

BLAST KILLS MILLIONS OF SALMON IN PUGET SOUND



The Salmon Eggs from Alaska Will be Hatched in New England in Troughs Like These.



Wheel for Catching Salmon near the Mouth of a Pacific Coast River

Masses of Rock Falling Into Stream Trap Fish Ascending River to Spawning Grounds and All Perish

DISASTER of a kind wholly without precedent has befallen the salmon fishing and canning industry of Puget Sound. It threatens seriously to impair the prosperity of the industry for many years to come.

A short time ago, while blasting operations were in progress on the Canada Northern Railroad to widen the roadbed along the bank of one of the principal tributaries of the Fraser River, immense masses of rock were unexpectedly dislodged, falling into the stream and completely blocking it.

If the accident had occurred a month later it would have involved no momentous consequences. But, unfortunately, it so happened that at this very time the sockeye salmon were ascending the river to spawn and a body of fish estimated at not less than 1,000,000 was intercepted. Cut off from access to their spawning grounds, all of them died without being able to deposit their eggs. The debris was removed from the stream as rapidly as possible, but too late. Of all the vast finny army not a single individual survived.

Now the seriousness of this accident will be realized to some extent when it is explained that the great salmon fisheries and canning plants of Puget Sound are supported by the annual runs of spawning fish bound for the upper waters of the Fraser River. Minor spawning grounds exist on several streams in the State of Washington, but the success of the industry and the livelihood of thousands of persons depend on the salmon which reach the headwaters of the Fraser and its tributaries.

No wonder then that the Government fisheries bureau speaks of the occurrence here described as a catastrophe. Suppose that in the blocked army of salmon there were 500,000 females. All of these were bearing eggs, and in the ordinary course of events they would have laid an average of 5,000 eggs each. This represents a total of two and a half billion eggs. If it is assumed that only one egg in every 1,000 was destined to produce an adult fish, there would have been 2,500,000 full grown salmon from this brood alone to return from the sea to the Fraser River four years later.

Sockeye salmon that were hatched in the headwaters of Pacific coast rivers last summer will go down to the sea as fingerlings next summer and when they are four years old they will return to the streams in which they first saw the light, their habit being never to go far away from the mouth of the river in which they were originally spawned. It follows then that the number of adults returning as intending parents is directly proportionate to the number of fry that survived out of the brood of four years previous. And thus it is manifest that four years hence, when the 1913 progeny come back to the Fraser, there will be a much diminished flock.

Nor is this by any means all the mischief, for a smaller number of salmon returning in 1917 means fewer eggs and fewer fry in that year. The effect of this shortage will appear again in 1921, and the consequences will continue to be felt for an indefinite time to come at four year intervals.

The sockeye is by far the most abundant species of salmon in British Columbia waters. It is the most valuable commercially of all salmon and supports the canning industry not only in Puget Sound but also in Alaska. Extremely particular in the choice of its spawning grounds, it always selects for the purpose streams that are feeders of lakes. So far as known it never ascends a river that has not one or more lakes as headwaters. On reaching the lakes it seeks the streams that empty into them and there builds its nest and deposits its eggs.

Ever since the early days of the canning industry the Fraser River has been famous for the enormous runs of sockeye salmon which ascend it to the lakes far inland. In fact this is the greatest of all sockeye streams. The name sockeye is that by which the fish is known in the Puget Sound region, but in Alaska it is commonly called the redfish or blueback.

The species ranges all the way from southern Oregon to Bering Sea. Formerly it was numerous in the Columbia River and its spawning beds in the headwaters of that great stream were important and extensive. But only a few are found there to-day, a pitiful remnant of the great schools that visited the lakes annually in earlier times.

The sockeye is plentiful in the Alas-

kan rivers, and occurs in all suitable streams on the Asiatic side of Bering Sea and as far south as Japan. Third in size among the five species native to those waters, it averages in weight about six and a half pounds when full grown. It furnishes in Alaska an annual catch of about 20,000,000 fish, representing 1,600,000 cases of forty-eight one pound cans, with a value of something like \$600,000. This is about 70 per cent. of the total value of the salmon catch in Alaska.

The sockeye is the neatest and most symmetrical of salmon. When caught in the ocean, or in the rivers fresh from the sea, it is a clear sky blue on the back and upper sides, shading to silvery white below and on the belly. But soon after entering a stream to spawn the color of its head changes to a rich olive, the back and sides turning to crimson and finally to a dark blood red. The flesh becomes spongy, the back somewhat humped and the jaws hooked or otherwise distorted.

When the salmon swim up a river to spawn they go to their death, for not one of them ever returns alive to the sea. Theirs is a wholesale and tragic sacrifice of themselves for the sake of the perpetuation of their species. On reaching the spawning grounds they pair off and excavate nests in the sand and gravel of the bottom by plowing with their noses and sweeping out the material with their tails. By this means a bowl shaped hollow is formed, perhaps three feet in diameter and eighteen inches deep. The female lays her eggs in the bowl and covers them up, after which the two parents devote themselves to the task of fighting off enemies, particularly the cutthroat and Dolly Varden trout, which follow the salmon to the spawning grounds for the purpose of stealing and eating their eggs.

Meanwhile the father and mother become thinner and thinner, until at length they die. The business of their lives has been accomplished and not one survives. Sometimes the upper reaches of the rivers that lead to the lakes are fairly blocked with masses of dead and dying salmon.

The incubation of the eggs, buried in the sand and gravel, goes slowly on, requiring eight or nine months before the baby salmon are hatched out. Even then the fry remain hidden; but, if known where to look for them on the spawning grounds, one can find them in numbers by wading in the shallows and picking up handfuls of the gravel during early spring. As yet they are not able to swim and they eagerly wriggle back into the gravel to hide themselves, a yolk sac attached to the belly of each little fish furnishing it with a temporary supply of sustenance.

Later they emerge from the gravel and pass out into the lakes, where they feed until they are four or five inches long. Being able by this time to take care of themselves pretty well they start on their long journey down the river to the ocean, where they remain in deep water off the coast for three years, that is to say, until they are full grown and ready to make their trip up the river to spawn in the headwaters and there in their turn to perish.

As a means of remedying to some extent the loss by the recent accident the fisheries bureau will hatch as many young sockeye salmon as possible for planting in the Fraser River. It is not practicable, however, to restore in this way the brood of 1912 and subsequent four year periods until a number of years have elapsed. A catastrophe of this kind upsets to a considerable extent the arrangement by which the output of the Fraser and other streams has been insured. Fortunately the bureau has a very extensive control over the salmon fisheries and in Alaska this goes so far that if such a measure were deemed wise the fishery could be suspended altogether for an indefinite time.

Formerly the canning companies pursued practices which were absolutely destructive. By stretching nets clear across a river or by interposing other equally effective obstacles they prevented the salmon from reaching their spawning grounds. The fish being shut off entirely from access to their breeding places it followed that in four or five years no more of them were left in that particular stream. This was not considered a matter of importance by the canners, inasmuch as when they caught the salmon in one river they could move on to another. If this sort of thing had been permitted to go on the salmon fishery in Alaska would have ceased to exist in a generation.

A stop has now been put to destructive methods of fishing and the fisheries bureau is in a position to maintain the output of salmon to the end of the century, even without the help of artificial hatching, except where the fishery is extraordinarily active or in cases in which the spawning grounds in the headwaters of rivers are reduced in area by the waste of sawmills and mines. There is no danger any longer of diminution of the supply of salmon.

Experience has proved that from 50 to 80 per cent. of the fish in any stream can be taken annually without reducing the supply.

In order to make this entirely clear it should be explained that each salmon river possesses a certain value, meaning that it is capable of producing just so many fish yearly. More than this number it cannot produce because there exists in the headwater lakes only a certain amount of available food for the young fry. If there are more than a certain number of fry there is not enough provender to go round and they

perish of starvation. This, in fact, was nature's method of putting a limit on the multiplication of salmon up to the time when man took a hand in the game.

Recently the fisheries bureau has taken the trouble to count the salmon in some of the more important streams. The first salmon census, so to call it, was in Wood River, Alaska. A barrier, called a rack, was placed clear across, with narrow gates to allow the fish to pass up stream and they were counted as they went through. In this way it is ascertained how many salmon are required

to maintain a supply in a given river. If the requirement is 500,000, all fishing is prohibited each year until that number has passed up. Then the canners are allowed to take as many as they like below the barrier, the maintenance of the supply being assured.

It is easily seen that with this sort of control serious impairment of the fishery is rendered impossible. As for the rivers which have been depopulated it is a matter of no great difficulty to repopulate them by artificial hatching. Thus the expectation is that a genera-

DANCING AS IT WAS AND AS IT IS



From the Bylander.

Most people tend to regard the time of Louis XV. as one of the most "abandoned" in all history. Its morals, however, if they were really such as we are taught to believe, were not reflected in the dancing of the period. Above "Sem" shows the stately minuet as practised by lords and ladies of the eighteenth century court, and the—Tango, as practised by highly respectable Parisians of this present year of grace.

Great Fishing and Canning Industries in the Northwest Suffer Unprecedented Disaster

tion from now the output of the Pacific coast salmon rivers will be much larger than it is at the present time. As for the prospect in the Puget Sound region, it is realized that in view of the large economic interests at stake in both the State of Washington and British Columbia, extraordinary efforts must be made by artificial hatching and by careful superintendence of the fishery to counteract as far as possible the shortage which must necessarily result from the accident to the Fraser River salmon. The fisheries bureau announces that the work of artificial propagation will be actively pushed.

In Alaska the fisheries bureau maintains two fully equipped hatcheries, established especially for the propagation of the sockeye salmon. One of these is at Yes Bay in southeastern Alaska, and the other on the island of Afognak, south of the Alutian chain. These two hatcheries are able easily to turn out 100,000,000 baby salmon annually and can probably do much better at a pinch. The eggs of the sockeye luckily are readily obtainable in unlimited numbers and there is no great difficulty in hatching them, although the period of incubation is extraordinarily long, eight or nine months.

PROF. KIRCHWEY ON EDUCATION

Continued from Fourth Page.

of the teacher is no more exhausting than that of the hard working man and woman in any other field of effort.

"So far as I know teachers are the only people in the country who think that their well being demands that they work but two-thirds of the year and rest the other third. And I submit that the burden of proof is on them."

"I am well aware that a large number of teachers in schools and professors in colleges report themselves as on the verge of going to pieces when the school year draws to a close. Looking at the matter candidly, I am convinced that they get into this condition simply because they know that a long summer vacation is just ahead of them. If that long resting season were not in sight most of the teachers would keep right on with their work and never think of breaking down."

"Why should they? Other men and women do not get on the edge of prostration after working just as hard for a full solid year with two or perhaps three weeks vacation. The professor has no more business to go to pieces than has the banker or practicing lawyer or physician."

"The system advocated of giving American children as good or better education than they now receive and of shortening the total period thereof by from two to four years undoubtedly would mean a considerable increase in the teaching force and in this way additional expense. But the money, would be returned to the taxpayers, because each child would be in school fewer years than at present. While speaking of this I wish to express the decided opinion that it is impossible to expect good results from school work where the classes are as large as they are at present."

"More important far than mere book teaching is it for the teacher to understand the individual pupil's temperament, habits of thought, outlook on life and his ambitions in this direction or that. To have this understanding the teacher must be able to give individual instruction to a large extent and also to have individual acquaintance with each of the pupils. Such personal knowledge of the various pupils of a large class is out of the question except in rare instances."

"The high school is the place where we should have a more general education in citizenship. I do believe, however, that the college course, especially after the second or sophomore year, should be so shaped wherever practicable as to furnish a basis of future work for students who intend to pursue advanced professional training. This is being done now to a limited extent, but not consistently and systematically. "It is true that many students do not know by the middle of their college course what their future career is to be; they have not decided on their definite life work. On two or three occasions I have taken a census of my law students in this respect and ascertained that from one-half to two-thirds of them had made up their minds to study law by the time they had reached the middle of their college course. Perhaps one-half of that number had made up their minds to become lawyers when they entered college as freshmen. But, as already indicated, the majority probably had no fixed plans for the future until they had spent at least two years in actual college life. And the habit of working barely enough to get through those first two years is a great handicap, which the young man realizes when too late."

"A very grave situation is created by the age at which professional men who have had a college course become able to support families. This fact has furnished the principal arguments for those who oppose higher standards of admission to the professional schools."

"When a young man is graduated from a law school, for example, he is not qualified ordinarily to engage in

the practice of law, but must spend one or two years in the practical work of a law office. I should say that in New York about six years of work is necessary after a law student is graduated before he can earn enough to support a family. In smaller and progressive communities he needs from three to four years."

"Among the remedies suggested for this condition is that of cutting down the college course to two years and reducing the period of time devoted to professional study. On the other hand, there is no doubt whatever that a liberal education is a valuable asset to a lawyer and an almost indispensable requisite to the highest success at the bar. Of course there are exceptional men who make their way to the front apparently regardless of such handicaps as the lack of a liberal education. But the conditions of modern life and the increasing complexity of the problems lawyers are called upon to deal with, constitutional and economic problems of the most difficult for the half-educated man to render the service demanded of him. The same thing holds true in medicine, in engineering and in the Church itself."

"We do not need to give our children less education, but we do need to give it to them in less time and without the enormous waste caused by needless long vacations and artificial methods. Prof. Kirchwey called attention to the statement recently made by E. E. Rittenhouse, a conservation commissioner of the Equitable Life Assurance Society, who shows that there are today in the United States alone 17,000,000 unmarried men and women who are of marriageable age."

"Why," asks Mr. Rittenhouse, "thirty-nine out of every 100 males without wives? Why should we have 17,000,000 unmarried persons in the United States, a number nearly equal to the population of Spain or that of China and Mexico combined?"

"Of the eight millions of unmarried men, at least five millions are living on their earnings upon themselves, many of them developing extravagant and often vicious habits. And as a result of this utterly selfish life another great army of young women is forced to toil in factories and business houses for the bare necessities of existence. For almost all of these millions of young women left school at 15, without any special training which would enable them to do skilled and highly paid work."

"Prof. Kirchwey thinks that the seriousness of this condition has been overestimated by Mr. Rittenhouse. "It is claimed by certain industrial observers," Prof. Kirchwey continues, "that the conditions resulting in sixteen million unmarried persons of marriageable age have been brought about by the increased cost of living, the fear inspired in young men that they cannot earn enough to support families when living expenses are rising steadily throughout the world. I do not dispute this opinion, but with a few days figures have been published apparently based on authority which seem to show conclusively that, as a whole, the various elements of the population marry at a younger age today than at any time in the past history of the country. This of course is contrary to the general opinion and I hear it and read it, but it must be taken into account; for there is good reason to think it may be one result of the system of American education."

"I think it reasonable to infer that something in the system is fundamentally wrong. It indicates that too much time has been spent in book study and recitation, and far too little time in cultivating ideals and in fitting boys and girls for lives of usefulness. As Mr. Wilcox of Cornell has well expressed: "What civilization needs is not more family larger families, but more and better families."