving license shall cause to be painted in plain, conspicuous figures upon both sides of the outside of the stern of their respective boats, three inches below the wash-board, the number borne upon the license of said boat. A failure or neglect to paint such register number upon such boat, as herein prescribed, shall subject the owner or owners thereof to a penalty of ten dollars, to be recovered in an action before a justice of the peace. The commissioner shall be entitled to charge the following fees, viz: Twenty-five cents for each license to a fisherman, fifty cents for a boat, one dollar for a seine or fish-trap of any kind, and twenty-five cents for a dip-net, which fees shall be reserved out of the moneys by him received for the licenses issued.

"SEC. 4. Any person or persons who, by the foregoing provisions of this act shall be required to take out a license, shall do such act or use such boat, seine, gill-net, weir or trap, dip-net, or fish with gill-net without having first taken out such license therefor as herein required, shall be liable to a penalty of fifty dollars for each and every offense, and shall moreover be required to pay the license fee required by law, to be recovered before a justice of the peace or other court of competent jurisdiction.

"SEC. 5. Any proprietor, managing agent, foreman, or employé in charge of any cannery upon the said Columbia River, employing a fisherman to whom no license has been issued or knowingly purchasing salmon from any person using a boat, seine, net, or fish-trap for which a license is required, without first having taken out said license, shall be liable to a penalty of fifty dollars for each and every offense, to be recovered before a justice of the peace.

"SEC. 6. All moneys received for license, herein referred to, excepting the fees for issuing the same, shall constitute a fund and be exclusively applied to the assistance of a hatching house or houses on the said Columbia River or its tributaries. Any person or persons or incorporated company who shall furnish satisfactory evidence to the said fish commissioner that a hatching house or houses has or have been established by such person or persons or company, and have actually hatched salmon with which said Columbia River is or has been stocked and supplied, the said commissioner shall forthwith pay over to such person or persons or company the said funds: *Provided*, If there be two or more of such hatching-houses in operation by different persons or companies, then such funds shall be distributed *pro rata* according to the number of hatched salmon.

"SEC. 7. The person or persons making complaint of any violation of the provisions of this act, by the failure to take out a license as herein required, or to do and perform other acts as herein prescribed, shall, upon the conviction of the party accused, be entitled to one-half of the penalty recovered. All fines and penalties hereby or herein imposed shall be enforced and collected as other fines and penalties are by law enforced or collected, and justices of the peace or other officers receiving such fines or penalties, after payment of one-half of such penalty so collected to the complainant, shall forthwith pay the remaining half to the fish commissioner, to be applied to the establishment of or assistance of hatching-houses, as provided in section 6 of this act.

"SEC. 8. The said fish commissioner shall biennially, on the 15th day of September, make a report to the governor to be submitted to the legislative assembly, which report shall exhibit the amount of moneys received from licenses, penalties, and other sources, and how applied; the condition, progress, success, &c., of the hatching-houses, hints, suggestions, or information on the subject of food-fish propagation, and such matters as may be valuable in legislation for the protection or preservation of food-fishes, and the salmon fisheries of the Columbia River.

"SEC. 9. No section, proviso, or part of this act shall be considered as valid or operative until the legislature of the State of Oregon shall enact a similar section, proviso, or act, in whole or in part, and from and after the passing of such a law by the State of Oregon, such parts hereof as shall be so enacted, shall immediately go into full force and effect. And the governor of this Territory is hereby requested to transmit an attested copy of this act to the governor of the State of Oregon, requesting him to submit it to the legislature of that State."