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WILL LANDLOCKED SOCKEYE BEHAVE AS SEA FISH IF GIVEN CHANCE IN OCEAN?

Interesting Experiment Set on Foot by Dominion Scientists to Study Possible Value of "Kokanee" or Landlocked Sockeye as Aides in Increasing Salmon Stocks of the Pacific Coast

If the fry of landlocked sockeye salmon are liberated in streams which lead to sea will they go out to salt water and then return in due course to reproduce normal sea sockeye?

Canadian scientists are studying this question out in British Columbia and should they find an affirmative answer it would be possible to increase greatly the commercial sockeye production, for eggs of the landlocked salmon, or "kokanee" or "redfish" as it is generally known, are obtainable in abundance in different Pacific coast areas. For the present, however, the investigators carrying on the work express no opinion as to its probable results.

Previous study has shown that sockeye which have been transformed by some chance into a landlocked fish will reproduce their kind but their kind is a small, stunted fish of, say, only six or eight inches in length. But will the rule work the other way? Or, to phrase the question differently, will young kokanee go to sea if given a chance and then, when they have come to maturity, reproduce sockeye such as are born from the normal sea runs?

It's a question of importance, for kokanee themselves are of practically no commercial value but success in the present experiment would make them worth a good deal, indirectly, since the sockeye salmon of the sea is one of the most valuable Canadian fish.

What's Being Done

The experiment which Canada has begun is being conducted in the Cultus Lake area of British Columbia, and the Fish Culture Branch of the Dominion Department of Fisheries and the Biological Board of Canada, which operates under the control of the Minister of Fisheries, are co-operating in the undertaking. A few weeks ago the staff of the fish hatchery at Nelson collected some 300,000 kokanee eggs in Redfish and Ko-

kanee Creeks, which are tributaries of Kootenay Lake, and transferred them to the Smiths Falls sub-hatchery in the Cultus Lake district. The eggs will hatch out at Smiths Falls next spring and the fry will then be placed in retaining ponds where they will be held until the spring of 1934. Then they will be marked and set free in Sweltzer Creek, which leads to the Chiliwack River and thence on to the sea. Two years after that it will be time for them to return to Sweltzer Creek and spawn, if they are to behave like normal sea sockeye, for salmon come back from the salt water to spawn in the same stream where they themselves were born. A careful watch will be kept for these marked kokanee, and, although the layman, of course, is not familiar with the practice, the plan followed in work of this kind makes it a comparatively simple matter to maintain an efficient watch by utilizing a series of "fences" whereby fish may be held for examination as they ascend a spawning stream.

Then, when it is seen whether or not the marked kokanee fry went seaward and returned again to spawn like normal sockeye, it will be possible to form at least a tentative opinion as to the likelihood that the kokanee can be made an effective agency in increasing the British Columbia sockeye stocks.

It may be, of course, that the present experiment will not be conclusive. Further investigation may be necessary before positive conclusions can be reached, but the expense entailed is negligible as no additions to the regular staffs or equipment of establishments concerned will be involved.

Lobster canneries in operation in Canada in 1931 numbered 337. Their output had a marketed value of about \$2,640,000.

PROBABLE ABUNDANCE OF FISH PREDICTED

North American Council on Fisheries Research Hears Interesting Results of Investigations

Scientists carrying on fisheries research in the western North Atlantic are gradually finding it possible to predict the probable abundance of various species of fish before the fishing seasons set in and thus to enable the fishermen to gauge more accurately the scale on which their outfitting preparations should be made.

Progress in this direction was reported at the recent 1932 meeting of the North American Council on Fisheries Investigations, which was held at Washington and was attended by W. A. Found, Deputy Minister of the Dominion Department of Fisheries, Doctor J. P. McMurrich, Chairman of the Biological Board of Canada, and Doctor A. G. Huntsman, of the Biological Board staff, as Canada's representatives. Newfoundland and the United States, two of the other countries which are members of the council, were also represented but no one was able to be in attendance from France, the fourth member-country.

Next year the council will meet in Canada, probably at the Atlantic Biological Station, Saint Andrews, N.B.

In the "prediction" field two cases of particular interest were brought to the council's attention. It was reported that Doctor Harold Thompson, who is in charge of fisheries research for Newfoundland, had been able to give fishermen of that Dominion accurate information as to the relative abundance of cod in certain areas and as to which of two different fishing grounds would be most productive of squid. O. E. Sette, of the United States Bureau of Fisheries, had predicted that the probable abundance of mackerel last year would mean a catch of approximately 35,300,000 in the United States and the landings actually totalled 32,183,000 pounds.

Many Investigations

Reports on many different investigations were made during the council's
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EACH CAN OF SALMON MARKED TO SHOW WHAT VARIETY OF FISH INSIDE

New Regulation Effective Shortly in British Columbia Provides for Special Markings on Cans Themselves to Indicate Particular Variety of Salmon Packed

Effective on April 1 next, a new provision in the regulations governing the inspection of British Columbia canned salmon requires that every can of salmon produced in the province shall bear upon the tin itself a prescribed letter showing what variety of salmon the can contains.

The particular value of the new regulation will be that it will make it impracticable for anyone to pass off to the consumer one variety of salmon as another. In Canada, of course, canned salmon sold on the domestic market must already bear a printed label identifying it as sockeye salmon or pink salmon, or whatever variety it may be, but shipments sold abroad are labelled by the importers concerned, who are not subject to Dominion control.

Under the new rule the following code of markings must be used, from next spring onward, to indicate the contents of the salmon cans sent out from the British Columbia plants:

- "S" for Sockeye.
- "P" for Pinks.
- "C" for Cohoes.
- "K" for Chums.
- "T" for Springs.
- "B" for Bluebacks.
- "H" for Steelhead Trout.

The regulation was adopted a week or two ago by an Order in Council passed by the Dominion Government in amendment of the Canned Salmon Inspection Regulations, which became operative this year. Under these inspection regulations every can of salmon packed in British Columbia must be submitted for inspection by a permanent federal board of experts before it may be marketed; salmon which fully meets the board's approval is certified by the Dominion Department of Fisheries; salmon which is of "Second Quality" but sound, wholesome, and fit for human food is not certified but may be sent to market, provided it is specially marked in a manner prescribed by the regulations; any salmon which does not come up to "Second Quality" when passed upon finally by the board is confiscated.

Other Changes

In addition to providing for identification marks on the salmon cans, the

recent Order in Council also amended the inspection regulation so as to require that, from April 1, 1933, all cans packed with pieces of fish from the head and tail portions of salmon must bear the words "Tips and Tails" in embossed letters, as well as the code letter indicating what variety of salmon has been used. The word "Canada," which is embossed on canned salmon approved by the Board of Inspection, is not to appear on cans of "Tips and Tails."

REST IN POUND MAKES PILCHARDS GOOD BAIT

Pilchards kept in pound for a week or more make better halibut bait than pilchards fresh from free wanderings at sea.

Fishermen in northern British Columbia have found this out by experience and there's really a very simple explanation for what might seem to be the strange condition they uncovered.

Fresh from their liberty in the sea the pilchards are very oily fish and because they slipped so readily from the hook they had not been found very satisfactory for baiting halibut hooks but when they are impounded for a time they lose much of their oil content and when they are put on the hook they stay there. This turned out to be the case when fishermen in the Rivers Inlet area impounded several thousand hundredweights of pilchards this year, kept them impounded for a week or more, and then sold them to halibut fishermen for bait.

Pilchards have not ordinarily appeared in northern British Columbia waters in large quantities—the great pilchard fishery of the province is in Vancouver Island areas—and the halibut fishermen have relied upon herring for bait purposes. In the past couple of years, however, the pilchards have shown up in some abundance in the northern district and if the runs there continue, the discovery that impounding makes them suitable for halibut baiting will doubtless mean that a good many of them will be sold for this purpose.

HOME SALTING OF SALMON SIMPLY DONE

Tasty, Nourishing Fish Food Easily Put Up for Family Use

Salting salmon in the home may be done by a very simple method, and the Nanaimo station of the Biological Board of Canada a research body operating under the control of the Minister of Fisheries, tells what it is.

By following this method the housewife may put up a nourishing and tasty food and have a supply on hand for family use from time to time.

Here is the substance of a statement prepared at the station, outlining the method to follow:

Clean strictly fresh fish—"no preserving process, however thorough, can yield a tasty or wholesome product from fish which is stale"—and then strip the flesh from the bones. Cut the fish into smaller pieces and score the skin lightly with a knife in several places. Rinse thoroughly in cold water to remove all blood and slime; rub each piece of fish with moderately fine (dairy) salt and place the pieces uniformly over a generous layer of salt in the bottom of a container such as an earthenware crock, a tub, or even an apple box; sprinkle a layer of salt over the first layer of pieces and continue to build up alternate layers of fish and salt, using, in all, about two pounds of salt to every pound of fish. The salt will immediately begin to draw out the moisture, and this action should be allowed to proceed for three or four days in a cool, dry place.

If a water-tight container has been used, brine will form from the salt and accumulated water in the course of a day or two. The fish tends to float in this brine and should be pressed under the surface by a cover and weights. At the end of the third or fourth day, tilt the container on edge until the brine has completely drained away, carrying with it a certain amount of residual slime and impurities. Now repack the pieces as before, using plenty of fresh salt, and at the end of the sixth or seventh day, pour off any new brine which may have formed. Without repacking, cover as tightly as possible and store in as cool and dry a place as can be found. This fish should keep for several months.

For those who prefer a strong flavour to their fish, repacking may be avoided by laying a piece of muslin or cotton over the top layer of fish as packed and spreading several pounds of coarse salt

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INCREASED SEA FISHERIES LANDINGS IN TWO PROVINCES DURING OCTOBER

Gains in New Brunswick, Prince Edward Island, Drops Elsewhere—Bigger Landings in Several Fisheries on Both Coasts—Fish Plentiful but Curtailed Operations Cut Dominion Total

Fishermen in New Brunswick and Prince Edward Island made larger October catches of sea fish and shellfish this year than in October, 1931, but in the three sea fisheries provinces there was lessened production and the total catch for the Dominion showed a decrease.

The drop in the Quebec landings was comparatively small but there was a more substantial decrease in Nova Scotia and the British Columbia catch fell off very sharply as a result of the curtailment of operations in the salmon and herring fisheries. In all five of the provinces—both those which showed gains and those where decreases occurred—the fishermen could have caught many more fish if world economic conditions had warranted greater fishing effort. There is no depletion of the fisheries.

All told, the Dominion's sea fisheries catch for the month was approximately 60,195,000 pounds, as compared with 84,918,000 pounds, in round figures, in October of last year. There was also decrease, of course, in the landed value of the catch to the fishermen, which totalled something more than \$562,900, as against \$986,500.

The catches, by provinces, for the two Octobers have been as follows, as shown by returns collected by the Dominion Department of Fisheries:

	*October 1932 lbs.	October 1931 lbs.
New Brunswick.. . . .	8,398,800	7,296,700
Prince Edward Island. . .	1,363,800	1,198,400
Nova Scotia.. . . .	3,795,000	9,471,800
Quebec.. . . .	2,705,200	2,845,600
British Columbia.. . . .	38,931,600	64,106,200

* Subject to revision.

Big Pilchard Gain

In British Columbia the salmon, halibut, herring, and pilchard fisheries are the four of greatest importance and, under normal conditions, large landings are made from all of them in October. This year the month's pilchard landings were much greater than in October, 1931—more than 16,300,000 pounds as compared with some 4,343,000 pounds—and the halibut catch was 2,136,000 pounds as compared with only 1,488,000. There were plenty of salmon and plenty of herring available for capture (the run

of chum salmon, by the way, was very large) but fishing effort was lessened because of uncertainty as to the likelihood of marketing an additional large quantity of canned salmon and because of the disturbed situation in the Oriental market for drysalted herring. With this lessened fishing effort, the salmon catch was only 15,055,000 pounds, as against 43,017,000 pounds a year ago, and the herring landings, 4,818,000 pounds, decreased by more than 12,000,000 pounds.

In Atlantic Areas

In Quebec there were increased landings of mackerel and herring, and there were also small gains in scallop and clam catches. Cod and smelts, the other varieties of fish taken by Quebec fishermen in October, were caught in smaller quantities than a year ago.

Nova Scotia's catch of haddock, 2,601,100 pounds, showed the tidy gain of 428,300 pounds. Smelt landings also increased quite substantially and more scallops were landed than in the previous October. Other catches decreased.

The New Brunswick catch of sardines, 15,103 barrels, was much larger than in the '31 month—indeed, almost 100 per cent larger—and cod catch showed very substantial increase, amounting to 763,300 pounds as against the earlier 440,100 pounds. The most interesting feature of the month in the New Brunswick fisheries, however, was the appearance of large schools of mackerel off the southwestern part of the province where the catch was 46,500 pounds—not such a great quantity, of course, but very much greater than the landings of mackerel in that particular area in any recent year.

200 Per Cent More Cod

The most notable result of the month's operations in Prince Edward Island was an increase of more than 200 per cent in the landings of cod, which reached a total of 202,000 pounds as against 63,500 pounds last year. The fishermen also made larger catches of lobsters, oysters, hake, and clams and quahaugs.

In the herring, mackerel, and smelt fisheries, however, the production was less than it had been in October, '31.

FISH ADDED TO LIST OF R.C.M.P. RATIONS

Under a new Ration List approved by Major General J. H. MacBrien, commissioner of the force, fish have been added to the rations issued by the Royal Canadian Mounted Police.

Some little time ago the Department of Fisheries took up with Mounted Police commissioner this question of having fish included in the rations of the force. General MacBrien convened a board to go into revision of the Ration list, with a view, among other things, to including fish if found advisable. The board subsequently recommended fish being put on the list as an alternative for meat, and the recommendation has been approved by the commissioner and made effective.

PROBABLE ABUNDANCE—Concluded

(Continued from page 1)

sittings—reports on bait investigations, drift bottle work, hydrological study, plankton study, and investigations into the cod, herring, mackerel, and haddock fisheries. Doctor Huntsman told of research touching the effect of warm temperature in increasing herring abundance in the Bay of Fundy district. W. C. Herrington, one of the United States investigators, told of progress being made toward predicting the probable abundance of haddock from year to year, and spoke also of the use of the new type of trawl—the "savings" trawl—which reduces the capture of small, immature, and unmarketable fish and gives them a chance to grow to commercial sizes.

To Assist Prediction

In the course of the meeting it was decided to set up a Hydrographical Committee for the purpose of centralizing hydrographic data collected off the Atlantic coast of North America, which must largely be the basis for fisheries predictions. No one country can effectively review the changing conditions in all the area influenced by the Gulf Stream and the Arctic currents, and all countries should benefit from a general pooling of the ascertained facts, and hence the decision to establish the committee.

Doctor Thompson, Newfoundland, was named as chairman of the committee with Mr. Herrington as the United States member and H. B. Hachey, of the Biological Board staff, the member representing Canada. It is expected that France and the Ice Patrol will each designate a corresponding member.

MANCHURIA MARKET FOR SALT SALMON

Drysalted herring from British Columbia have been sold on the Manchurian market in some quantity in recent years but the Canadian Trade Commissioner stationed in Manchuria now points out that the territory also offers opportunities for selling salted salmon. In addition, there is a small Manchurian outlet for certain Canadian canned fish such as "good quality salmon, pilchards, sardines, lobsters."

"It is a peculiarity of the local situation," the commissioner states in referring to the possibility of doing business in salted salmon, "that fish of larger size than herring are in popular demand and, on this ground, salmon or other salted fish of several pounds weight are purchased more readily than smaller varieties." Any Canadian shippers sending salted salmon to the Manchurian market, however, must expect to face rather sharp competition from some other sources.

HOME SALTING—Concluded (Continued from page 3)

on this to act as a weight. After three or four days, lift up the cloth and see whether enough brine has formed to reach the level of the cloth when it is in place. If not, add the necessary amount of cold, concentrated brine made by dissolving three and one-half pounds of fine salt in a gallon of water, and replace the cloth. The coarse salt on the cloth insures the brine being kept saturated. The container may now be covered and stored as above. In this case the fish are kept in brine instead of in dry salt.

A variation of the second plan is to drain off the first brine which collects and, without repacking, cover the fish with fresh brine prepared as described. Replace the cloth with its layer of salt, fit with a tight cover and store as above. The pouring off of the first brine removes the slightly sour taste, which is, however, preferred by some.

If a non water-tight container such as an apple box is used, the brine seeps away as fast as it is formed and it is only necessary to repack the pieces with plenty of fresh salt at the end of the third day, repeating this packing after a week if the fish is to be kept for many months. In general, the product thus treated is not quite so pleasing in appearance since the ready access of air is apt to cause a yellow discolouration.

DISTRIBUTE EGGS, FRY, BY MANY MILLIONS

During the 1932 season the natural reproduction of Canadian food and game fishes has been supplemented by the distribution of 138,800,000 eggs, fry, and older fish placed in suitable streams in different parts of Canada by the Dominion Department of Fisheries, which by such means, and other action, helps to maintain and enlarge the country's fisheries stocks.

The total distribution included about 97,527,000 eggs, fry, and fingerlings of the British Columbia sockeye salmon (*Oncorhynchus nerka*) and 21,460,000 eggs, fry, and fingerlings of the Atlantic salmon, or *Salmo salar*. Different quantities of the eggs, etc., produced by one or two other varieties of salmon and several varieties of trout made up the remainder of the distribution.

Preparatory to next season's distribution, collection of eggs from parent fish has been in progress for some weeks past at different hatcheries, both east and west, that are conducted by the department's Fish Culture Branch, which carries on federal fish cultural activities. At some of the plants the collection work has been completed, elsewhere it will be finished shortly. The eggs thus obtained by collection operations are placed in the hatcheries and either allowed to hatch out or to reach only the "eyed" stage, for in some cases—though not many—it is desirable that "eyed" eggs be planted while, in other cases, fry or fingerlings are best for distribution purposes.

In the Maritime Provinces this autumn parent salmon were impounded by the branch in retaining ponds on the Margaree, Nictaux, Phillip, and Sackville Rivers in Nova Scotia, the Miramichi, Restigouche, and St. John Rivers in New Brunswick, and the Morell in Prince Edward Island, and at the proper time they were stripped of their eggs and milt. The fertilized eggs are now in various Atlantic hatcheries where they will develop during the winter.

In British Columbia egg collection was completed some time ago at Pitt River and Pemberton in the Fraser River watershed. It was also satisfactorily under way at some eight other points, including places on Vancouver Island, at Rivers Inlet, and in the Fraser and Skeena watersheds. Some collection was also made at Cultus Lake where a special study of sockeye salmon propagation is in progress.

DEPUTY MINISTER ON OFFICIAL B.C. TRIP

W. A. Found, Deputy Minister of the Dominion Department of Fisheries, is now in British Columbia on the annual official trip which he makes to the Pacific coast to take up fisheries matters with departmental officers and representatives of the fishing industry in that part of Canada. He will return to Ottawa in the earlier part of December.

While in British Columbia Mr. Found has planned to hold meetings with representatives of different branches of the industry at Vancouver, New Westminster, Prince Rupert, and Nanaimo so that there might be interchanges of views and discussions of such matters as possible changes in the fisheries regulations. As one of the Canadian members of the International Fisheries Commission, popularly known as the Pacific halibut commission, he has also attended sittings of the commission at Seattle and Prince Rupert during his stay on the coast.

BRITAIN WOULD TAKE CANADIAN OYSTERS

There's a market for more Canadian oysters in Great Britain. Heretofore the Canadian sales in the British market have been very small, although the market has been a large importer, but with the present increasing interest in Empire trade there is opportunity for the Dominion to enlarge the business and expand its oyster industry. Of late years the United Kingdom has made heavy purchases from Holland and the United States and smaller but substantial purchases from France and the Irish Free State.

Canada's trade commissioner in the north of England has recently pointed out that in his territory oysters from the Dominion "are regarded as of excellent quality." In speaking of the requirements of the United Kingdom market he added that the oysters most in demand are "those which will pack from 1,400 to 1,500 to a barrel," the reference being to a barrel "similar to the ordinary kind employed for shipping flour and apples." Satisfactorily packed, he said, Canadian oysters "should find a ready market, but the profit will naturally depend on the price which can be realized in the Dominion."

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UPWARD TREND IN HALIBUT ABUNDANCE IN NORTH PACIFIC APPARENT IN 1932

Investigations Satisfy Canadian-United States Commission Maintenance of World's Most Valuable Halibut Fishery Can be Accomplished by Continuation of Sound Regulation

Investigations which it has carried on during the past few years have satisfied the International Fisheries Commission, representative of Canada and the United States, that the halibut fishery of the North Pacific, which was being rapidly depleted, can not only be maintained as the world's most valuable fishery of the kind, but can be made productive of a greater abundance of fish.

The investigations show that the desired end can be accomplished by the application of regulations which are entirely practicable from the standpoint of the halibut industry.

What sound regulation can do has already been indicated, moreover, by the fact that the abundance of halibut on the banks has shown an upward trend during the past year. Evidence of this trend was to be seen in an increased catch per unit of fishing gear.

Regulations that were adopted to govern the fishery during the 1932 season were found by the commission to work very well, on the whole, but it is understood that certain minor modifications for the coming season have been under consideration and are dealt with in the report and recommendations which the commissioners are now submitting to the Government of Canada and the Government of the United States. Under the Pacific Halibut Treaty the commissioners have power of regulation over the fishery, subject to the approval of the Governor General of Canada and the President of the United States.

Industry Consulted

Preparation of the report and recommendations followed upon sittings which the commission recently held on the Pacific coast with the Advisory Council, which on the suggestion of the commissioners several years ago, was formed

of representatives nominated by the fishermen's associations on the different parts of the coast. Public hearings attended by fishermen were also held by the commission at Seattle, Wash., and Prince Rupert, B.C. At the meeting with the Advisory Council the commissioners went fully into the whole situation with the representatives of the associations, outlining the results of investigational work done during the past year and indicating what these results showed to be necessary for the proper protection of the fishery.

The International Commission, popularly known as the "Halibut Commission," was created under the Pacific halibut treaty between Canada and the United States, which has as two of its main provisions (1) that a thorough investigation be made by the commission into the life history of the Pacific halibut and (2) that recommendations be made as to proper regulation of the fishery with a view to its maintenance and upbuilding. In pursuance of these objects the commissioners have given their work much thought and the staff which has been under their direction has carried on a great deal of most efficient scientific investigation.

The commission is understood to be well pleased with the progress that has been made, and feels that no similar investigation has accomplished more in an equal time or has carried out work of this kind, which is essentially of a costly nature, on a more economical basis. One of the results of the investigation has been to establish that different areas of the treaty waters are populated by distinct stocks of halibut which do not intermingle with one another to any extent. If the different stocks of fish in these different areas are to be properly

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WILL PUT MORE FISH IN PEACE RIVER BLOCK

Charlie Lake, Chief Water in Area, to be Stocked with Kamloops Trout

Charlie Lake, the chief lake in the Peace River Block, has no fish in it now except suckers and so-called minnows, but plans for stocking it with Kamloops trout are being considered by the Dominion Department of Fisheries, following an inspection which was made by departmental officers last summer of a number of the more remote interior waters of British Columbia.

Applications to have the lake stocked with some more valuable varieties of fish than suckers have been made by residents of the Peace River Block from time to time, but authoritative information was lacking as to the existing situation until the special inspection trip of the past summer was made.

Many Trout Elsewhere

In addition to making the long trip to Charlie Lake, the departmental officers who carried out the special interior inspections covered numerous parts of the Bowron Lake and Barkerville-Queenel area, and the Chilcotin, Tatla, and Anahim districts. In the latter territory it was found that Kamloops trout are apparently generally plentiful and it is believed that as travel facilities improve these parts of British Columbia will be visited by increasing numbers of tourists and other anglers; already, by the way, anglers have been going in as far as Chezacut, One-Eye, and Anahim lakes. In many of the waters in this area whitefish and kokanee were also found to be plentiful, as well as two varieties of suckers which are quite frequently used in considerable quantities by the settlers for food purposes.

Trout were also seen to be abundant in numerous lakes in the Caribou district, inspection extending as far as Bowron Lake, northeast of Barkerville. "In the warm summer months, of course," says the reporting officer, "most of the successful fishing is by troll but in the

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FEDERAL RESEARCH AID TO FISHERMEN IN PROPER HANDLING OF LIVE LOBSTERS

Steps to Take and Conditions to avoid in Business of Big Importance Brought Out by Report and Addresses by Dominion Scientific Investigator

Trade in live lobsters has come to be a big business on Canada's Atlantic coast in recent years, as indicated by the fact that sales to the United States in 1930 and 1931 averaged more than 9,600,000 pounds a year in quantity and slightly more than \$2,000,000 in value, and that is why the Dominion's fisheries authorities had investigations set on foot this year as to the best methods of handling the lobsters so that they will get to market in prime condition. Scientific research in the interests of fisheries progress is, of course, an important part of Canada's program, and investigations of various kinds are carried on every year.

The lobster investigations, conducted by Dr. A. F. Chaisson, a member of the Biological Board of Canada, which is a research body operating under the control of the Minister of Fisheries, brought out many facts which will be useful to the lobstermen in marketing their catches to advantage and steps have been taken to make knowledge of these facts generally available. As one step toward letting the fishermen have the benefit of Dr. Chaisson's work, the Dominion Department of Fisheries recently arranged a series of meetings in Eastern Nova Scotia at which he gave addresses. Nine or ten meetings were held in the latter part of the year and a number of others are being planned for the early part of 1933. Another step, taken by the Biological Board, was the issuance of Dr. Chaisson's report in bulletin form.

Dr. Chaisson's investigation dealt with the subject from many angles. An important part of the undertaking was a study of the temperature conditions on lobster transportation boats, which, under an arrangement made by the Department of Fisheries, carry live lobsters from Eastern Nova Scotia to Massachusetts. (In 1932, by the way, these boats handled about 11,600 crates of lobsters as compared with 6,771 crates in 1931 and 3,616 crates in 1930.) In this particular part of his work Dr. Chaisson made six trips on the transporting boats, using temperature registering apparatus and making careful study of the relation of temperatures to the vigor of the lobsters.

Later on, experiments were carried out at the Atlantic Biological Station at St. Andrews, N.B., to observe "the effect on live lobsters of the temperature ranges

obtaining in the holds of the collection boats." These experiments, Dr. Chaisson found, supported the findings of the large-scale operations on the boats themselves, "i.e., that temperature conditions on the collection boats may, in general, be considered as favourable for maintaining the vigor of shipments."

Lobsters and Temperatures

Summing up conclusions as to temperatures and their effect upon live lobster shipments, Dr. Chaisson says:—

"It may be stated conservatively that temperatures from 33 to 50 degs. F. are safe for shipping lobsters in air over a period of time considerably longer than that required for the average shipment between Eastern Nova Scotia and Massachusetts." (The time is ordinarily about three days.) "Within the time limit of these shipments, 50-55 degs. F. appears to be equally favourable. Temperatures above 60 degs. F. should be definitely avoided although a slight rise above 60 degs. does not appear to be harmful for the first 24 hours, provided that lobsters are kept moist and held in uncirculated air."

The care of lobsters intended for marketing alive, Dr. Chaisson points out, begins the moment they are taken from the trap in which they have been caught, and, indeed, the most variable factor observed during the trips the investigator made on the transportation boats was "undoubtedly the condition of the lobsters when shipped." The lobster which is to get to market in tip-top condition must be handled gently, not roughly, when taken from the trap; it must be protected from direct sunlight, and from wind for "if the gills are allowed to dry, asphyxiation results;" claws should be plugged or banded with wide rubber bands so that the lobsters may not mutilate one another.

When lobsters, after being caught, are to be held for a time before sending them forward to market "the most important single factor" in maintaining their vigor is the adequate circulation of the sea water in which they are kept. It is to be remembered, among other things, that rise in water temperature insufficient of itself to cause weakening or death "may do so by cutting down

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NOVA SCOTIA SALMON ON NEW TRAVEL ROUTE

Tagged Fish from Nictaux and River Phillip Migrate to Eastern Newfoundland

Some of Nova Scotia's salmon seem to have been seized by wanderlust.

Recent reports to the Dominion Department of Fisheries show that a salmon from the Nictaux River, in western Nova Scotia, and another from River Phillip went travelling 'way over to the east coast of Newfoundland, although ordinarily Nova Scotia salmon, save those spawned in the Margaree, stay close to homewaters when they go into the sea from the spawning grounds. What happened to send these two fish so far off the usual migration route of their kind is a question which is interesting the fish culture people and the scientists. It may be, of course, that these particular salmon simply chanced to be more venturesome than others but the fisheries authorities would like to know whether this gives the reason for the wanderings or whether the explanation is to be found in some fact of importance touching the ways of the salmon race.

The fish from the Nictaux, captured in Conception Bay, Newfoundland, in early December, was a female salmon which had been tagged in November, 1931, in the course of departmental tagging operations. It was identified by the Canadian tag, which has now been received at Ottawa through the Newfoundland Fishery Research Commission. When liberated in the Nictaux the fish weighed six and a half pounds but in the thirteen months which intervened before its recapture by the Conception Bay fisherman it had put on another eight and a half. Apparently it found satisfactory feeding grounds during its travels.

The River Phillip salmon had been tagged a year before the Nictaux fish and it escaped recapture until last June, when it was taken in Bonavista Bay. Like Conception Bay, Bonavista is on the east coast of Newfoundland but somewhat farther north.

Results of tagging carried on by the Fish Culture Branch of the Fisheries Department and by the Biological Board of Canada have indicated that Atlantic coast salmon generally—not the salmon of Nova Scotia only—do not go very far away from Canada's shores, as a usual thing, save in the case of the fish from the Margaree. These latter salmon have frequently been found in Newfoundland waters.

FISHING EFFORT CURTAILED BECAUSE OF UPSET MARKETS, PRODUCTION CUT

World's Economic Disturbance, Not Scarcity of Fish, Explanation of Smaller Catches made by Fishermen of Dominion During 1932

Because world markets have been so upset during 1932, Canadian fishermen curtailed their fishing effort and that means that when the statistics for the year have been compiled the catch will be found to have been substantially below normal.

Unrevised figures collected by the Dominion Department of Fisheries show that in the first ten months of the year the landings from the sea fisheries totalled approximately 6,404,000 hundredweights, or something like 1,200,000 hundredweights less than in 1931. Statistics covering the result of operations in the inland fisheries—most of these freshwater fisheries are administered by provincial authorities and not by the Dominion—are made up annually only and the figures for the January-October period are therefore not yet available but it may be taken for granted that the landings were smaller than in normal years.

The world's economic troubles tell the story. Canada must seek outlet in export markets for the greater part of its yearly fisheries production and with those markets much unsettled it was natural for the fishermen to lessen their catching effort. There were still plenty of fish in Canadian waters. Reduced catch does not mean that the country's remarkable fisheries resources have undergone depletion, nothing of the kind. As a matter of fact, in several of the sea fisheries—notably the very important lobster fishery of the Atlantic coast—the January-October catches were larger than in the corresponding period of 1931 in spite of the unfavourable market situation. If sales prospects had been brighter, the fishermen could have made their total catch much larger than it was.

Some November Results

The latest monthly figures available are those showing November results in the sea fisheries, which have been made up from returns to the Dominion Department of Fisheries. No one who keeps in mind the disturbed state of the markets will be surprised to know that these unrevised statistics show that the November landings from the sea fisheries were smaller than in November, 1931, or about 333,500 hundredweights

as compared with some 714,000. The Pacific coast catch, 173,185 hundredweights, decreased by 361,700 hundredweights, chiefly as a result of curtailment of operations in herring drysalting and in the salmon fishery. On the Atlantic coast the catch amounted to 160,345 hundredweights, a drop of some 18,841. Landed value fell off sharply on both coasts and totalled \$357,500.

Quebec alone among the five sea fisheries provinces showed a gain in catch for the month, and showed, too, a gain in landed value. Bigger cod landings accounted for the increase, although the Quebec men caught more herring, too, than a year ago. Cod catch also increased somewhat in Prince Edward Island and slightly in New Brunswick; in Nova Scotia it decreased. Landings from most of the principal fisheries of the Atlantic coast dropped off, but Nova Scotia fishermen increased their smelt catch and their scallop takings.

In British Columbia the principal November operations are in the salmon, herring, and halibut fisheries. As already noted, salmon and herring catches were much smaller in November just past than they were in November, 1931, and the quantity of halibut brought ashore was also smaller.

The decrease in herring catch was due to unsettlement in China, where the British Columbia output of drysalted herring ordinarily finds market. Some political troubles in the Orient joined with the economic disturbance to make marketing difficult in China.

UPWARD TREND (Conc.)

protected, the areas must obviously be treated differently in regulating the fishery. This fact was recognized in the regulations adopted before the opening of the last season. Another fact established by the investigators was that certain areas are populated by immature fish which scatter largely to adjacent banks when they reach maturity, and to give these fish a chance to grow up the regulations forbid all fishing in two of these "nurseries"—one off British Columbia and the second off Alaska. Other provisions in the regulations put limitations upon the quantities of halibut that might be taken from each of the two largest producing areas.

FISHERMEN HELPED BY DEPARTMENT'S ACTION

Buyers Testify Department Work Important Aid in Ensuring Quality Production

Work undertaken by the Dominion Department of Fisheries includes steps to enable fishermen to keep in touch with improvements in the methods of handling and processing fish and several letters which have recently reached the department from different quarters have brought further testimony to the usefulness of these efforts, which are carried on in part by the regular Fisheries Inspectors in the various areas where fisheries administration is in federal hands and in part by other departmental employees appointed for this particular purpose. In carrying on this work the officers give information by means of demonstration as well as by word of mouth, and the fishermen generally are most receptive.

One of the letters received by the department refers to improvement in the quality of the dried codfish processed in the Magdalen Islands where, for several seasons past, a man skilled in preparing cod in what is known as the "Gaspé cure" has been on duty to give demonstrations among the fishermen. The writer of this letter is a buyer for a firm dealing in dried fish and he has written that in examining over 2,000 quintals of cod in the Magdalens in recent months he found "a very great improvement in the fish as compared with other years." The fish were split much better, he said, and "showed better care in the salting." What improvement in quality means, of course, is not only a better product for the consumer but better business for the fishermen.

What Others Say

Another letter came from a firm in Cape Breton, Nova Scotia, whose business includes trade in dried cod. This firm acknowledged the helpfulness of "the valuable advice" given by one of the department's fish curing experts and stated that the fishermen in its district "have had proofs this fall of the importance of putting up first class goods."

Then, to cite a third case, a Massachusetts company, which does a large fish importing business, wrote that the work of departmental instructors has apparently had "very satisfactory" results as "we are getting fish of the quality

(Continued on page 4)

FISH COOKERY TALKS REACH WIDE AUDIENCE

Department of Fisheries Program Covers Big Territory—B.C. Meetings Starting

Way up in a remote settlement of Northern Ontario, where, as it happened, there was no mail in or out this year between early November and early December, housewives have listened eagerly to radio talks on fish cookery by Mrs. Evelene Spencer, cookery specialist of the Dominion Department of Fisheries, and have applied her hints in their own cooking.

A belated letter from one of the women has told the story, which is of interest as indicating how wide a territory is being covered by the program instituted by the Fisheries Department to present authoritative information on fish cookery to Canadian women and thus to help to increase the use of Canada's fine fish foods. Consumption of fish cannot be greatly increased in one small settlement, of course, no matter how excellent the cooking, but multiply this Northern Ontario community by many others here and there in the Dominion which are also being reached by the Spencer broadcasts and the results may mean a good deal to the fishing industry in the way of expanded demand for its products.

Pacific Coast Program

At present Mrs. Spencer is in British Columbia where, at the outset of 1933, she will begin another series of demonstrations, broadcasts, and addresses before various organizations. Her first British Columbia work will be done in Vancouver, where plans for her program have been mapped out at conferences which she and departmental officers have had with representatives of the fishing industry, and subsequently she will go to Victoria and a number of other Pacific coast centres. She will be in British Columbia for a number of weeks.

The British Columbia program follows upon work in Manitoba, where demonstrations were held in Winnipeg and Brandon and radio addresses were given at both places. Previously Mrs. Spencer had been in various centres in Ontario and Quebec. It had also been intended to have her visit several places in Manitoba in addition to Winnipeg and Brandon but unavoidable circumstances made it impossible to carry out this plan.

FISHERMEN HELPED (Conc.)

which we must have in order to please our customers." Perhaps even better evidence of the effects of the department's work is found in the fact that a second Massachusetts company resumed buying this year in certain Nova Scotia districts where it had done no business for a number of years because it had been unable to obtain cured fish to suit its requirements in those particular areas.

Representatives of both these large United States companies made trips during the summer to Nova Scotia fishing communities where departmental instructors have been at work and they expressed themselves as much pleased with the products which they examined. And they did not stop at words, but they did business at different places, and at some points at least negotiations regarding further purchases next year were also begun.

The meetings in Manitoba, where an assistant supplied by the Game and Fisheries Branch of the provincial Department of Natural Resources worked with Mrs. Spencer, were most successful, and attracted large numbers of keenly interested women. Even a temperature of 35 to 40 degrees below zero was not sufficient to keep the Brandon women from attending. In Winnipeg the audiences at the demonstrations, which were held tri-weekly for a number of weeks in the assembly quarters of one of the city's largest stores, averaged between 450 and 500, and the women displayed the greatest interest. Not only were they interested in watching the expert cookery, but numbers of them expressed appreciation of the valuable information given by Mrs. Spencer as to the healthful properties of fish foods. In her demonstrations Mrs. Spencer used fresh-water fish and sea fish from both coasts of the Dominion, and direct results in the way of increased demand for fish products were reported by different fish dealers.

During her stay in Manitoba Mrs. Spencer also spoke before several organizations, in addition to giving radio talks and carrying on demonstrations. One of the meetings at which she spoke by invitation was the provincial convention of the Daughters of the Empire.

Though marketed conditions were unfavourable last year, the catch of whitefish from the Dominion's fresh water fisheries was nearly 15,800,000 pounds. A large part of Canada's annual whitefish landings is exported to the United States.

WILL PUT MORE FISH (Conc.)

spring and fall the fly fishing is really wonderful." The number of people visiting these (Caribou) lakes is increasing every year and motorists are going as far as roads will permit and then often secure pack horses and go to distant points for practically virgin waters."

At Charlie Lake

Going to Charlie Lake the inspecting officers had to travel the water courses north from Prince George by river boat, with many of the streams in a state of flood which brought an element of considerable danger, and a cold pouring rain adding continual discomfort. Once at the lake, which is some six miles northwest of Fort St. John, and at an altitude of nearly 2,300 feet, they found it to be a very attractive piece of water about nine miles long and of an average width of a mile and a half. Its greatest depth is fifty-six feet but the average about twenty feet. Its only tributary is Stoddart Creek, which has its source in a high plateau covered by moss and muskeg. The outlet stream drains into the Beaton River. The lake apparently contains an abundance of fish food.

Curiously enough, although there are no game fish found in Charlie Lake, information gathered by the officers was that grayling, Rainbow trout, and Lake trout are all present in Moberley lake, another large body of water in the Peace River Block. Whitefish, pike, and suckers were also stated to occur in Moberley, the first two varieties in fairly large numbers and the suckers in abundance.

FEDERAL RESEARCH (Conc.)

the amount of oxygen available for respiration in the case of lobsters held in bulk," and "the matter of oxygen supply for the lobster from sea water is made worse by the fact that the life processes go on at a much faster rate at high temperatures than at low temperatures, so that not only is the oxygen dissolved in sea water less at high temperatures but it is used up at a faster rate."

Salinity Important

"Sheltered bays into which fresh water enters are not suitable for keeping lobsters. Lobsters held close inshore near the outlet of even a small stream may be detrimentally affected," and so, too, heavy rain in localities where there is little water movement may be injurious.

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BLENDING PRODUCES NEW MEDICINAL FISH OIL OF HIGH VITAMIN POTENCY

Perfecting of Blended Product One of Many Useful Results of Research Work Carried on by Dominion Board in Interests of Fishing Industry on Both Coasts

Blending pilchard oil and oil from the liver of the grayfish scientists working under the Biological Board of Canada in British Columbia have perfected a medicinal oil equal in vitamin potency to standard liver oils and this new product is now being used under medical supervision in certain institutions on the Pacific coast.

Production of this blended oil is only one of many achievements by Biological Board scientists whose work it is to carry on fisheries research for the Dominion. This new oil—"Marinol," it's called—was perfected by the staff of the board's Pacific Experimental Station at Prince Rupert, which has done much useful research, but work of similar value has also been done at the board's other stations, one of them at Halifax, N.S., another at Saint Andrews, N.B., and the third at Nanaimo, B.C.

For instance, research workers at Halifax tackled the problem created by the fact that the fishing industry on the Atlantic coast has had difficulty in smoking fish under certain atmospheric conditions, and these investigators have now devised a means which enables smoking to be carried on efficiently under any kind of weather conditions.

As another example of the achievements in fisheries research: A scientist carrying on investigations under the auspices of the board found out the cause of red discoloration of dried codfish and discovery of the cause made it possible to avoid discoloration, which had sometimes caused serious loss to the important dried fish trade.

Studying the oyster and methods of oyster culture in Prince Edward Island, another of these federal research workers was able to develop a satisfac-

tory and comparatively inexpensive system of oyster farming suitable for that area. On the Pacific coast systematic studies of the spawning, spatting, and growth of the oyster have also been in progress with a view to assisting in the expansion of the British Columbia oyster industry.

OTHER USEFUL RESULTS

Discoloration of canned lobsters caused loss to the lobster industry of the Atlantic coast, and a scientist was set at work to find the reason for discoloration and how the difficulty could be overcome. He did both parts of his job.

More recently—last year, as a matter of fact—the Biological Board also had a highly qualified investigator make a thorough study to determine what conditions are necessary in transporting live lobsters to market if they are to reach their destination in sound shape, and the valuable information which was thus obtained has now been made available to the fishermen and others connected with the lobster industry. The importance of an investigation of this kind is indicated by the fact that exports of live lobsters to the United States run into millions of pounds every year—the total was more than 9,500,000 pounds in 1931—and it is necessary that shipments get to market in first class condition, if shippers' returns are not to be cut down.

Fisheries research work under the Biological Board, which operates under the control of the Dominion Minister of Fisheries, goes on all year 'round. Many different subjects are taken up, and the accomplishments already noted are only examples taken

(Continued on page 4)

MORE SCALLOPS, MORE SCALLOP BEDS FOUND

Big Gain in Production of Tasty Shellfish in New-Brunswick Area

Fishermen generally had their difficulties in last December but the scallop fishers of Southwestern New Brunswick had better fortune than some of the men in the fishing industry elsewhere and, indeed, their greatly increased catch and the discovery of several new beds was a feature of the month's Atlantic coast operations.

Scallops taken by Charlotte County fishermen during December totalled 2,440 hundredweights, with a landed value of \$3,510, as compared with only 940 hundredweights and a value of \$1,070 in December, 1931. As a matter of fact, and it is reason for satisfaction, the scallop landings in this district have been showing a steady and substantial annual increase in the past few years.

During December fishermen from Grand Manan Island—the island is part of Charlotte County—did fairly well on some previously known scallop areas but, better still, they also discovered several new beds, although none of very large size. Others did well at the Wolves Islands beds, producing areas discovered a comparatively short time ago by one of the scallop investigation boats which were at work for the Dominion Department of Fisheries. Subsequently, these fishermen tried dragging on a bed off Campobello, which was formerly an important producer but had been regarded as exhausted some fifteen years ago, and much to their satisfaction they found the fishing very good. One large boat, in a single day, landed enough scallops to produce a hundred gallons shelled.

Scallops, nutritious and tasty shellfish, occur in the waters of three of the Dominion's Atlantic provinces—Nova Scotia, New Brunswick and Quebec. Nova Scotia is much the largest producer, with New Brunswick ranking second.

EXPANDED BRITISH COLUMBIA OYSTER OUTPUT POSSIBLE INVESTIGATOR SAYS

Extension of Right Cultivation Methods Can Bring Increased Production, Biological Board Worker Reports, in Telling of Important Study on Pacific Coast

Areas of natural oyster bottom along Canada's Pacific coast are relatively small but an investigation which the Biological Board of Canada has been conducting has indicated that it would be possible to increase the oyster production of British Columbia, perhaps quite substantially, by the more extended use of suitable methods.

Three kinds of oysters occur in British Columbia—the Native oyster and two species introduced from elsewhere, the Japanese or Pacific oyster and the Eastern or Atlantic—and in the four-year period, 1928 to 1931, the annual production from the beds of the province average about 3,320 barrels.

The investigator carrying on the oyster study is C. R. Elsey, of the staff of the Pacific Biological Station at Nanaimo, which is one of four main fisheries research centres conducted in the Dominion under federal control, and his preliminary account of his work has recently been printed by the Biological Board. This preliminary report, in addition to indicating the natural oyster producing areas of the province, the effect of currents, water temperature and salinity upon oyster development, and the characteristics of the different varieties of oysters, contains a number of pages dealing with methods of cultivation.

The most extensive acreage of natural oyster bottom in the mainland portion of British Columbia, the report points out, is to be found in Boundary bay and the largest acreage on Vancouver Island is in Ladysmith harbour, while there are also small beds at such localities as Toquart harbour, Esperanza inlet, Quatsino, the Bardswell group of islands, Fish Egg inlet, Blunden harbour, Nanoose bay, and Pender harbour.

COULD ENLARGE OUTPUT

So far as Boundary bay is concerned, Mr. Elsey reports that the production of Native oysters is small "in proportion to the area of potential oyster bottom." He describes lack of suitable cultch (material for collecting oyster spat) as the primary cause of this condition, although there are other contributory

factors, but "suitable cultch in large quantities can be made available in the form of the shells of Japanese oysters if the cultivation of this species is proceeded with on as large a scale as conditions warrant." Similarly, at Ladysmith the production of Native oysters is "very small compared to that which can be obtained by the use of suitable and adequate cultching methods," and in his references to the Ladysmith situation Mr. Elsey also suggests that the present system of tenure and rentals (which are matters in the control of the Provincial Government) should be reviewed. "Other suitable places for development, typified by Pender Harbour and Nanoose Bay, should be built up by the importation of spat collected in wire baskets in Ladysmith harbour or Boundary bay, or of mature oysters from other districts which are less suitable for intensive cultivation."

So far as the Japanese oyster is concerned, Mr. Elsey says that it can be obtained cheaply as seed and will grow rapidly on an extensive acreage in British Columbia, "much of which is not suitable for the Native oyster and is at present of no value." He recommends that only ground which is unsuited for the Native species be used for growing the imported Japanese seed. The Japanese oyster differs from the Native and Eastern varieties in flavour and appearance but unprejudiced persons regard it as "a very acceptable and nutritious sea food."

Imported Eastern oysters, the report says, experience "excessive mortality" in Pacific areas and because of this fact, and the failure of these oysters to "breed generally," Mr. Elsey is of the opinion that they "apparently present no possibilities for extensive cultivation in British Columbia."

In addition to its four main fisheries research stations, the Biological Board of Canada, which is under the control of the Dominion Minister of Fisheries, operates two sub-stations. One, at Ellerslie, P.E.I., is for research in connection with the oyster. The other, at Cultus Lake, B.C., is making an intensive study of the Fraser River sock-eye salmon.

SMELT CATCH GAINED ON ATLANTIC COAST

Sharp Increase in Landings by Sea Fishermen of Eastern Provinces in 1932

Atlantic coast smelt fishermen did well in 1932, so far as size of catch was concerned. All told, the sea fishermen's smelt landings amounted nearly to 93,900 hundredweights—the figures are unrevised but they may probably be taken as approximately correct—as compared with something more than 66,300 hundredweights in 1931 and 57,480 hundredweights in 1930. In each year there were also substantial catches from the inland fisheries of Quebec.

The Atlantic smelt, known to the scientists as *Osmerus mordax*, is a small fish of pleasing flavour which normally finds ready sale. It is in demand in the United States and each year large shipments are made from Canada to New York and other centres, also the boarder. In 1931, for instance, these exports totalled 64,000 hundredweights and had a value of \$815,000.

The Atlantic smelt itself is greenish in colour on the upper part of its skin and silvery on the sides, with dark spots on the body and fins. It may reach a length of about a foot. New Brunswick is the largest Canadian producer, and, indeed, is the world's largest producer, but the smelt is taken off all four of the Atlantic provinces. Smelt also occur in British Columbia waters but they are the fish known as *Osmerus thaleichthys* and they are not taken in as great quantities as the Atlantic smelt. Another species of smelt, sometimes called the Surf smelt, is also found on the Pacific coast.

TRY OYSTER CANNING ON PACIFIC COAST

Canada's oyster production is ordinarily put upon the market in the fresh form but some canning operations on an experimental scale have recently been undertaken in British Columbia, one of the four oyster-yielding provinces of the Dominion. During the past year a few cases of the canned product were put up by a Pacific coast firm which used the Japanese oyster—a variety of oyster which has been introduced from Japan both in some United States waters and in British Columbia. The marketing possibilities, however, have not yet been definitely determined.

CATCH FROM CANADA'S SEA FISHERIES 7,200,000 HUNDREDWEIGHTS LAST YEAR

Unsettlement of World Markets Reflected in Curtailed Catching Effort by Commercial Fishermen in Dominion's Sea Provinces—Gains Shown in Some of Fisheries in December

Exclusive of the catches from one or two minor fisheries, the landings from Canada's sea fishing operations in 1932, as shown by unrevised statistics, was approximately 7,120,000 hundredweights. This total was smaller, of course, than the sea fisheries total for 1931—"of course," because it went without saying that with economic unsettlement continuing throughout the world during 1932 the fishermen would curtail their fishing effort. The reduction in total landings simply reflects market disturbance. Plenty more fish could have been taken from the Dominion's sea fisheries resources if the market situation had warranted greater catching effort.

With fishing curtailed and catch therefore reduced, and with prices low, the landed value of the 1932 fares fell below the 1931 figures and amounted in all to approximately \$11,026,000 as compared with about \$14,519,000. Revision of the 1932 figures by the Dominion Department of Fisheries, which has collected and compiled the unrevised totals now given, will make some change both as to catch and value but the changes are not likely to be important.

There are five sea fisheries provinces in the Dominion—British Columbia, Nova Scotia, New Brunswick, Quebec, and Prince Edward Island—and in all of them except Prince Edward Island catch and landed value alike decreased in 1932. In Prince Edward Island the total landings showed an increase of something more than 1,600 hundredweights, but notwithstanding the gain in catch the landed value figures decreased as a result of lowered prices.

The following table gives the catch and landed value totals for each of the sea fisheries provinces:

	Catch cwt.s.	Landed Value
British Columbia.. . . .	3,276,319	\$4,207,639
Nova Scotia.. . . .	1,947,888	3,533,538
New Brunswick.. . . .	985,948	1,441,355
Quebec.. . . .	671,648	823,979
Prince Edward Island.. .	237,380	714,596

RESULTS IN DECEMBER

In December the landings from the month totalled 382,500 hundredweights, in round figures, and landed value was about \$437,000. On both sides of the account the figures were smaller than

in December, 1931. On the Atlantic coast the decreases were quite small but in British Columbia there were substantial reductions.

The Atlantic fishermen brought ashore slightly more than 124,330 hundredweights, or approximately 8,795 hundredweights less than in the preceding December. Landed value total, \$384,000, showed a decrease of only \$2,000 or so. On the Pacific coast the month's catch was a little more than 258,200 hundredweights and landed value was \$52,860 as compared with 355,500 hundredweights and \$225,910. Much the greater part of the catch decrease in British Columbia was due to a reduction in the quantity of herring taken. The market for drysalt herring in the Orient was so disturbed that the British Columbia herring fishermen lessened their catching effort greatly. The British Columbia salmon catch for the month, some 2,800 hundredweights, was slightly greater than the catch in December, 1931, but salmon landings are never large in December.

Nova Scotia catch and landed value both increased, the former reaching 91,930 hundredweights (a gain of 1,840 hundredweights) and the latter passing \$287,000 (a gain of \$30,000, in round figures). Cod, haddock, hake and cusk, smelts, lobsters, and scallops were all taken in increased quantities. Halibut catch also increased, but halibut fares are never very large in December.

New Brunswick's figures fell below those for the preceding December. The fishermen landed more herring and more scallops but the production from most of the other fisheries was smaller than in the 1931 month. The total catch for the province was approximately 27,100 hundredweights (in December, 1931, it was over 31,600) and total landed value was \$30,225, a decrease of some \$33,000.

December operations in Quebec sea fisheries are practically confined to smelt fishing and in Prince Edward Island the operations are also on a small scale. The Quebec smelt catch for the December just past was 719 hundredweights, a gain of more than 500 hundredweights. In Prince Edward Island increased smelt

(Continued on page 4)

MANY WOMEN AT FISH COOKERY MEETINGS

Demonstrations by Dominion Fisheries Department Specialist Attract Large Vancouver Audiences

Continuing the program undertaken by the Dominion Department of Fisheries to increase the use of Canadian fish foods and thus to assist the fishermen and fishing companies, Mrs. Evelene Spencer, the department's cookery specialist, is now at work in British Columbia where she will remain for some weeks.

At present Mrs. Spencer is in Vancouver where, early in January, she began a series of demonstrations and addresses which has been most successful. The demonstrations have drawn large audiences of women, who have shown the greatest interest. Many of the women have expressed themselves as gaining much valuable information from the meetings, both as to different methods of preparing fish for the table and as to the exceptional value of fish foods from the health standpoint. In her radio addresses and several talks which she has given by invitation before Vancouver luncheon clubs, Mrs. Spencer has emphasized the health value of fish, pointing out that the abundance of vitamins, iodine and other health-making elements in fish foods make them particularly desirable items of human diet.

Persons associated with the fishing industry in Vancouver have shown keen interest in the department's campaign and have assisted in the plans for the city program. As evidencing their appreciation of the effort which is being made to assist the industry by means of the demonstrations and addresses, the members of the Vancouver branch of the Canadian Fisheries Association tendered a complimentary banquet to Mrs. Spencer a few evenings ago.

Quebec's sea fisheries are carried on in the Magdalen Islands area and off Bonaventure, Gaspé, Saguenay, Matane, and Rimouski counties. Their production in 1932 had a landed value to the fishermen amounting to about \$529,000.

Two excellent reasons for eating Canadian fish are that fish are nourishing and health-making foods and that Canadian fish are unexcelled in quality. There's no need to buy imported fish products.

SUBSTANTIAL GAIN IN B.C. SALMON PACK

Output from Pacific Canneries Shows 62
Per Cent Increase for Past Year

British Columbia's pack of canned salmon for 1932 amounted, in round figures, to 1,081,000 cases. Finally revised returns will not change the total very much.

As compared with 1931, the 1932 figures show an increase of about 395,900 cases but, of course, the pack was substantially smaller than the output from the British Columbia canneries in years of normal world economic conditions. Salmon fishermen and salmon canners curtailed their operations during the year because of their realization that the markets would not satisfactorily absorb as large a production as could have been processed from the abundant supplies of fish which were running during the year. Except in the case of pinks, the salmon runs in British Columbia waters during 1932 were at least of average size and catch and pack could have been much increased if the market outlook had warranted greater operating effort.

Sockeye pack—over 284,300 cases—was about 7,000 cases less than in 1931 and the output of canned steelheads, which is never more than a couple of thousand cases or so, also decreased, although only slightly. On the other hand, the outputs of all other varieties of canned salmon—springs, cohoes, chums, pinks, and bluebacks or young cohoes—were all larger than in the previous year. The chum pack increased by more than 250,000 cases, the pack of cohoes by 83,600, and the pack of springs by about 48,800 cases. Pink pack showed a gain of over 16,000 and 3,200 more cases of bluebacks were put up than in 1931.

Goitre is rare where fish foods from the sea are eaten regularly. The reason is that these foods are the greatest known diet source of iodine, the goitre preventative.

Cod, black cod, ling cod, and red cod, are all taken in the commercial fisheries of British Columbia. Ling cod are caught in greater abundance than any other of these varieties.

Fish are rich in Vitamin D. That's one reason why it is desirable that growing children eat fish regularly.

BLENDING PRODUCES NEW MEDICINAL (Conc.)

from a larger number. The present program of investigations includes a survey of the ocean conditions off Nova Scotia, with a view to finding out the effects of currents, winds, and temperature on the movements of fish and the effects of chemical content of the sea water on the growth and distribution of plankton, the food on which fish live. A somewhat similar investigation is also being made on the Pacific coast in a study which is concerned particularly with herring and pilchards. Studies of the migrations of salmon on both coasts of the Dominion, research as to the nutritional value of canned salmon, experimentation in connection with fish cultural practice and the prevention of loss in handling eggs and fry, and a number of other pieces of scientific work are also included in the program now under way, while courses of instruction for fishermen, cannery managers, and fishery officers and hatchery officers are also a regular and important part of the board's work.

The board itself was established by an act of Parliament about twenty years ago, and at first its personnel was made up entirely of scientists. Some years later, however, the act was amended and the organization of the board was put on a new basis so that the membership now includes representatives of the fishing industry and representatives of the Department of Fisheries as well as fourteen scientists representing as many different Canadian universities.

The members of the board act as such without salary or emolument. They meet annually for the review of work accomplished, the discussion of future undertakings, and the election of officers and committees, and the action they take is subject to the approval of the Minister of Fisheries. In the intervals between the meetings of the board its business is supervised by a central executive committee, and there is also a sub-executive on each coast which is assisted by an advisory committee from the fishing industry itself.

CATCH FROM (Conc.)

landings were also the main factor in lifting the total fisheries catch for the month above the figures for the preceding December. Smelts, caplin, tom-cods, and clams also entered into the Prince Edward Island catch which amounted, in all, to 4,587 hundredweights as against 3,622.

AIDS REPRODUCTION OF SALMON STOCKS

Coho and chum salmon and steelhead trout frequenting the Koksilah River in British Columbia will find it easier after this to make their way to the spawning grounds in the upper reaches of the stream.

Or, put in another way, the action of the Dominion Department of Fisheries in constructing a fishway at Koksilah Falls will assist the fish to get to the spawning areas and thus will aid reproduction and help to maintain the stocks of salmon and steelhead in this area.

The Koksilah, a fairly large river, drains from the hills and the run-off is rapid. When low water conditions obtain on the river, as has frequently happened in the past, the chums and cohoes and steelheads have sometimes been unable to get past Koksilah Falls on their way upstream to the spawning grounds. The fishway is designed to remedy this state of affairs and help the spawning fish on their way. The construction, which was undertaken last summer, was not costly and the fishway is expected to justify the outlay abundantly.

A number of other fishways have been built by the department from time to time on both coasts of the Dominion and, in the main, they have proven most useful, although here and there some unusual local conditions make effective fishway operation rather difficult. As a matter of interest it may be noted that the Mersey River, Nova Scotia, which was designed by the Department's engineers, overcomes a height (60 feet), which is understood to be greater than that surmounted by any other fishway anywhere.

Crabs occur on Canada's Atlantic coast, as well as in the Dominion's Pacific waters, but much the larger catch is made by British Columbia fishermen. In 1931 they landed more than 537,000 pounds with a marketed value of something over \$27,900. Some of the catch is canned, but the greater part is marketed in the fresh form.

Smelts, small but very delicious fish, are taken in all Canada's sea coast provinces, but New Brunswick is much the biggest producer, and indeed is the world's biggest producer. In 1931 New Brunswick fishermen landed something like 4,720,000 pounds.

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Hon. A. DURANLEAU, M.P.

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W. A. FOUND

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SALMON OIL FOUND RICH IN VITAMINS

Health-Making Element in Oil Mixed
Through Flesh of Valuable
Canadian Fish

Canadian salmon are delicious and nourishing fish but there's an added reason why they make excellent food, and that is because their body oil is rich in vitamins essential to health.

Vitamin A and Vitamin D both occur in salmon oil and the presence of Vitamin D is especially important since this vitamin is so valuable an agent in preventing and curing such ills as rickets.

Recent research has indicated that salmon oil is similar to recognized medicinal fish oils in vitamin potency and since the oil is mixed through the flesh of the fish persons using salmon on the table will obtain from it the vitamin supply necessary to good health. So far as salmon in the canned form is concerned, the research has apparently not shown it to be very high in Vitamin A content but rich in Vitamin D. Certain fish liver oils, such as cod liver oil and halibut liver oil, of course, are also very rich in vitamins and hence their medicinal value.

The particular salmon research in question here was not conducted in Canada but the oil samples used were from salmon of the same varieties as occur in British Columbia waters where the fish are of high quality. At the present time some research as to the nutritive value of salmon is being carried on at the Prince Rupert Experimental Station of the Biological Board of Canada and it will doubtless bring out further interesting and important facts.

EASILY DIGESTED

The investigation referred to in this article was carried out by members of the staff of the federal Children's Bureau of the United States, who reported that they found salmon oil a very potent antirachitic agent. "Like cod liver oil," they said, "salmon oil, especially that from the more highly coloured species,

(Continued on page 4)

HEALTH AUTHORITY COMMENDS FISH FOODS

Statement by Canada's Deputy Minister of
National Health Advises Greater
Consumption

"Fish is one of our most valuable foods, and the consumption of greater quantities than are now in use is advisable from the standpoint of nutrition and the prevention of rickets and goitre."—
Dr. J. A. AMYOT, Deputy Minister, Department of Pensions and National Health, Ottawa.

Increasing testimony to the value of fish foods in the diet has been given of late years by scientists and health authorities in various countries, and for Canadians there is special interest in a statement in this connection by Dr. Amyot, who points out that fish is equally as nutritious as meat, is more easily digested, and, in addition, contains certain elements valuable from the health standpoint. The source of the statement gives it weight as a guide to the housewife and the hotel and restaurant manager in planning Canadian meals.

"Fish and meat," says Dr. Amyot's statement, "contain the same nutritive constituents, namely, protein and fats. The protein of fish is essentially the same as that of meats, and is equally nutritious. As the muscle fibre of fish is shorter than that of meat, fish is more easily masticated and digested. Fish, in addition, contains vitamins and is especially rich in vitamin D, which is so necessary for the development of bone. The use of vitamin D prevents rickets. The existence of vitamin D in fish oils suggests the importance of fish as a diet for the young.

"Sea foods are of special significance in that their iodine content is higher than that of plants or flesh of animals. It is well known that iodine prevents the development of certain swellings of the thyroid gland, known as goitre. Goitre is less prevalent among people in the vicinity of sea coasts than among inland people. This is due to the greater consumption of fish by the former.

(Continued on page 8)

HELP FISHERMEN TO INCREASE EFFICIENCY

Further Instructional Work Given and
Planned by Dominion Fisheries
Authorities

Continuing the plan of assisting fishermen to widen their knowledge and skill, the Dominion fisheries authorities have recently conducted another course of instruction at the Atlantic Fisheries Experimental Station, Halifax, N.S., which was attended by thirty-five men from different parts of the Maritime Provinces. The Halifax station is one of several fisheries research centres maintained by the Biological Board of Canada, which operates under the control of the Minister of Fisheries.

Part of the service rendered by these stations consists in giving special instruction to fisheries officers and fishermen, and during February work of this kind was in progress not only at Halifax but also at the Pacific Biological Station at Nanaimo, B.C., where British Columbia officers on the staff of the Dominion Department of Fisheries attended courses dealing with subjects relating to their work.

Another piece of instructional work which will be done under the Biological Board in March will be a special course at Halifax for lobster cannery managers, which will be designed to assist the lobstermen in increasing the efficiency of cannery operations.

THE FISHERMEN'S COURSE

The recent course for fishermen at the Halifax station was similar to previous annual courses which have been given there for several years past. Men who attended the classes in other years have testified to the benefit they received, and, perhaps partly as a result of what they have said, even more interest than usual was shown in this year's "school." Many more fishermen than could be admitted applied for enrolment. Present facilities at the station make it impossible to handle satisfactorily a larger enrolment than thirty-five, and this num-

(Continued on page 4)

TRY ADDED SAFEGUARD FOR SPAWNING SOCKEYE

With a view to diminishing the number of sockeye salmon taken from British Columbia spawning grounds by the Indians for food purposes, federal authorities have been trying out the plan of having coastal Indians cure chum and pink salmon for shipment to interior tribes for use instead of the sockeye from the spawning streams, and the plan apparently promises to be successful.

The coast Indians are paid for their fish and labour by the Department of Indian Affairs so that the plan serves the dual purpose of giving them employment and of helping to ensure adequate seeding of the sockeye spawning beds elsewhere.

In times past the Indians have taken a good many sockeye from the spawning grounds in the interior to serve as winter food. That was natural enough. Everybody likes British Columbia's fine sockeye salmon. But having regard to the future of the sockeye fishery it is of prime importance that the spawning beds be adequately seeded from year to year, and hence the wish to keep down the Indians' capture of the spawning fish. Several attempts were made to supply the Indians of the interior regions with fish which would be satisfactory to them as a substitute for the sockeye which they might otherwise take themselves, but these endeavours were not successful. Salmon prepared by whites from catches made in districts where the fish could be taken without jeopardizing spawning requirements did not quite meet with the Indians' favour when supplied to them.

TRY INDIAN CURE

In 1931 a trial was made of the plan of having coastal Indians dry some salmon, pinks and chums, according to their own methods and then shipping these fish to inland tribes. Chums and pinks, of course, are fish of sound food value although they do not bring as much money on the commercial market as the sockeye, which has flesh of richer colour and is the most valuable variety of Pacific salmon. The pinks and chums prepared in accordance with the Indians' own methods found much more favour than those previously supplied from other sources, and in 1932 the same plan of dealing with the case was tried again.

During 1932 about 4,600 chum salmon were cured by Indians at points in the Sechart and Pender Harbour districts where the fish could be taken without

(Continued on page 4)

TROUBLES FAR AWAY LOWER FISH VALUE

Upset Markets in Orient Main Factor in Cutting Canada's January Fish Return

Herring fishermen in British Columbia made a substantially larger catch in January than they had taken in January, 1932, but the landed value of the fish was only \$11,475, as compared with \$99,990, and here is a striking illustration of the effect of disturbed conditions abroad upon Canada's fisheries operations.

Taking the Dominion as a whole, the landed value of the total catch from all sea fisheries in January was less by \$120,360 than the figure for January, 1932, and a simple calculation shows that \$38,500 of this decrease was in the Pacific coast herring returns.

When world times are normal, much the greater part of British Columbia's annual catch of herring goes to market in China in drysalted form. The business has run into big figures, big as to output and big as to marketed value—sometimes production has been as much as a million hundredweight and the value considerably more than a million dollars. Now, however, a combination of troubles, some of them local to the Orient and some of them world-wide, has dislocated the Chinese market for these fish very badly, and hence the heavy drop in the landed value of the herring taken from British Columbia waters in January.

Other examples of the adverse effect of disturbed world conditions upon Canada's fisheries trade could, of course, be cited. It is these conditions, not conditions in the Dominion's fisheries themselves, which have temporarily lessened production and financial return.

JANUARY RESULTS

In January the landings from all of Canada's sea fisheries totalled approximately 329,000 hundredweights with a landed value to the fishermen of slightly less than \$349,200. As compared with results for the preceding January there was a small drop in catch but the value figures, as already indicated, decreased more substantially.

In British Columbia the landings increased by some 20,440 hundredweights, totalling 223,765 hundredweights, with the herring fishery accounting for about 18,800 hundredweights of the gain. The remainder of the gain was in the catches

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LIVE LOBSTER TRADE IN BIG PROPORTIONS

Rapid growth of trade in live lobsters, or "lobsters shipped in shell," has been one of the prominent fisheries developments on Canada's Atlantic coast in comparatively recent seasons, and in the four-year period, 1929-1932, the shipments averaged 128,350 hundredweights annually.

Last year the shipments from the four Atlantic provinces, which border the world's lobster-producing area, totalled 134,810 hundredweights.

Most of these live lobsters are sold in the United States market, although there is, of course, an important measure of domestic consumption. In 1930, for example, the sales to the United States amounted to more than 96,300 hundredweights and the value figure, roundly stated, was \$2,280,000. Some of the lobsters are forwarded to market on regular transportation lines, some on "well smacks," and, from Eastern Nova Scotia, large quantities are carried on lobster transportation boats which operate under a plan brought into effect by the Dominion Department of Fisheries. "Well smacks" are boats in which sea water is allowed to enter and flow about the lobsters. When other means of transportation are used the lobsters are carried in fairly large crates and icing is employed to keep the temperature at required level.

Nova Scotia is much the biggest shipper of live lobsters, and in 1932 its shipments were somewhat larger in the aggregate than in 1931, or some 98,240 hundredweights as compared with 96,790. New Brunswick also does a large business, although its shipments in 1932 were only 32,400 hundredweights as against slightly more than 39,000 in the preceding year. Quebec and Prince Edward Island ship on a smaller scale than the other two provinces. In 1932 the Quebec total, something more than 2,400 hundredweights, exceeded the 1931 business, but in Prince Edward Island, with about 1,700 hundredweights, there was a decrease.

In 1844 Canada's fisheries production for the year had an estimated value of only \$125,000. In the half dozen years immediately preceding the present world-wide economic unsettlement the annual production had an average value of more than \$51,000,000.

During 1932 the salmon fishermen of British Columbia landed 1,166,671 hundredweights of salmon.

PRODUCTION GROWS IN SCALLOP FISHERY

If the present trend in the fishery continues, many more Canadians are going to be able to enjoy scallops, nourishing and delicious shellfish which are taken on some parts of the Dominion's Atlantic coast.

Last year there was a gain in scallop catch in Quebec, an increase of almost 90 per cent in the landings in Nova Scotia, which is the largest producer, and in New Brunswick the landings were almost three times as great as in 1931. Now come reports to the Dominion Department of Fisheries showing that in January the upward trend was again pronounced in New Brunswick and Nova Scotia. Scallop fishing in Quebec does not begin until later in the year.

New Brunswick fishermen landed 2,825 barrels of scallops in January, or more than five times the quantity they brought ashore in January, 1932. In Nova Scotia the landings totalled 4,274 barrels or substantially more than twice the size of the catch in the 1932 month. Better still, from the fishermen's point of view, the price obtained was also somewhat higher than last year.

The growth in scallop production is increased activity on the part of some of the fishermen but it is also attributable to action by the Department of Fisheries in recent years in carrying on investigations which have led to the discovery of new scallop beds. The investigating boats located several important beds on different parts of the coast.

HEALTH AUTHORITY—*Conc.*

Nutritive studies indicate that food of the class of oysters, crabs, clams and other shellfish is of greater value in certain respects than the muscle of meats.

"Fish is preserved by freezing, cold storage, salting, smoking, drying and canning. These processes, if properly carried out, do not materially affect the nutritive value. . . .

"Excellent quality of canned fish is procurable in all parts of the country owing to modern methods of preservation. Salt and smoked fish are of great value, as is the roe of fish, which is considered a delicacy. Fish is one of our most valuable foods, and the consumption of greater quantities than are now in use is advisable from the standpoint of nutrition and the prevention of rickets and goitre."

WIDEN SASKATCHEWAN AREA FOR WHITEFISH

Northern Lake Becomes New Producer Following Federal Fish Culture Work

In less than two weeks at the outset of this year 21,000 pounds of whitefish were landed by a few commercial fishermen at Birch Lake, northern Saskatchewan, a piece of water where there were no whitefish at all until it was stocked with fry by the Dominion Department of Fisheries several years ago.

The Birch Lake case is another proof of the effectiveness of intelligent fish cultural work in enlarging the fisheries resources of the country.

As compared with landings from Canada's major whitefish areas, a 21,000-pound catch is not a great quantity, of course, but it's worth noting when it comes from a lake where these fish were unknown until fish culture operations started them growing. And, as a matter of fact, the landings could have been larger but the fisheries authorities thought it well to impose a catch limitation as this was the first season that fishing for whitefish has been permitted at Birch Lake since stocking was undertaken.

FISH GOOD QUALITY

The fish themselves, according to a report by fisheries officers in Saskatchewan, weighed about three and a quarter pounds, on the average, and were very fat and of good colour. All of them were shipped to New York in an unfrozen condition.

Birch Lake, which lies some sixty miles from North Battleford and covers an area of 15,000 acres, has always held some suckers and ling and a few pike, but Nature overlooked adding a supply of whitefish, although these fish are abundant in some other Saskatchewan waters. Requests that the lake be stocked with whitefish were made to the Dominion Department of Fisheries, which at that time administered the fisheries of Saskatchewan, and in 1926 the department's Fish Culture Branch made an initial distribution of fry, which were transported to the lake from the hatchery at Fort Qu'Appelle, about 375 miles away. Other distribution of fry were made in each of the four succeeding years.

In the autumn of 1931 test fishing was carried on in the lake by a Saskatchewan fishery officer, who landed a number of

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U.S. VESSELS MAY BUY CANADIAN SUPPLIES

Announcement recently made at Ottawa that Canada will again issue *modus vivendi* licences to United States fishermen, up to the end of May, recalls to mind some of the long story of various arrangements which have been in effect from time to time in the past as to entry of United States fishing vessels into the Dominion's Atlantic ports.

So far as the licences themselves are concerned, they will allow United States fishing vessels to enter Canadian Atlantic ports to purchase bait, ice, seines, lines, or other Canadian supplies or outfits but, unlike earlier *modus vivendi* licences, they will not permit the transshipment of catches or the shipment of crews.

As already noted, any *modus vivendi* licences now issued by Canada will be effective until the end of May of the present year.

GLANCING BACK

Going back into history, the Treaty of Versailles, 1783, granted United States fishermen specific liberty to a share of Canadian inshore fisheries. This right was lost through the War of 1812 and after 1818 the United States surrendered all but the liberty to enter Canadian ports for shelter, wood, or water or to make repairs, to fish around the Magdalen Islands and off part of the north shore of the Gulf of St. Lawrence, and to dry and cure fish in unsettled bays, etc., in that north shore area. Later on came the Reciprocity Treaty, 1854, and the Treaty of Washington, 1871, both containing provisions as to fisheries trade and fishing privileges. In 1885 the fisheries articles of the 1871 treaty were terminated by the United States. Three years later a settlement of existing differences was negotiated and what has been known as the "Unratified Treaty of 1888" was drawn up. Out of this treaty grew the original *modus vivendi* licences.

One of the provisions of this was that United States fishing vessels were to be able, without fee, to obtain annual licences permitting them to purchase provisions and outfits in Canadian ports, to tranship their catches, and to ship crews. The makers of the treaty recognized, however, that it could not receive sanction before the commencement of the approaching fishing season and as a temporary arrangement for not more than two years it was agreed that on

(Continued on page 4)

TROUBLES FAR AWAY—Conc.

from two or three of the minor fisheries. Fewer salmon were taken than a year ago, but January, of course, is never a month of large salmon landings. On the landed value side of the British Columbia account for the month, the effect of the unfavourable conditions in the herring market was very marked. The total landed value of the catches from all the sea fisheries of the province was \$45,100, a decrease of over \$97,000, and, as previously pointed out, the decrease in herring value alone was \$88,500.

IN ATLANTIC REGIONS

On the Atlantic coast the month's landings from the sea were 105,246 hundredweights—22,000 hundredweights or so less than in January, 1932—and landed value, \$304,100 fell off approximately \$23,000.

New Brunswick showed some gain both in catch and landed value—with the totals standing at 33,760 hundredweights and \$113,585. For the most part the betterment was in the smelt and scallop fisheries. Nova Scotia's catch was 68,528 hundredweights, and its landed value totalled slightly more than \$182,000, smaller figures in each case than in the preceding January. Neither Prince Edward Island nor Quebec is ever a large scale producer in January. Smelts and caplin made up the island's catch in the 1933 month—2,958 hundredweights with a landed value of \$8,495. No landings were reported from Quebec.

SALMON OIL—Conc.

has the advantage of providing Vitamin A in addition to Vitamin D. It also provides an apparently easily digested fat. . . ."

In the course of the research a clinical test was made with thirteen infants suffering from rickets. Only two of the children had previously received antirachitic treatment. The investigators reported that the test showed that "salmon oil is an antirachitic agent of considerable potency in the treatment of infantile rickets." Once initiated, "healing proceeded rapidly. Response to treatment was very prompt and advanced healing was brought about in from three to nine weeks."

Canadian production of dried fish (cod, haddock, hake and cusk, and pollock) during 1932 totalled approximately 258,600 hundredweights. Most of the annual output of dried fish goes to export markets, where the Canadian product has held high reputation for years.

PILCHARDS FIND FAVOUR WITH FORAGING COHOES

Coho salmon apparently found pilchards so tasty in some British Columbia waters last summer that they turned rather an indifferent eye upon the salmon troller's "spoon."

At all events, in the opinion of some of the fishermen this is the explanation of a drop in troll catch in Fisheries District No. 2, the northern district of British Columbia.

Pilchards have not ordinarily been known to frequent District 2 waters in large numbers, although very abundant elsewhere off the province, but in 1931 the runs put in an appearance and last year the fish turned up again in quantities in the lower portion of Burke Channel and in various parts of the Bella Bella area. They came along in the coho season and apparently the salmon liked them. The trollers found that the cohoes were not "taking the spoon" as readily as in some other seasons and they believed they knew the reason when examination of salmon which were landed showed the fish to be "gorged with pilchards." The live pilchards evidently had more attraction for the cohoes than the troller's glittering spoon. That was a bit rough on the pilchards, and unfortunate for the fishermen.

Whether or not pilchards will continue to go into District 2 in large numbers is a point which people connected with the fisheries will watch with interest. The chief pilchard fishing operations are now conducted in Vancouver Island areas but presence of the fish in abundance elsewhere off the British Columbia coast might open up new possibilities.

TRY ADDED SAFEGUARD—Conc.

danger that their capture would mean that escapement to the spawning grounds would be insufficient. These prepared chums were then sent to inland Indians, who seem to have liked the fish; indeed, in one part of the province at least the Indians ordered an additional quantity themselves after the original shipment had been received. The satisfactory results so far achieved suggest that possibly the plan followed may ultimately lessen greatly the interference with sockeye on the remote spawning grounds in the headwaters of the Fraser and Skeena and other important salmon streams.

HELP FISHERMEN—Conc.

ber were admitted. Only bona fide fishermen between certain ages are accepted for courses of this kind and each one is granted his railway fare to and from Halifax and an allowance of \$40 toward meeting his living expenses while at the school.

The work of these fishermen's courses includes instruction in such subjects as the preparation of dried, boneless, and pickled fish, the coopering of barrels, navigation, motor engines, and refrigeration. There is also elementary instruction in certain scientific subjects related to the fisheries, as, for example, chemistry, bacteriology, and biology. For the most part, the teaching is done by members of the station's staff but some subjects such as navigation are dealt with by special instructors engaged for the purpose.

WIDEN SASKATCHEWAN—Conc.

whitefish averaging in weight about three pounds. Request was made that commercial fishing be allowed in the winter season of 1931-32, but it was thought better to keep the lake closed until another spawning had taken place. This winter, however, commercial operations were permitted, but with a catch limit of 20,000 pounds. Seven fishermen set to work with gill-nets. Eleven days later the limit had been reached but the men were allowed to take another thousand pounds which were needed to complete a carload. The success of the first season's fishing indicates that the whitefish stocks, though strangers to Birch Lake, are thriving and that the lake will continue to be a very satisfactory producer.

U.S. VESSELS MAY BUY—Conc.

paying a fee of \$1.50 per registered ton United States vessels could obtain annual licences giving them the privileges which the treaty contemplated. The United States subsequently rejected the treaty but Canada continued to issue the licences until 1918 when arrangements were made for reciprocal privileges in the ports of either country. This arrangement came to an end in 1921 when special war legislation ceased to be effective in the United States. Canada revived the *modus vivendi* plan in 1922 but brought it to an end at the close of the following year.

Caplin, a valuable bait fish, is taken in the sea fisheries of Quebec and Prince Edward Island. In 1932 the landings were 3,094 barrels.

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W. A. FOUND

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MORE THAN 98 PER CENT OF SALMON PACK UP TO CERTIFICATION QUALITY

Inspection of Big Quantity of Canned Product by Dominion Government Inspecting Board in British Columbia Last Year Showed Output High in Quality Standard

Of all the canned salmon inspected in British Columbia last year under the strict federal system of governmental inspection now in effect, only a little more than one per cent was found to be below the standard required for certification.

The system became operative last June and by the end of December approximately 988,500 cases of salmon had been inspected by the permanent Board of Canned Salmon Inspection appointed by the Dominion Government, and out of this total only some 11,700 cases were found to be below the standard necessary to obtain certification as fresh, firm, well-packed fish in good merchantable condition.

And of these 11,700 cases—the exact number was 11,666—only 1,090 were found to be poorer than “Second Quality” or, in other words, were not sound, wholesome, and fit for human food.

The figures testify plainly to the quality of the salmon which go into the cans in British Columbia and to the efficiency and care which is used in the cannery operations, for the members of the Inspection Board are experts of long experience and established reputation in the salmon trade and canned salmon which they find worthy of certification must be of unquestionable quality.

BUYERS PROTECTED

People who buy certified Canadian canned salmon may be certain of obtaining a nourishing and healthful food processed in such a way that all its natural goodness has been retained unimpaired, and with nothing put into the can save the salmon itself and the necessary allowance of salt. No colouring matter, nothing but fish and salt, goes into any of Canada's canned salmon. Buyers of Canadian certified canned salmon may also be certain

that the canning process was carried out when the fish were absolutely fresh for the inspection regulations provide specifically that no certificate shall be issued covering any shipment unless the salmon were landed at the cannery for canning within twenty-four hours of the time when they were caught or unless they were gutted and iced immediately after capture.

Under the inspection regulations, which are regulations made under the Meat and Canned Foods Act, a Dominion statute, all canned salmon must be submitted to the Board of Inspection for examination before leaving the producers' hands. Shipments which the board approves as fresh, firm, well-packed, and in good merchantable condition are certified. Shipments which are sound, wholesome, and fit for human food but below certification standard may only be marketed as “Second Quality” and each can must have permanently attached to it an extra lid bearing in plainly embossed letters those words—“Second Quality.” The presence of this extra lid and its embossed inscription tells the purchaser that he is not getting certified fish.

Only the two kinds of canned salmon are allowed to go to market under the regulations—the certified product and the “Second Quality.” Any shipment which the Inspection Board finds to be below “Second Quality” is confiscated.

Canada's total catch of cod during 1932 was 1,284,493 hundredweights, according to unrevised figures compiled by the Dominion Department of Fisheries. About 7,100 hundredweights were landed by British Columbia fishermen and the remainder on the Atlantic coast.

FISHERY OUTPUT CUT BY WORLD TROUBLES

Canadian Fishing Effort in February Lessened Because of World-Wide Conditions

Smaller landings were made from most of Canada's sea fisheries in February than in February, 1932.

The explanation, of course, is the same as in the case of other recent decreases. Unfavourable market conditions induced by the world economic disturbance led to curtailment of fishing effort. Many more fish could have been taken, and would have been taken if marketing prospects had been more promising.

Unrevised statistics compiled by the Dominion Department of Fisheries show that, all told, the February catch on both sea coasts amounted to 151,000 hundredweights, with landed value to the fishermen amounting to \$262,400, as compared with a catch of 363,930 hundredweights and landed value of \$314,520 in February, 1932. There were decreases in both catch and value on each coast alike.

In British Columbia waters the total catch for the month was 80,400 hundredweights as against about 266,380 hundredweights a year ago, and landed value was \$67,205, a drop of some \$30,000. The net decreases for the province were due, in chief part, to a lessening of herring fishing because of the unsatisfactory state of the market for the drysalted fish in China, the country which is normally the chief outlet for this product. Salmon catch for the month also decreased. On the other hand, the landings of halibut were 10,235 hundredweights, or not so very far short of four times the quantity taken in February, 1932. Halibut landed value for the month was \$36,465 as compared with \$17,455 in 1932.

Nova Scotia fishermen did not make as large a total catch as in the preceding February but, chiefly as a result of larger returns from the lobster fishery, total landed value, \$115,430, showed a...

(Continued on page 4)

SEEK CAUSE OF MACKEREL REDDENING

Dominion Scientists Searching out Means of Preventing Discoloration in Important Salt Fish

Canada does a substantial export business in pickled mackerel every year, principally with the West Indies and the United States, and the importance of maintaining a satisfactory standard of production is one of the reasons why research workers on the staff of the Biological Board of Canada have been seeking the cause of a red discoloration which sometimes occurs in the salted fish and how this defect may be prevented.

So far, the investigation has indicated that two causes are probably indirectly responsible for the discoloration—failure to process the fish sufficiently soon after capture and, second, either the use of an insufficient amount of salt or uneven distribution of the salt over the fish. Actual tests made at the Atlantic Fisheries Experimental Station, Halifax, where the investigation is being conducted, have shown that with slack salting the red discoloration occurred; uneven salting produced the spotted appearance sometimes encountered commercially; but adequate salting with either mined or solar salt produced good cures free from reddening. The pickling of the mackerel for these tests was carried out under the direction of one of the Dominion Fisheries Department's supervisors, who has fish curing and inspection as his special field.

ANALYZED MANY SALTS

In some trade circles the opinion has been held that when reddening of salt mackerel occurs it is chiefly due to the use of mined salt, but the Experimental Station's study seems to show that this view is not well founded. In the course of the research a large number of samples of salt were analyzed, and a progress report issued by the station states that "on the whole, mined salts appear to be purer than solar salts, but the individual variations among different samples offset this slight advantage. It is to be expected, therefore, that, in so far as preservative action is concerned, all salts are about equal. This has been found to be true. Red mackerel has been found with both solar and mined salt. The great

(Continued on page 4)

B.C. SALMON SPAWNING GROUNDS WELL SEEDED

Inspection Shows 1932 Situation Generally Satisfactory with Chum Seeding Especially Good

Inspections made by officers of the Dominion Department of Fisheries have indicated that spawning grounds in British Columbia streams were generally well "seeded" in 1932 by all the different varieties of salmon save, in some areas, the pinks, and it may therefore reasonably be expected that the runs of mature fish developing from the year's reproduction will be of satisfactory size. In some streams heavy freshets may have had adverse effect on some of the spawn but this is only a possibility, not a certainty.

In the case of the pink salmon, the 1932 runs to some areas of the province were below expectations and the seeding of the spawning beds in these districts was not up to normal. This was so, for instance, in the Queen Charlotte Islands, as well as in some other places in the north.

PINKS' CASE PUZZLES

The explanation of the comparative scarcity of pinks in these areas can only be conjectured. The spawning grounds had been well seeded with pinks in the brood year, 1930, and runs of satisfactory size might have been expected to be general last year. What happened to make the runs smaller here and there, nobody knows. One suggestion is that some unusual condition developed at sea which destroyed the fish after they had gone to the ocean from the spawning streams in 1930. There are other conjectures, but they are no more than conjectures. It is difficult to determine with certainty the causes operating among creatures which spend most of their life in the deep waters.

But if pinks were not as plentiful as expected in some parts of British Columbia in 1932, chum salmon, on the other hand, were exceedingly abundant in almost all the areas which they normally frequent. In some places, as reported by the Fisheries Department inspectors, the chum spawning streams were "packed with fish."

As already indicated, moreover, the seeding of the spawning beds by the other varieties of salmon—sockeye, springs, and cohoes—was generally satisfactory.

BIG BETTERMENT IN SCALLOP FISHERY

Catches and Value of Tasty Atlantic Shellfish Rise Sharply—More Beds Found, Too

Scallop fishing results in New Brunswick and Nova Scotia were an outstanding "bright spot" in the Dominion's fisheries operations in February.

The total landings in the two provinces, Canada's major producers of these delicious shellfish, were eight times as great as in February, 1932, and their landed value to the fishermen was almost ten times the 1932 figure.

In large part the betterment in results was due to investigations carried on in recent years by the Dominion Department of Fisheries which led to the discovery of important new scallop beds in Maritime Province areas. At the same time, some of the February gain was due to the discovery of other new beds by the fishermen themselves while operating off Charlotte county, New Brunswick. One of these latter beds lies to the northeast of Cheyne Islands and yields well-meated scallops of good size. Another is a fairly large producing area near Big Duck Island, where the fishermen were reported as making good catches whenever weather conditions permitted them to carry on dragging.

Charlotte county waters are the area where the New Brunswick scallop fishery is carried on and during February the fishermen there landed 3,249 barrels with a landed value of \$13,800, as compared with only 100 barrels and a value of \$300 in the preceding February and 790 barrels and \$5,430 in February, 1930. In Nova Scotia it is in waters off the western part of the province that the scallop fishery is centered and there the February catch was 3,024 barrels, and landed value \$14,085, as against 677 barrels and \$2,518 a year ago. Scallops are also found in some areas in Prince Edward Island and Quebec but they are not landed there in February.

Canadians who have eaten scallops know how tasty a dish they make. There may be Canadians, however, who do not know that in its natural state the scallop is a fair sized shellfish which, unlike the oyster, does not attach itself to rocks but moves about by opening and closing its shell. It is shipped to market in shelled form and, as a matter of fact, it is really only its adductor muscle which is eaten.

DEFINITE STANDARDS OF EFFICIENCY, SANITATION, SET FOR LOBSTER PLANTS

Cannery Grading System Established by Dominion Fisheries Authorities and Only Plants of Prescribed Standards of Construction, Equipment, and Methods to Receive Lobster Canning Permits

With a view to ensuring a uniformly high standard of Canadian canned lobster production, amendments have been made to the regulations under the federal Meat and Canned Foods Act so that all lobster canneries must now satisfy definite and strict conditions as to construction, equipment, sanitation, and operations, and a grading form based upon investigations made by the Biological Board of Canada will be used in determining whether or not the requirements are met.

No cannery will be eligible to receive an operating permit unless it meets these conditions, and a further provision of the amended regulations is that the minimum requirements will be raised next year and again in 1935.

Former regulations bearing on the condition of canneries and their operations have been retained but the amending Order in Council makes the requirements more specific and comprehensive, and while Canadian canned lobster has been a good product in the past, and many of the canners have operated excellent plants, the change in the regulations will make the general standard of operation higher and give added guarantee of quality. Institution of this system of grading lobster canneries, and refusing permits to plants which do not reach a sufficiently high rating, is only one of a number of steps which have been taken by the Dominion fisheries authorities in the past few years to ensure quality output from the country's great fisheries resources.

WHAT REQUIREMENTS ARE

For existing plants the minimum number of marks necessary to enable the canneries to obtain operating permits this year will be 60, out of a maximum of 100, for construction and equipment and 75, out of a maximum of 100, for operation and sanitation. In 1934 the minimum marks required will be 65 and 80, and in 1935 the minimum will be lifted to 75 and 85 with every plant required to have a steam retort included among its apparatus.

New canneries erected for operation this year or next year will not be given permits unless they can meet the 1935 grading requirements from the outset.

In establishing the grading standards and working out the grading form the Dominion authorities followed in outline a form which was proposed some years ago, making such alterations in it as experience and investigations carried on in the past two or three years had shown to be necessary or desirable. The investigations were conducted by scientists on the staff of the Atlantic Fisheries Experimental Station of the Biological Board, who were assisted by fisheries inspectors on the staff of the Dominion Department of Fisheries. These scientists subsequently graded a number of Maritime Province canneries in accordance with the standards suggested by their study and last year other plants were graded by the fisheries inspectors, whose training has included preparation for such work. Future grading will be done by the inspectors, who will use the prescribed grading form.

THE GRADING METHOD

In rating a cannery as to "construction and equipment," account is taken of its location, construction, and apparatus, with 8 points the maximum allowance for location, 22 for construction, and 70 for equipment. Proximity to tide-water and distance from any undesirable surroundings enter into the marking for "location." In reckoning the marks for "construction" the grading officer takes into consideration such matters as proper subdivision of the plant, whether walls and ceilings, have been sheathed and painted or whitewashed, whether drains and ventilations are satisfactory, etc. The marks given for equipment depend upon whether the plant is well equipped or poorly equipped with crates or cars to hold the lobsters until processing begins, vats, cooling tables, cracking tables, packing table, exhaust apparatus, overalls or large aprons for the workers, and so on.

Thirty-seven marks are the maximum for cannery sanitation and 63 for pack-

(Continued on page 4)

RECORD TROUT CAUGHT WHERE NONE BEFORE

Saskatchewan Case Striking Example of Success of Dominion's Fish Culture Operations

Bigger than the biggest Loch Leven trout previously known to have been taken in Canada, one of these fish weighing 10 pounds 2 ounces was recently caught in the Cypress Hills area of Saskatchewan.

The fish was a "whopper" but what makes the case particularly noteworthy is the fact that this big fellow was caught in a part of the country where there were no trout at all until the Loch Leven species were introduced there by the Dominion Department of Fisheries prior to the transfer of Saskatchewan fisheries administration to provincial control several years ago. It's another striking proof of the effectiveness of intelligent fish culture.

For the most part the Dominion department's fish cultural work is in connection with efforts to maintain and increase the country's stocks of commercial fish but attention is also given to the enlargement of angling resources, with a view both to widening the recreational opportunities of Canadian citizens and adding to the attractions offered the tourist. The Cypress Hills case is only one instance in which sport fish have been successfully introduced by the department in sections of the country where nature had overlooked this particular endowment.

So far as the introduction of Loch Leven trout in the Cypress Hills district is concerned, the Fish Culture Branch of the Fisheries Department made its first "planting" in 1924 when fingerlings from the hatchery at Banff were set free in Frenchman's river. Other plantings were made in 1925, 1926, and 1929. All told, about 376,000 fry and fingerlings were put into the river and as it has a number of tributaries the young fish made their way to different waters in the district.

They thrived, too, for while the 10-pounder is the biggest so far caught, other trout taken by anglers in this area in recent summers have been of good size. Incidentally, it may be noted that a 10-pound fish is several times as large as the average Loch Leven trout taken in Scotland, the original home of this species of fish.

FISH DEMONSTRATIONS FOR PRAIRIE CITIES

Fish cookery demonstrations, planned as part of the program of the Dominion Department of Fisheries, are now being arranged for Alberta and Saskatchewan cities, following the conclusion of demonstrations held on the Pacific coast.

Prior to going to British Columbia some weeks ago, Mrs. Evelene Spencer, the department's cookery specialist, had conducted demonstrations in different parts of Ontario, Quebec, and Manitoba.

The schedule for Alberta and Saskatchewan meetings has not been wholly completed but in making the arrangements for the work to be done by Mrs. Spencer in these provinces the Dominion department will have the co-operation of provincial authorities. It is expected that demonstrations will first be held in several of the larger centres of Alberta and then Mrs. Spencer will begin the Saskatchewan program.

In British Columbia, Mrs. Spencer held demonstrations at Vancouver and Victoria, and visited Prince Rupert where she gave several addresses on fish foods and methods of preparing them for the table. She also spoke over the radio on a number of occasions and before several clubs. All of her work is designed to increase popular interest in the Canadian fishing industry and to stimulate the use of Canadian fish and shellfish. The Vancouver and Victoria demonstrations were most successful and representatives of the Pacific coast fishing industry expressed themselves as thoroughly convinced of the usefulness of the department's campaign as a means of increasing the demand for the fishermen's products. Approval of the campaign was officially recorded in a resolution passed by the Pacific coast section of the Canadian Fisheries Association commending the department's "sincere and practical endeavour to stimulate greater home consumption of fish" and praising the capable manner in which the work is being done.

Nova Scotia's sea fishermen caught 26,640 hundredweights of alewives last year. Most of the catch was used fresh, but 1,287 hundredweights of the smoked product were put up; 1,800 barrels of the fish were pickled.

FISHERY OUTPUT CUT—(Conc.) gain of \$15,400. Lobster catch was 1,977 hundredweights, as against only 11 hundredweights in the 1932 month, and it had a landed value of \$41,690 as compared with \$310. These increases were accounted for by the fact that an amendment to the fishery regulations permitted February lobster fishing in the western part of the province where it was not allowed a year ago. Nova Scotia cod and scallop catches also increased during the month, and in the case of scallops the gain was relatively large, with landed value also rising sharply. There was reduced production from most of the other Nova Scotia fisheries.

In New Brunswick there was a total catch of 24,175 hundredweights with a landed value of \$71,200—a decrease of 14,400 hundredweights and \$31,000, round figures. As in Nova Scotia, scallop catch and value increased substantially. Returns from the smelt fishery, New Brunswick's major February fishery, were less than a year ago.

February operations in Quebec were confined to smelt fishing only and the catch, 2,000 hundredweights, was a third smaller than in February, 1932. In Prince Edward Island, smelts, tom-cods, and caplin were taken. Caplin and tom-cods landings showed a little decrease but the smelt catch, 745 hundredweights, was smaller by some 500 hundredweights than last year.

SEEK CAUSE OF—(Conc.)

majority of the red mackerel examined at the station," the report adds, "have been belly-burned, indicating a poor condition previous to salting."

This salt mackerel investigation is only one of many pieces of study and experimentation carried on by Dominion scientists in the interests of fisheries development and the fishing industry. This particular undertaking is of importance only to Atlantic coast fisheries people for mackerel do not occur on Canada's Pacific coast, but both Atlantic and Pacific problems, of course, are dealt with by the research workers. Four scientific stations, two on each coast, as well as several substations, are conducted by the Biological Board, which is under the control of the Minister of Fisheries for the Dominion, and their work is wholly on problems related to the proper conservation and development of the fisheries and the furtherance of the efficiency and success of the fishing industry.

FISHWAY SPEEDS UP SALMON JOURNEYINGS

Salmon making their way to the spawning grounds on the upper portion of the Cowichan river in British Columbia reach their destination more quickly now than was possible for their predecessors a year or two ago, and for this advantage they may thank the fishway built by the Dominion Department of Fisheries at Skutz Falls in 1931. As a matter of fact, the fishway has done more than speed up the salmon's travels, for chums, a variety of salmon which, it is stated, were never before known to reach the spawning grounds above the falls, were enabled to make the passage in 1932.

Fishways have been built by the department in different areas where the fisheries are under Dominion administration and their purpose, of course, is to assist in maintaining the stocks by enabling the parent fish to get past obstructions which would otherwise bar the passage to the spawning grounds. In some cases, local conditions are difficult to overcome but, in the main, fishways built by the department, or from plans made by the department's engineers, have proved efficient in accomplishing their purpose.

DEFINITE STANDARDS—(Conc.)

ing operations. To obtain the sanitation maximum the plant must have its boats kept clean; the lobsters must be carried in crates or baskets and protected from the sunlight; the crates or cars must be anchored in clean sea-water and must themselves be cleaned regularly; the cannery walls must be cleaned every day, lined or scalded with live steam; the tables must be scalded several times daily, the dishes cleaned frequently and sterilized at least once a day; the employees must be cleanly in dress and person at all times. Various other essentials are also laid down on the grading form.

In judging a cannery as to "packing operations" the grading officer takes account of a number of technical points, such as proper "culling" of the lobsters before processing begins, prompt packing of the lobsters after they have been boiled, careful washing of the meat in a spray of running water, use of proper pickle, efficient sterilization methods, etc.

Black cod, ling cod, red and rock cod, and grey cod, which is also called whitling, are all taken in British Columbia fisheries. Ling cod are caught in greatest abundance.

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VALUE OF DOMINION'S SEA FISHERIES PRODUCTION FOR MARCH SHOWED GAIN

Total Landed Value of Catches to Fishermen Greater than in March 1932, with Betterment in British Columbia Halibut Fishery and Several Atlantic Fisheries Main Factors

Increased returns from the cod, haddock, halibut, and scallop fisheries on the Atlantic coast and from the Pacific halibut fishery lifted the landed value of Canada's sea fisheries production in March above the figures for March, 1932.

The landed value of all the fish and shellfish taken on both coasts during the month was slightly more than \$301,700, a gain of approximately \$63,600.

Of this gain over \$40,000 is to be credited to the Atlantic coast and over \$23,000 to British Columbia.

The total catch in March, however, was smaller than in the corresponding period of 1932, a state of affairs which was chiefly due to a large reduction in British Columbia herring landings. On the Atlantic side the month's catch from all the sea fisheries amounted to 98,525 hundredweights, a gain of 40,620 hundredweights, but on the Pacific coast there was a decrease of more than 93,160.

Save in the herring fishery, the British Columbia catches were almost as large as in March, 1932, and in one or two cases—notably the halibut and salmon fisheries—there were increases. Herring landings, however, totalled less than 3,000 hundredweights, as compared with more than 92,000 hundredweights, the great decrease being explained by the fact that this year seining for herring was not permitted in March in Fisheries District No. 3, the big herring-producing area of British Columbia, where, in March, 1932, large catches were made, and were used, for the most part, in reduction plants.

Atlantic Betterment

No landings from Quebec sea fisheries were reported for March, and Prince Edward Island landings were only a few thousand pounds; it is in other months of the year that Quebec and

Prince Edward Island fishermen make their catches. Both of the other Atlantic provinces—New Brunswick and Nova Scotia—made larger landings than a year ago, and got more money for them.

Statistics gathered by the Dominion Department of Fisheries show that during the month the Nova Scotia fishermen landed approximately 87,870 hundredweights of sea fish and shellfish, as compared with only 51,750 hundredweights in the 1932 month, and the catch had a landed value of \$147,410, a gain of nearly \$31,400. In New Brunswick the landings were 10,480 hundredweights, an increase of 4,300, in round figures, with a landed value to the fishermen amounting to \$15,765, which represented a gain of slightly less than \$8,800.

The chief gain in New Brunswick was in scallop production and value. Scallop areas of the province are centred off Charlotte county and more intensive fishing, and the discovery of some new beds, resulted in the catch totalling 2,880 barrels with a landed value of \$10,100, as against 184 barrels and \$917 in March, 1932.

In Nova Scotia, too, the scallop fishermen were much more successful than a year ago. Their landings for the month were 2,955 barrels, or more than twice the quantity taken in the preceding March, and the landed value, \$14,230, showed an increase of almost 200 per cent. Substantial gains, both as to catch and landed value, were shown in the Nova Scotia haddock and halibut fisheries, and a large gain in the case of the cod fishery. Over 36,400 hundredweights of cod were taken, or more than twice the quantity landed in the 1932 month, and the landed value, \$38,530, showed an increase of almost \$16,200. Nova Scotia lobster landings were some-

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FISH COOKERY EXPERT IN PRAIRIE CITIES

Federal Department's Campaign to Increase Use of Fish Foods Extended to Alberta, Saskatchewan

Fish cookery demonstrations, and addresses on the value of fish foods, are now being given in Saskatchewan by Mrs. Evelene Spencer, specialist in fish cookery, who was put in the field by the Dominion Department of Fisheries last year to carry on work of this kind in different parts of the country with a view to stimulating the demand for Canadian fish and shellfish and thus to aid the fishing industry by bringing about increased use of its products. In the Saskatchewan program the Dominion department has the co-operation of the Saskatchewan Department of Natural Resources, which administers the fisheries of the province, and plans are being made for Mrs. Spencer to cover a number of centres. Use is also being made of radio facilities to broadcast some of her addresses over the province as a whole.

Mrs. Spencer went to Saskatchewan from Alberta where she had held most successful demonstrations in Edmonton and had spoken before several women's meetings. The Fisheries Service of the Alberta Department of Lands and Mines joined in the work of making the Edmonton arrangements. At these demonstrations, as at others elsewhere, fish from widely separated parts of the country were cooked and served, the purpose of the campaign being to increase popular interest in Canadian fish foods generally, not fish from one particular locality. The fish used at Edmonton included fresh-water fish from Alberta itself, fresh and prepared fish from the Pacific coast, and fish from the Atlantic coast.

The original plans for the Alberta program contemplated having Mrs. Spencer go to Calgary, Lethbridge, and Medicine Hat before she started eastward, but circumstances made it de-

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WIDENING CANADIAN FISH INSPECTION SYSTEM ON ATLANTIC COAST IN JUNE

Further Quality Safeguards in Interests of Consumers and Producers Alike Provided under Amended Regulations Effective Shortly Covering Compulsory Inspection of Pickled Fish and Hard Cured Herring Bloaters

After the end of May no pickled alewives, pickled herring, pickled mackerel, or herring bloaters, and no pickled salmon except mild cured salmon may be shipped to market by Canadian producers until both the fish and the containers have been inspected by duly authorized officers and the containers have been marked in specified manner.

Shipments of pickled fish which have passed inspection will have stencilled on each container a crown surrounding the word "Canada," as well as certain information as to grade, weight, etc., and thus the buyer may know that his purchase is a product conforming fully to the requirements of the Canadian regulations—regulations under the Fish Inspection Act, a federal enactment. Shipments which fall below the quality prescribed by the regulations but are, nevertheless, fit for human food will not be stencilled with the official brand, although a mark will be placed upon them to show that they have been inspected.

In the case of smoked bloaters the marking system will be different in that the crown stencil will not be used but boxes of the fish which have been passed by an inspector will be marked by him with the word "Inspected," which will indicate that they satisfy the requirements under the regulations.

Compulsory inspection of these pickled fish and bloaters from June 1 next has been decided upon as one more step by the Dominion fisheries authorities to ensure the maintenance of a high standard of production in the country's fisheries and thus not only to serve the consumer but also to benefit the producer. In this particular instance the commodities affected are Atlantic coast products, and representatives of the fishing industry in that part of the Dominion were consulted by the Department of Fisheries when the details of the inspection regulations were being worked out. Hitherto there has been provision for the inspection of these fish products and their containers under the Fish Inspection Act but inspection has

not been compulsory and to meet the new situation important amendments have been made to the regulations laid down under the act.

The inspection work will be carried out by the Fisheries Department's permanent fisheries inspectors in the different districts and these officers have made themselves fully qualified for service of this kind through special courses of study at the Fisheries Experimental Station maintained by the Dominion at Halifax. The inspection will cover both the containers to be used in packing fish coming under the act and the processed fish itself, for the regulations govern the construction of containers as well as processing. When inspections are required the cooper or packer, as the case may be, must notify the fisheries inspector for that particular area and the officer must attend to the work with the least possible delay. In the case of an appeal against an inspector's decision a re-inspection by another inspector may be ordered by the Minister of Fisheries and, under one of the amendments to the former regulations, any such re-inspection must take place within seven days.

An important change made in amending the regulations consists in the addition of sections defining grades for the different classes of pickled mackerel. Spring mackerel are now to be packed in two grades, "Large" and "Medium"; summer mackerel are to be graded "Large," "Medium," or "Small"; and the fat fall mackerel "Extra Large," "Large," and "Medium." The grade, in each case, depends upon the length of the fish and the number required to fill a barrel, both length and count specifications being set out in the regulations. In the case of pickled alewives the amended regulations set the minimum length of "Large" fish at ten inches instead of nine as formerly, and the length of "Medium" fish at not less than eight inches instead of seven. The grades for pickled herring have been slightly changed as to title but there is no change in the grading requirements.

LOBSTER CATCH IN MAGDALENS INCREASED

Enlarged Production from most Fisheries of Quebec Islands in 1932

Although the catches from most of the fisheries of the Magdalen Islands were larger in 1932 than in the preceding year, the landings of herring fell off sharply and the clam landings substantially, with the net result that the islands' total production, slightly more than 255,000 hundredweights, showed a decrease of some 13,000 hundredweights.

The drop in herring catch, which was the main factor in lowering total landings, was chiefly due to the unsatisfactory state of the market for smoked herring. Ordinarily, the Magdalens are big producers of smoked round herring but last year the marketing prospects did not encourage the fishermen to seek large catches for use in smoking operations.

The figures as to the quantities of different varieties of fish taken in the Magdalens in 1932 have been made up from information assembled by the Dominion Department of Fisheries and although they are as yet unrevised it is probable that they are not far astray. Incidentally, it may be noted in passing that the Magdalen Islands are the only part of Quebec where the fisheries are administered by the Dominion; in the other parts of the province administration is in provincial hands.

Lobster Fishery Feature

Increased returns from the lobster fishery featured the year for the islands' fishermen. The catch, 27,500 hundredweights, was about 7,260 hundredweights larger than in 1931 and its landed value was \$139,000, in round figures, as compared with \$103,800. More men were engaged in this fishery than in the preceding year and the number of traps in use increased by 9,200.

The fishermen reported cod as being more abundant than in 1931 and their catch totalled 59,190 hundredweights, a gain of some 1,300 hundredweights. Notwithstanding the increase in catch, the landed value, \$38,500, was considerably less than half as great as in the year before, a state of affairs which was chiefly due, of course, to the disturbed conditions prevailing in the export markets for dried fish.

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CANADIAN CANNED SALMON RATES HIGH IN "ENERGY VALUE" RESEARCH SHOWS

Important Vitamin Content also Found in Investigations Carried on by Federal Fisheries Scientists Working at Pacific Coast Research Centres Maintained by Dominion

There's a good deal of "energy value" in Canadian canned salmon.

And important vitamin content, too. Studies recently in progress at federal fisheries research stations in British Columbia have shown that canned sockeye contain as many as 819 calories to the pound.

An adult man expends from 2,500 to 6,000 calories in each 24 hours—the number varying with activity—so it will be seen that a meal of canned sockeye will give him a goodly share of his day's calorie requirements.

The investigators have not yet completed their examination of the other varieties of canned salmon but pinks have been found to have valuable calorific content, though not as great a content as sockeye.

Supply Vitamin D

In addition to studying "energy value" the research workers have been ascertaining the vitamin potency of canned salmon and they have found that the sockeye oil and the pink oil each contains from 50 to 67 units of vitamin D per gram, and D, of course, is one of the most important vitamins, essential to the human body. The oil from canned sockeye also showed from 2 to 2.5 units of vitamin A per gram.

The "energy" study has been going on at the Pacific Biological Station at Nanaimo and the work on vitamin potency at the Pacific Fisheries Experimental Station at Prince Rupert. What has already been accomplished emphasizes the value of Canadian canned salmon as a food. This work on salmon, however, is only one of the investigations being carried on at the fisheries research centres in the interests of the Dominion's fishing industry. Other studies are in progress at the two Pacific coast stations and still others at the Atlantic coast stations. All four centres, and several sub-stations, are conducted by the Biological Board of Canada, which is under the control of the Dominion Minister of Fisheries. A permanent staff of experts is employed by the board to undertake study and experimentation in connection with fish-

eries problems, and volunteer workers are also in the service from time to time.

In ascertaining the calorific value of canned salmon the Pacific coast investigators used cans of fish which has been chosen at random from sample lots obtained from the 1931 commercial pack in different districts of British Columbia. Some of the samples came from the Skeena River district, some from Rivers Inlet, others from the Fraser River, others from the Butedale region, and some from the Alert Bay district. Only sockeye and pinks were used, but similar work is to be done on the other varieties of canned salmon. The sockeye were found to lead the pinks in oil and calorific content but not in mineral content. The importance of mineral matter in food, of course, is in its contribution to the growth and well-being of the bones, teeth, etc.

VALUE OF DOMINION'S (Con.)

what less than a year ago, and landed value decreased.

On Pacific Coast

In British Columbia the halibut fishery was the "star" of the piece for the month. It yielded a catch of about 15,950 hundredweights, or 3,400 hundredweights more than in March, 1932, and the landed value of the fish to the fishermen was something more than \$79,000, which meant a gain of \$30,000.

March is never a big month in the British Columbia salmon fishery. It is later in the year that fishing is on a large scale. This year the March catch was only 4,120 hundredweights, but that was somewhat larger than the catch of twelve months before. In salmon landed value, \$34,370, there was a gain of \$4,300.

Herring, cod, flounders, ling cod, clams, etc., were the other species taken by Pacific coast fishermen during the month.

Canadian fisheries products are exported to between 90 and 100 different countries. The biggest business is with the United States.

GET 18-POUND TROUT 4,500 FEET ABOVE SEA

Sportsmen who caught large numbers of fine trout in Beaver Lake, British Columbia, last summer had proof in their creels that fish culture gets results.

Up to 1927 there were no fish in Beaver Lake, which lies about 30 miles from Kelowna and at an altitude of 4,500 feet above sea level. Starting in 1927 and continuing in several subsequent years, the Dominion Department of Fisheries, through its Fish Culture Branch, stocked the lake with Kamloops trout eggs and fry. Eggs were also placed in Island Lake, another part of the same chain of waters leading to Okanagan Lake.

Last year large numbers of trout were taken on the fly in both Beaver and Island, and the fishing was especially good in the former where one big fellow weighing 18 pounds was included in the catch. Of course, the 18-pounder was away above the average but a number of eight and ten-pound fish were taken and a great many which ran three and a half pounds or so. Sportsmen of the district are greatly pleased with what the fish cultural operations have accomplished in this case, and one of them, writing to the department at Ottawa, describes Beaver Lake as having been made into a fishermen's paradise.

Most of the department's fish cultural effort is naturally centred on commercial species of fish such as the salmon in order to help to maintain the stocks of raw material for the fishing industry, but attention is also given to the improvement of the country's angling resources and what has been done at Beaver Lake is a case in point.

FISH COOKERY EXPERT (Con)

sirable to alter the schedule and have her go from Edmonton to Saskatchewan and return to Calgary and other Alberta centres a little later. Arrangements have been made to have her go back to Alberta about the middle of May, and after that she will start for the eastern provinces.

Earlier in the year demonstrations were held in Vancouver and Victoria, and Mrs. Spencer also addressed meetings at those cities as well as meetings at Prince Rupert and Kamloops. Last year she did work in Manitoba, Ontario, and Quebec.

SEA LIONS NUISANCE TO HERRING FISHERS

Both fishermen and sea lions were after herring in the Pearl Harbour area of British Columbia in some recent weeks but the fish, apparently knowing something of the lions' appetite, promptly hurried out to deep water off shore, with the result that the fishermen had added difficulty in catching the desired supply of herring for bait purposes. The incident is worth noting as another example of the trouble, and loss, which sea lions cause in British Columbia fisheries. It is because of their depredations of the salmon runs and the damage they do to fishermen's nets that the Dominion Department of Fisheries sends one of its British Columbia vessels to certain rookeries each year for the purpose of shooting some of the lions and thus to keep the herds within reasonable limits as to numbers.

This year was the first occasion—for a long time at all events—that sea lions had invaded the Pearl Harbour area in any numbers during the herring run, and the fishermen are quite convinced that the reason the herring suddenly fled to the deep waters was to escape the voracious strangers. At one time in March the number of lions estimated to be in or near Pearl Harbour was 100 or more.

LOBSTER CATCH (Con)

Landings of mackerel and smelts increased, but smelt catch in the Magdalens is never very large. In the case of mackerel the catch was nearly 46,100 hundredweights, which represented a gain of more than 3,600 hundredweights. Some eels and halibut were also landed, while in the preceding year neither of these fish were taken by the Magdalens' fishermen.

Children need plenty of vitamin D in their diet. An excellent way of making sure they get it is to see that fish foods are frequently served on the family table.

Working eleven hours, a scallop fishing boat in the Bay of Fundy recently made a catch amounting to eight and a quarter barrels of shelled scallops. That was the "high line" catch for one day, up to that time.

WHITEFISH CHIEF OF FRESH WATER FISHES

Marketed Value of Dominion's Production Reaches Big Figure Every Year

Canada's most important fresh-water fish, from the commercial standpoint, is *Coregonus clupeiformis*. Some people may not recognize it under that big name, but they know the "common whitefish," and *Coregonus clupeiformis* and the common whitefish are one and the same. And a very valuable fish it is to Canada, much in favour on the market as an excellent food.

This whitefish is abundant in the Great Lakes, especially Lake Erie, and, to quote the former Naturalist of the Dominion Department of Fisheries, "its distribution has been reputed to be from Labrador and New Brunswick to the Prairie Provinces and northward." Another commercial variety of whitefish taken in Canadian waters is *Coregonus labradoricus* or the "Labrador whitefish," which is also known sometimes as the "Sault whitefish." One or two other kinds of whitefish are also found in the Dominion, as, for example, the Rocky Mountain whitefish or *Coregonus williamsoni*, which occurs in parts of Alberta and British Columbia and is regarded as a game fish.

The principal commercial production of whitefish in Canada is in Manitoba, Ontario, Saskatchewan, and Alberta, but there are landings of substantial size from Quebec waters. Small catches are made both in the Yukon Territory and New Brunswick. In 1931 the total marketed value of the whitefish taken by commercial fishermen in the different provinces was \$1,425,000 and in 1929, when marketing conditions were more favourable, the catch amounted to more than 19,600,000 pounds with a market value of more than \$2,453,000. A large part of the annual catch finds sale in the United States.

Common Fellow Biggest

The common whitefish is the largest of the whitefishes, "and may reach a length of two feet, but the average length is far below that. In colour it is olivaceous above and white beneath, and its lower fins may be dusky. The dorsal fin is high, the ventral fins are placed below the posterior portion of that fin, and the caudal fin is deeply forked. . . . Its food consists of minute crustaceans, mollusks and aquatic

PLANES USEFUL AID IN FISHERIES PATROL

Seaplanes have demonstrated their usefulness in fisheries patrol work in Canada and they will again be in use this year on the Pacific coast.

As a class, the commercial fishermen of Canada respect the fishing regulations but there is always the possibility, of course, that someone may prove an exception to the rule and the seaplane, swift, coming suddenly out of the sky, is an effective means of checking anything of the kind or of catching the offender. Last year the planes utilized in the fisheries patrol in British Columbia were on duty in the air for 275 hours and 25 minutes. That was a considerably shorter flying time than was required in the previous year, and much below the maximum of 443 hours and 40 minutes in the 1930 season, but in 1932 the lessened intensiveness of fishing operations, which was the natural consequence of unfavourable world market conditions, made it unnecessary to have the seaplanes in the air for as long a time as in other years. Care is always taken in every year, of course, to see that the seaplane patrol is employed only when and where it is absolutely needed, and in this way the expense is kept at a minimum.

insects, and such may be considered as essentially the nature of the food of the whitefishes in general." The Labrador whitefish is bluish-black above and silvery below, with dusky fins, and with marks on the edges of the scales. "It is rather slender in form, and a readily distinguishing feature is a series of permanent small teeth on the tongue." The Rocky Mountain whitefish, "only about a foot in length," is of a bluish colour, with silvery sides, and each of its fins is tipped with black.

Other known varieties of whitefish include the "humpback," which occurs in Alaska and has been recorded from Lake Bennett, British Columbia; Coulter's whitefish, which is closely related to the Rocky Mountain; the "broad whitefish," which occurs in the Mackenzie and Yukon rivers and Alaska and has been recorded from Great Bear Lake and Lake Bennett; and the widely-distributed round whitefish or shad-waiter.

In Canada's inland fisheries more whitefish are taken than any other variety of fish. A large part of the catch is exported to the United States.

FISHERIES NEWS BULLETIN

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CANADIAN CANNED SALMON AND LOBSTERS TO ENTER FRANCE AT LOWEST DUTIES

Fresh, Dried, Salted and Smoked Fish and Some Other Fisheries Products from Dominion also Given Entry to French Market Under Minimum Tariff by New Trade Agreement

Under the new trade agreement recently made between Canada and France, fresh, dried, salted, and smoked fish from the Dominion and specified quotas of Canadian canned salmon and lobsters will be admitted to the French market under the minimum tariff rates.

A condition of entry on these terms is that the goods shall be conveyed direct from a Canadian port into a French port without transshipment in any country which does not enjoy the tariff advantages for which the agreement provides.

Certain Canadian fisheries products in addition to those already named will likewise enter France at the minimum rates of duty, and the complete list, as quoted from the agreement, is as follows: "Fish, fresh; fish, dried, salted, or smoked; fish of the salmonoid family, preserved 'au naturel', marinated or otherwise prepared; lobsters, fresh, preserved or prepared; fish fats; spermata; roe of cod and mackerel." The agreement, of course, also covers numerous other Canadian goods beside fisheries products. Some of these latter commodities will be admitted under the French minimum tariff and others at certain rates of discount from the general tariff. In the case of shipments to a French colony or protectorate the same principles are to be applied to Canadian goods covered by the agreement as will apply in the case of exports to France—that is entry will be granted at the lowest rates of duty in force or at certain percentages of discount from the general tariff effective in the area in question.

Trade agreements must always mean both "give" and "take" and in the present instance the Dominion is granting reduced rates of duty on a number of French articles. The only fisheries products affected, however, are "sardines, cooked in oil and preserved in

oil." These sardines are now to be admitted under the Intermediate Tariff "less a discount of twenty per cent," instead of under the Intermediate Tariff as heretofore.

Salmon and Lobsters

Admission of Canada's canned salmon and lobsters under the French minimum tariff is probably the most important change brought about by the agreement, so far as the Dominion's fishing industry is concerned. France is an important market for canned salmon, and a very substantial market for Canadian canned lobster, but there have been difficulties in the way of Dominion exporters who have sought sales there, and the new tariff arrangement will be welcome.

Expressed in terms of the metric quintal, 220 pounds, the canned salmon quota established for Canada in the French market is 25,000 quintals, gross weight, for the period ending September 25 next, and "after the 1st October a new quota shall be fixed agreed upon by both governments." The quota for lobsters is to be 3,000 quintals per annum. As a matter of fact, the agreement's item relating to lobsters covers fresh lobsters as well as those "preserved or prepared" but at present the Dominion ships only canned lobsters to France.

Shipments of canned salmon and canned lobsters must be accompanied to France by certificates of origin issued by Canadian officials designated for this purpose and they must be visaed by French consular authorities in Canada. Any shipments which are not accompanied by these certificates "shall be submitted to the rate of the General Tariff." The agreement also requires the Dominion Department of Fisheries to take "all necessary measures to ensure that the quotas provided are not exceeded."

(Continued on page 8)

RAINBOW PROMISE WELL IN NOVA SCOTIA

Trout Native to Pacific Coast Apparently Thriving but Lakes Closed as Protective Measure

In the past year or two fourteen Nova Scotia lakes have been stocked with Rainbow trout by the Dominion Department of Fisheries, through its Fish Culture Branch, and in order that the newcomers may be given every chance in life these waters have now been closed to fishing until the opening of the trout season of 1935.

Rainbow trout are fine game fish but they are not indigenous to the Maritime Provinces and if they are to become established in the Nova Scotia waters where they have been introduced it is necessary that they be fully protected in the early stages of their career in the province. As a matter of fact, however, test fishing and observations carried out by officers of the Fish Culture Branch have indicated that the Rainbow put into the Nova Scotia lakes are coming along well. They promise to become an important addition to the angling stocks of that part of the world. The expectation that they will continue to thrive is supported, moreover, by the fact that Rainbow introduced by the department into several lakes in Prince Edward Island, and in one New Brunswick area, have thrived most satisfactorily.

Not every trout water will do for Rainbow and careful examination must be made before any lake is selected for stocking. In Nova Scotia the lakes which were found to be apparently suitable for these fish, and where stocking was undertaken by the fish culture people in the past year or so are as follows: Brazil and Bird, Yarmouth County; Cranberry and Kempt, Queens County; Midway and Round, Digby County; Clam (Upper Roseway River), Shelburne County; Spectacle, Lunenburg County; Giants, Guysboro County; McIsaac Lake (Leitches Creek), McMillan Lake (Catalone), Levers Lake (Gabus), and Enon Lake, Cape Breton

(Continued on page 8)

BIG GAIN IN NOVA SCOTIA COD CATCH FEATURED APRIL SEA FISHERY RETURNS

Landings of Fish and Shellfish by Atlantic Coast Fishermen Showed Sharp Gain Over Figures for April, 1932, with Small Decrease Reported for Pacific Areas

Canada's total catch of sea fish and shellfish in April was some 37,500 hundredweights greater in April than it had been in April, 1932.

On the Pacific coast the month's landings showed a small decrease but there was a gain of nearly 38,260 hundredweights in the Atlantic provinces. The greater part of the gain was in the Nova Scotia catch of cod which was more than twice as large as in the 1932 month, or 64,680 hundredweights as compared with 28,280.

With world markets still upset, however, the total landed value of the month's catch to the fishermen was less than in April of last year—\$461,300, in round figures, as against \$612,100. Atlantic coast landed value showed a decrease of \$141,200—chiefly as a result of lessened lobster catch and value—and on the Pacific coast, or, in other words, in British Columbia, there was a decrease of slightly less than \$9,600.

All the figures for April, 1933, are from unrevised returns compiled by the Dominion Department of Fisheries but it is not probable that the revised statistics will differ from them very greatly.

April catch increased in Nova Scotia and New Brunswick, fell off slightly in British Columbia, and also decreased in Prince Edward Island. No landings were reported by Quebec sea fishermen, but, of course, Quebec catch is never large in April, and that is true also in the case of Prince Edward Island. New Brunswick alone showed a gain in landed value, as compared with April, 1932, the betterment being chiefly due to larger returns from the scallop and sardine fisheries.

Some Provincial Results

The total catch for the month in British Columbia was 37,975 hundredweights, and landed value totalled \$150,325. Halibut landings were slightly smaller than a year ago, but landed value, \$78,770, showed a drop of about \$5,500. The salmon fishery showed some gains both in catch and landed value, but it is not until later in the year that salmon fishing operations are at their height and production is large. In the herring fishery there was also gain on both sides of the account.

The big increase in Nova Scotia cod catch was the feature of April operations

on the Atlantic coast. The scallop fishery in Nova Scotia and New Brunswick again showed substantial gain amounting in the two provinces to 6,290 barrels with a landed value of \$20,790, as compared with 3,768 barrels and a landed value of \$11,535 in April, 1932.

Nova Scotia's haddock catch, 27,865 hundredweights, was a trifle larger than in the preceding April. The halibut landings on the other hand showed a slight decrease. Taking the Atlantic coast as a whole, there was a substantial decrease in the herring landings.

In New Brunswick, as already indicated, the sardine catch was considerably larger than in the 1932 month. The landings totalled 4,260 barrels—a gain of about 3,600 barrels—with a landed value of \$3,764, a betterment of about \$3,100. More alewives were taken by New Brunswick fishermen than a year ago, and landed value increased slightly. There was also a substantial increase in the landings of clams and quahaugs, 1,440 barrels being taken, which amount is an increase of more than 100 per cent.

Lobster fishing was in progress during the month in two of the Atlantic provinces—Nova Scotia and New Brunswick—but the major operations were in Nova Scotia waters. In this later area the catch was 14,715 hundredweights, or very little more than half the quantity taken in April, 1932. Landed value amounted to \$132,595 as compared with \$321,370.

RAINBOW PROMISE—(Cont.)

County; and Lindloff Lake, Richmond County. All of these lakes, as already indicated, have now been closed to fishing until the opening of the trout fishing season of 1935, and the closing order also applies to Nancy Lake, Queens County, where Rainbow are to be introduced this year.

Rainbow were placed in most of the lakes in question in 1931 and 1932 but in one or two cases introduction took place in 1930. Fry, fingerlings, and yearlings were used in stocking, the distributions being made from several of the department's Nova Scotia hatcheries. Further distributions of Rainbow to these lakes are also to be made during the present year.

TRY OUT FISHERIES IN JAMES BAY WATERS

Experimental Commercial Fishing Licensed in Tidal Areas by Dominion Fisheries Department

Some idea of the commercial fishing possibilities of James Bay may be obtained this year through the operations of several fishermen who have been granted experimental licences by the Dominion Department of Fisheries which administers the tidal fisheries of the region. The administration of fisheries in non-tidal portions of water tributary to James Bay is in provincial hands.

It has been known, of course, that there are different kinds of fish in James Bay—whitefish, trout, species of herring, etc.—but the measure of their abundance has not been determined. This year's operations are expected to be helpful toward indicating what quantities of various species might be obtained if commercial fishing were undertaken. The results of the licensees' experience should also be useful to the work of framing future fisheries regulations to conserve the fish stocks of the area.

The licences now issued by Ottawa permit the licensees to fish with gill-nets in James Bay and the tidal waters of Moose River, but the meshes of the nets are not to be smaller than three inches or larger than 5½ inches extension measure. The licensees also require the fishermen to make fortnightly reports to the Fisheries Department as to the results of their operations. The reports are to show what kinds of fish are taken and the total weight of the catch of each kind. They will also indicate the minimum, maximum and average length and weight in the case of each species, and the state of the fish as to firmness of flesh, spawning condition, and so on.

The licences are good for the current year only, and their issuance does not imply any right to their continuance, nor do they confer any exclusive fishing privileges. Experimental licences were also issued by the Department of Fisheries both in 1931 and 1932, but for various reasons the licensees did not operate.

Last year's run of herring to the Barclay Sound area of British Columbia was the heaviest in years. The runs in several previous years had been light but the 1932 experience discounts the idea that the stocks had fallen off.

MEMBERS OF SAME FAMILY, ATLANTIC AND PACIFIC SALMON DIFFERENT FISH

British Columbia Varieties of Canada's Most Valuable Fish in One Scientific Genus, Atlantic Salmon in Another—Their Looks and Their Life

Salmon are taken commercially in the waters of both coasts of the Dominion, but not the same kind of salmon on each coast.

To use some scientific terms, Canada's salmon are all members of the *Salmonidae* family, but the five varieties taken by Pacific coast fishermen are salmonoids of the genus *Oncorhynchus*, while the Atlantic fish belongs to the *Salmo* genus. Taken as a group, the Canadian salmon are more valuable, from the dollars and cents standpoint at least, than any other fish found in the waters of the Dominion.

Using some more scientific terms, here are the names of the several kinds of Canadian salmon, as Science gives them, and their popular names too: Atlantic salmon—*Salmo salar*; Pacific salmon—*Oncorhynchus nerka* or sockeye; *Oncorhynchus kisutch* or coho; *Oncorhynchus tshawytscha* or spring; *Oncorhynchus keta* or chum; *Oncorhynchus gorbusha* or pink. The British Columbia salmon, sometimes spoken of as the "blueback," is simply the immature coho, and the steelhead, another of the fish used in the Pacific coast salmon industry, doesn't belong to the *Oncorhynchus* group but to the *Salmo* genus, being known scientifically as *Salmo gairdneri*.

The Atlantic salmon is taken commercially by fishermen of all four of the eastern coast provinces. New Brunswick and Quebec are the biggest producers and the Nova Scotia catch is of very substantial size, but salmon are taken in only small quantities in Prince Edward Island. Most of the Atlantic catch is marketed fresh or frozen, but a small quantity is canned and a few of the fish are smoked.

In British Columbia, on the other hand, the salmon canning industry is one of the most important industrial enterprises of the province, and in 1930, the year of record production, more than 2,220,000 cases of canned salmon were put up. Large quantities of the British Columbia fish are also marketed fresh or frozen, and a good deal of the catch is used in drysalting operations and in mild-curing. Small quantities of smoked and pickled salmon are also put up.

What They're Like

The mature Atlantic salmon, as described by Andrew Halkett, former Naturalist of the Dominion Department of

Fisheries, is steel blue or brownish on the back and silvery on the sides. The body, head and fins are more or less covered with black spots, and there are red patches on the sides of the male fish. The ventral and anal fins are whitish with a grayish tinge on the inner side of the former, and all the other fins are dusky in colour. Like the Pacific coast fish, the Atlantic salmon spawns in fresh water. There is this notable difference between the salmon of the two coasts, however, that the Pacific fish spawn only once and then die, while *Salmo salar* spawn year after year.

While the sockeye, spring, coho, pink and chum salmon of British Columbia all belong to the one genus, there is considerable difference in the length of the life cycles of the several varieties and in their average mature weight. The spring, for instance, may live six or seven years and reaches an average weight of about twenty pounds, while the pink lives only two years and its average weight on maturity is approximately four pounds. The sockeye's life span is four years, though sometimes five or six, and its average mature weight some five pounds. The coho lives three years and averages about six pounds, and the chum lives three years or four and comes to weigh eight pounds on the average.

The sockeye is the most important of the Pacific coast salmon from the commercial standpoint, largely because of the rich red colour of its flesh. Its skin is blue on the back with a silvery sheen, and silvery on the sides. The upper fins are dusky and the lower pale. The coho is described by Halkett as bluish green on the back with silvery sides, which are covered with dark marks. The pectoral fins are dusky and the dorsal and adipose fins and the top of the caudal fin, as well as the back and top of the head, are sparingly spotted. "The spring salmon is of a dusky colour on the back which may be variegated with olivaceous, the head being darker, and is silvery on the sides and beneath; the back of the fish and the dorsal and caudal fins are marked with black spots. Toward the spawning time the males become blackish in colour mingled with red." The chum salmon is dusky in

(Continued on page 4)

FEW HOURS STORM COSTS FISHERMEN DEAR

On one comparatively short stretch of coast in Nova Scotia a week or two ago the Storm King, in a single day, robbed fishermen of lobster boats worth over \$3,600, more than 350 lobster traps, and at least 50 herring nets.

Equipment representing an amount equal to the earnings of a good many weeks was all wiped out in a few hours.

The case is worth citing as indicating the hazards of the fisherman's life. It is a life of difficulty at best, and frequently a life of risk, and those who follow it are well worthy of their hire.

The same storm which worked havoc on the piece of Nova Scotia coast in question also did damage in Prince Edward Island and elsewhere in the Maritime Provinces. On the north shore of Prince Edward Island, between Malpeque and East Point, according to advices received by the Dominion Department of Fisheries from its supervisor at Charlottetown, the fishermen reported "that not less than half of their (lobster) gear was totally destroyed. The herring nets were almost all destroyed also."

JAPANESE CRABMEAT PACK SHOWS DECLINE

Official statements by the Japan Canned Crab Packers and Exporters' Association show that there was a very sharp decline in Japan's production of canned crabmeat in 1932. The year's pack of 306,700 cases was 30 per cent smaller than the output of the year before. Crab canning is not carried on in Canada on a large scale but Japanese crabmeat comes into competition with canned lobster from the Dominion in various markets, and the size of Japan's pack is therefore always of interest to the Canadian lobster industry.

CANADIAN CANNED SALMON (Contc.)

The agreement has been made "pending the conclusion of a Commercial Convention regulating in a more complete manner the Customs and Tariff relations between Canada and France." It is for a one-year period and may be rescinded on three months' notice by either party, but it may also be extended by tacit consent. It was signed at Ottawa by the Prime Minister and the Secretary of State, on behalf of Canada, and by the French Minister to Canada.

PUT BACK IN WATER HOOKED TROUT REVIVE

Gill Injuries not Fatal if Small Fish Promptly Returned to Stream

Small trout which have been injured about the gills by the angler's hook will soon recover, in many cases at least, if they are promptly freed and put back into the water.

That statement may be contrary to a belief which is perhaps quite widely held but tests made by a Canadian investigator have indicated that it is true, and sportsmen who happen to land small trout when fishing for the big fellows should make it a point to get them back into the water at once so that they may have a chance to recover and mature and help to ensure good sport for anglers later on. In some cases, of course, the fisheries regulations provide that trout under certain sizes *must* be returned to the stream or lake but, regulations aside, it is good sportsmanship to put the small fish back in the water so that they may help to maintain the angling resources.

The investigation as to the effect of hook injuries on small brook trout was carried out last year under the Biological Board of Canada, which is the federal fisheries research body and operates under the control of the Minister of Fisheries. A number of trout with hook injuries in their gills—several gill arches—were under observation in the tests, being placed in a trough where they could easily be watched. Their injuries made them sluggish and, to quote from the report of the investigator, they "did not respond readily to tactile stimuli for several hours," but after twenty-four hours most of them seemed quite normal again. Only a small percentage—less than ten per cent—failed to survive, and, to quote again from the report, "the experiment indicates that a high percentage of hooked trout which are injured, even to the extent of severing a gill arch, may be expected to live if returned to the water when released from the hook."

More than 1,600,000 pounds of live lobsters were shipped to the United States market in 1932 by Eastern Nova Scotia fishermen by means of the lobster transportation service arranged by the Dominion Department of Fisheries. Trade in live lobsters from different parts of the Maritime Provinces has become of increasing importance of late years.

FINE SPIRIT MARKS CANADIAN FISHERMEN

Canadian fishermen have been having their share of trials during the past year or two but they have shown a fine spirit, and an extract from a recent report to the Dominion Department of Fisheries by one of its British Columbia supervisors is pertinent comment in this connection. "Fortitude and consideration of the difficulty of others engaged in the industry, by practically all concerned, were never apparent as during the past year," runs the officer's report in referring to the attitude of the fishing people of his district. "Determination to carry on in spite of obstacles, low prices, and difficult market conditions was a very noticeable feature throughout the year."

And the same courageous spirit that was shown by these Pacific coast people during 1932 has been characteristic of Canadian fishermen generally.

TONS OF SALMON IN RELIEF ALLOWANCES

Fish foods have been included among the relief supplies issued in the different parts of Canada, and in one of the western provinces two and a half tons of salmon were recently distributed in this way in one month. The salmon in this case were from British Columbia but fish of various other kinds have also been made available under the relief schemes followed in different places.

MEMBERS OF SAME—(Cont.)

colour on the upper parts of the body, and paler on the sides. It may either be marked with black dots or unmarked. As a rule the fins are blackish. As the spawning time approaches the males become red and are often mottled or barred. The pink, the smallest species of the genus, is sometimes known as the humpback, because of the humped condition which the males assume at the spawning time. Normally the upper parts of the pink's body are bluish and the under part silvery. There are numerous black spots on the upper and hinder parts, and larger, oblong, black spots on the caudal fins. The steelhead salmon, *Salmo rivularis*, is greenish above and silvery below. Its head, back, dorsal, adipose and caudal fins are covered with black spots, and at certain seasons of the year there are flesh coloured bands along the sides.

"BANKERS" OF ATLANTIC HAVE FAIR SUCCESS

Early Trip to Banks by Schooners Fishing for Dried Fish Trade Fairly Satisfactory

Fairly successful results were obtained by deep sea schooners from Lunenburg, N.S., one of North America's major fishing ports, on this year's "frozen baiting" trip to the great banks off Newfoundland when they sought fish for the dried fish trade.

Some 14 "bankers," as these vessels are called, made the trip and their catches, expressed in terms of green-salted or slack-salted fish, averaged about 550 quintals, although weather conditions were not favourable for fishing. The vessel reporting the largest catch brought home 700 quintals.

Last year no schooners went out from Lunenburg on the "frozen baiting" trip, which is so called because frozen bait is used. This year, with prospects in the dried fish trade seeming to be somewhat improved, a number of the vessels decided to go out, and they left port about the end of March, returning some five or six weeks later.

Cod make up the larger part of the catch taken by schooners fishing on the banks for the dried fish trade. The fish are cleaned and split at sea and salted down in the vessels' holds. Then when they have been brought to port they are dried in the open air and sun, or perhaps in an artificial drier. Fish prepared in this way are a tasty and excellent food and in addition to the sales made in the domestic market the Dominion, in normal times, does a large scale export business in foreign dried fish markets, such as the West Indies and some other southern islands, Brazil, Italy, etc. In the past year or two, of course, the business has suffered under the adverse economic conditions which have prevailed throughout the world. All four of the Dominion's Atlantic coast provinces engage in dried fish production, but the largest output is in Nova Scotia.

Fish taken commercially in the inland, or freshwater, fisheries of Quebec include bass, carp, catfish, eels, herring, maskinonge, perch, pickerel or dore, pike, salmon shad, smelts, sturgeon, and whitefish. The greater part of the Canadian catch of eels is made in Quebec's inland fisheries.

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LOBSTER SHELL RED? NO, DARK GREEN? IT'S EACH COLOUR AT DIFFERENT TIMES

Complete Change in Shade of Shell Interesting Feature in Canning of Dominion's Most Valuable Shell Fish—Canning Process Outlined— Big Export Trade

Many a shell on Canada's Atlantic coast suddenly changed its colour from a dark green to rich red in the past few weeks.

Literally thousands of them did it. Did it in a few minutes, too.

But the case is not so mysterious as it might seem. The shells were lobster shells, and it is a peculiarity of the lobster that although the natural colour of its shell is dark green it turns red when the lobster is boiled in a cannery vat, or anywhere else for that matter.

The world's greatest lobster fishery is in the waters off Canada's Atlantic provinces, and in recent weeks the summer lobster fishing season has been at its height. That is why it may be said with certainty that thousands of shells swiftly changed colour for all canned lobster is boiled in the cannery process, and although the trade in live lobsters has increased sharply of late years the greater part of the Dominion's annual catch still goes into cans.

Very Valuable Fishery

Among Canadian landings of fish and shellfish the lobster catch of the four Atlantic provinces is second only to the British Columbia salmon catch, so far as annual marketed value is concerned, and on the greater part of the eastern seaboard the lobstermen have been having a busy time. In a few districts there is no summer lobster season under the fisheries regulations but everywhere else the fishermen, the shippers of live lobsters in the shell, and the operators of the canneries have all been making the most of opportunity, although in some areas the catch has unfortunately been smaller than in 1932.

Lobsters, of course, are delicious sea food, whether in the fresh or canned form, and the product of the Dominion's canneries has well-established reputa-

tion, not only at home but in such export markets as the United Kingdom, France, Sweden, Denmark, and the United States. In 1932 the export business amounted to \$2,470,000, and in some preceding years when world trading conditions were more satisfactory the figure was well over the \$3,000,000 mark.

Lobsters do not occur in Pacific waters but in the Atlantic provinces canning has been carried on for a great many years. Methods have improved from time to time, of course, and the Dominion's lobster canning has kept pace with progress. Moreover, increasing strictness of inspection combines with the good judgment of the operators to ensure proper standards of production.

From Sea to Can

Canning at any plant begins as soon as possible after the fishermen's boats have landed their catches, so that the lobsters may be processed when they are in prime condition. First the lobsters are boiled in quantities in large vats for a few minutes in order to loosen the meat from the shell, and the shells that went in green come out red. Only a few minutes are required for this boiling. Then when the lobsters have drained and cooled on large tables known as "coolers" their claws are split with a small cleaver, and the meat is "shaken" from the claws, "pulled" from the tails, and "picked" from the arms with a small knife. After that the meat is washed in cool running water and packed in parchment-lined cans. In filling the cans the practice is to put the tails around the can at the bottom, place the arm meat in the centre, and the claw meat on top.

Each can is weighed to see that it contains the required legal quantity of meat and then a small quantity of weak

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FISH MEN COMMEND DEMONSTRATION WORK

Campaign of Fish Food Lectures and Demonstrations Continued in Interests of Fishing Industry

Joining in a letter to the Dominion Department of Fisheries, a number of fish dealers in Victoria, B.C., recently expressed approval of the campaign of fish cookery demonstrations and lectures which the department is conducting. Naturally, they spoke especially of the program given in their own city a short time ago, but they commended the campaign as a whole. Similar opinions have been expressed by other fisheries people elsewhere.

The purpose of the campaign, of course, is to increase popular interest in Canadian fish foods and their use and thus to benefit the fishermen and fishing industry by widening domestic demand for these products. The demonstrations and lectures are given by Mrs. Evelene Spencer, the department's specialist in fish cookery, and in recent weeks the field covered has included a number of Prairie Province centres—Edmonton, Calgary, Lethbridge, and Medicine Hat in Alberta, and Regina and Saskatoon in Saskatchewan. As a matter of fact, the field has been very much wider than this group of cities, for the program included numerous radio talks which were heard over a wide area, and heard with interest, as was indicated by reports received by the stations.

Manitoba Wants More

At the request of the provincial fisheries authorities of Manitoba a second program is now being given in that province. The first Manitoba program, given last autumn, was found so useful that the provincial authorities asked for additional demonstrations and meetings. After the Manitoba schedule is completed, Mrs. Spencer may speak before some Women's Institutes in Ontario and

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SEA FISHING LANDINGS AGAIN MOUNTED IN DOMINION, MAY STATISTICS SHOW

Landed Value Up Somewhat on Pacific Coast as Halibut Operations Show Gain but Smaller Returns from Lobster Fishery Pulled Down Figures from Atlantic Coast

Total landings of sea fish and shellfish on Canada's two coasts were greater in May than they had been in May, 1932, but with market conditions still unfavourable the landed value of the catch to the fishermen showed a decrease.

Catch amounted in all to 1,018,580 hundredweights, as compared with 924,868 hundredweights in the preceding May, and landed value was slightly more than \$1,448,000, which meant a drop of \$564,700.

In British Columbia the catch was less than a year ago but landed value showed a gain of about \$8,400. On the Atlantic coast, on the other hand, the situation was just the reverse—catch increased but landed value fell off by \$573,000. On the face of it, a value gain in spite of smaller catch, in the one case, and lowered value notwithstanding larger landings, in the other case, might seem a bit difficult to understand, but the explanation is simple. Although total catch decreased in British Columbia, more halibut were taken than a year ago, and the halibut is one of the most valuable of Pacific fish; on the Atlantic coast, however, there was a sharp drop in lobster landings, though catches increased in many of the other fisheries, and the lobster is Canada's most valuable shellfish.

Lobster catch for the month decreased in all four of the Atlantic provinces. Altogether, the landings totalled 171,350 hundredweights, as against 229,200 hundredweights in May, 1932. Landed value amounted to slightly more than \$783,700, a decrease of about \$598,400.

Eastern Results Generally

In two of the Atlantic provinces—Nova Scotia and New Brunswick—the month's landings from all the different sea fisheries went above last year's figures. In Quebec and in Prince Edward Island, on the other hand, there were decreases. Landed value dropped in all four provinces.

In Nova Scotia the cod, hake, halibut, herring, shad, and scallop fisheries all yielded increased quantities. In New Brunswick the herring, shad, and clam

landings showed gains, and there were very substantial increases in the landings both of alewives and sardines. Quebec's herring catch was considerably smaller than a year ago. The lobster fishery was the principal other fishery in progress in Quebec waters during the month, and as already indicated lobster landings fell off all along the coast. In Prince Edward Island there was a gain in herring catch but this was offset by lobster decrease.

In British Columbia

As previously suggested, results in the halibut fishery featured the month's operations on the Pacific coast. The catch, as shown by unrevised statistics collected and compiled by the Dominion Department of Fisheries, amounted to 21,460 hundredweights, a gain of nearly 2,600 hundredweights over the total for the preceding May, and landed value was \$92,325, up \$24,500.

More ling cod were taken than in the corresponding month of last year and one or two of the less important fisheries also showed small gains. In the salmon and herring fisheries, however, there were decreases on both sides of the account.

FISH MEN COMMENT—(Cont.)

later in the year, it is expected, she will go to the Maritime Provinces.

Fish from all parts of the Dominion, and fish in different prepared forms, as well as the fresh and frozen product, is used in the different demonstrations. In the prairie cities, for instance, whitefish and pickerel from prairie waters, British Columbia fish, including some Pacific oysters, and Atlantic coast fillets were all cooked and served to the audiences.

Similarly, in the addresses before public meetings and over the radio, Canadian fish foods generally are discussed, not simply fish and shellfish from one part of the country.

Considerably more than half a million pounds of dried dulse were marketed from Southwest New Brunswick, the chief producing area, in 1932.

HERRING SPAWN MAKES COVES LIKE OATMEAL

Eggs of Common but Useful Fish in Great Abundance in Northern New Brunswick

Herring spawn was present in such quantity in some of the coastal areas of northern New Brunswick a few weeks ago that the waters in many of the coves looked "just like oatmeal," according to a report to the Dominion Department of Fisheries by one of its inspectors in that part of the country. There was a great abundance of spawn, the officer wrote—more than many of the fishermen of the district had ever seen before at one time, although the herring is a common fish and its spawn may often be observed.

Incidentally, although the sea herring is a common fish that does not mean that it is unimportant. Far from it. Figures for 1932 are not yet available in complete form but in 1931 the catch of herring in the sea fisheries of Canada's Atlantic coast, including the small herring classed as sardines, had a marketed value of almost \$1,750,000 and the British Columbia catch was worth nearly \$1,060,000, or a total of more than \$2,800,000, and that in a year when, from the producers' standpoint at least, market conditions and prices left something to be desired.

The Atlantic herring—it is taken in the waters of all four of the Atlantic provinces—belongs to the genus *Clupea*, and so does the British Columbia fish, but they are different species, the former being known scientifically as *Clupea harengus* and the latter as *Clupea palasii*. (Fresh water herring, which also occurs in Canada, do not belong to the *Clupea* genus.) The greater part of the British Columbia catch is ordinarily put up in the drysalted form for export to China. On the Atlantic coast much of the catch is pickled and a good deal is smoked and sold as bloaters or kippers. On both coasts herring are also largely used for bait and they are also the raw material from which reduction plants produce part of their output of fish meal and oil. Some canned herring are likewise included in the Dominion's annual fisheries production, while of course many of the fish are marketed fresh. Whether fresh, smoked, pickled, or canned, however, Canadian herring are tasty, nourishing food.

HUGE DISTRIBUTIONS OF EGGS, FRY, AID MAINTENANCE OF CANADA FISH STOCKS

**Seedings of Commercial Species Totalling Over
129,000,000 Chief Part of Distributions from
Federal Fish Hatcheries in 1932 but
Many Plantings of Game Fish
Spawn and Fry also Made**

Distributions of eggs, fry, fingerlings and older fish from Dominion Government fish hatcheries in 1932 totalled 147,953,000 in round figures, and of this great number more than 129,000,000 were the eggs, etc., of commercial species.

By distributions of this kind the Dominion Department of Fisheries, which operates the federal fish hatcheries through its Fish Culture Branch, lends effective aid in maintaining and increasing Canada's stocks of fish, both game fish and some of the commercial species. Nature was kind to Canada, of course, in giving the country an abundance of fish of many different kinds, but there is a good deal of fishing, commercial fishing and angling, and fish cultural effort is one of the means employed by the department to guard against depletion of the stocks in those parts of the Dominion where fisheries administration is in federal hands.

Over 100,000,000 Sockeye

The largest distribution in 1932, as, indeed, in most years, was in the case of Sockeye, the most valuable of the Pacific coast salmon. All told, 102,625,000 Sockeye eggs, fry, etc., were put out from the departmental hatcheries, or approximately 11,100,000 more than in the year before. Next came the Atlantic salmon, which is both an important commercial fish and one of Canada's chief sport fish, and in this case the distribution was 24,511,000, or a million more than in 1931. The Spring and Coho salmon and the Steelhead of British Columbia were the other commercial species included in the year's distribution—2,707,500 altogether. (The Spring salmon, by the way, is taken by sport fishermen on some parts of the British Columbia coast, although it is ordinarily ranked as a commercial fish.)

Numerous seedings of game fish were made by the fish culture people during 1932, in addition to the distributions of commercial species. Among these sport fish were Speckled, Kamloops, Cutthroat, Rainbow, Brown, and Loch Leven trout, Landlocked salmon, etc. Some

were placed in British Columbia waters and some in Maritime Province areas, sections of Canada where the fisheries are administered by the Dominion authorities.

No doubt, some of the newcomers from the hatcheries have not survived, although in planting eggs or releasing fry or fingerlings care is always taken to put them only in waters which investigations have shown to be suitable. Some loss is bound to occur, but Canada's experience has shown that intelligent fish cultural effort brings very useful results and it may reasonably be expected that a good many grown fish in the runs of the next few years will be the product of the 1932 distributions. The commercial fisherman and the angler alike will reap benefit.

LOBSTER SHELL RED?—(Conc.)

pickle is added. After they have been hermetically sealed the cans are ready for the cooking process. In some canneries this cooking is done in steam retorts, in others the cans are boiled in water. (The retort method is quicker and is stated to have other advantages, and a recent change in the canning regulations provides "every (lobster) cannery operating in 1935 and thereafter shall be equipped with a steam retort.") When cooking has been completed the cans are cooled, dried, tested for defectives, polished, and labelled if labelling is to be done at the point of production. Then they are packed in wooden cases for shipment to market.

Several hundred lobster canneries are normally in operation in Canada each year. They vary in size, of course, and, to some extent, in equipment, but no one of them is permitted to operate unless inspection by a fully qualified fisheries officer has shown it to be built, equipped, and operated in such a way as to meet certain definite requirements regarding sanitary and other conditions.

B.C. SALMON VALUE SHOWS GAIN FOR 1932

**Dislocation of Chinese Herring Market Big
Factor in Drop in Provincial Fisheries
Total**

Almost half of the net decrease in the marketed value of British Columbia's fisheries production in 1932 was accounted for by smaller business in one commodity—drysalted herring.

That shows what disturbed conditions in one important market can do to business.

China is the main market for herring in the drysalted form and British Columbia has been making large sales there annually for some time past. In 1931 the province produced drysalted herring valued at more than \$776,000, practically all of it intended for export to the Orient. Last year, however, as a result of a combination of circumstances, conditions were so upset in the Chinese market that the British Columbia herring men curtailed operations greatly and their drysalted output amounted only to 269,000 hundredweights, in round figures, as compared with 788,000 hundredweights in the year before, and it had a marketed value of less than \$214,000.

No one, of course, will be surprised that the total marketed value of British Columbia's fisheries production in 1932, as shown by a preliminary report prepared by the Dominion Department of Fisheries and the Bureau of Statistics, was less by \$1,195,000 than it had been in 1931 when it had amounted to about \$11,109,000. The greater part of the production must seek sale abroad and with world economic conditions badly out of gear some decline in value was naturally not unexpected. As a matter of fact, it speaks well for the spirit of the fishing industry of the province that the number of canneries and other fish processing plants in operation during the year, 89, was only ten less than in the year before and the number of persons engaged in the fisheries, 14,823, actually showed an increase of between seven and eight hundred.

An outstanding and cheering fact in connection with the year's results is that the production from the salmon fishery—Canada's most important single fishery, from the dollars and cents standpoint at least—was greater by almost \$500,000 than in 1931, amounting to

(Continued on page 4)

WHALING RESUMED ON PACIFIC COAST

Market Outlook Believed More Favourable Operations Re-started After Two- Year Cessation

Canada has come back into the whaling industry this year with the resumption of operations on the Pacific coast after two years when the whalers stayed in port because world market conditions made satisfactory returns unlikely.

In other whaling countries, too, there was curtailment of operations in 1931 and 1932, but with the stocks of oil, etc., now reduced the outlook for the industry is believed to be more favourable.

Some half dozen different kinds of whales are taken in British Columbia whaling, which is centred off the Queen Charlotte Islands, and the total catch made in 1930 yielded oil, whalebone meal, and fertilizer having a marketed value of \$228,000. Oil is the chief product of the industry and the half million and more gallons which were obtained in 1930 was worth something more than \$192,000. Most of Canada's whale oil production, by the way, is exported to the United Kingdom and the United States.

In 1929 more whales were taken in British Columbia waters than in 1930—407—and the resultant oil and other products had a value of \$387,000. The annual catch fluctuates, of course, and in some years it has reached 450 or even 500, and in other seasons it has been less than 200. In the five-year period, 1926-1930, it averaged 312.

Of the different British Columbia whales, the Fin and the Sperm are the most plentiful. Ordinarily, the Fin comes first, although this was not the case in 1930 when 147 Sperms were captured as against only 62 Fins. The other varieties taken are the Hump, Sei, and Sulphur, and the occasional Bottle-nose.

People who buy British Columbia canned salmon obtain a product which has been subjected to expert inspection before going to market. Not a single can of British Columbia salmon is permitted to go on sale until it has been inspected by federal experts appointed to do this very work.

B.C. SALMON VALUE—(Conc.)

\$7,592,000. With demand-outlook apparently rather better in some canned markets, the canners expanded their operations in some measure and put up nearly 1,100,000 cases, as compared with 685,100, and at \$6,358,000 the marketed value of the pack showed a gain of \$1,150,000. Of course, for times of normal world conditions these figures would not be large but the gains they reveal are encouraging evidence of gradually improving outlook.

Salmon, halibut, herring, and pilchards make up the "Big Four" in British Columbia fisheries, although a large number of other fish of commercial importance are also taken by the fishermen of the province. In 1932 the halibut and pilchard fisheries, like the herring fishery, showed decreases in the value of the production. Adverse market conditions, of course, tell the story in each instance.

In the case of the pilchard fishery, the unsettled state of the markets for fish meal and oil was mainly responsible for drop in catch and value. Most of British Columbia's pilchard catch is used in the manufacture of meal and oil but in 1932 the operators of the producing plants reduced output, putting up only 1,315,865 gallons of oil and 8,842 tons of meal as compared with not much less than twice as much in the preceding year, and there was a large drop in marketed value of the year's catch. The reduction plant operations also reduced their production of meal and oil made from dogfish or grayfish and from fish waste, although they turned out more herring meal and oil.

Dogfish, which occur on both coasts of Canada, are only small sharks but they are frequent causes of a good deal of havoc in the fisheries, preying upon fish and damaging nets. They have some commercial value, however, in that they may be utilized in the production of fish meal and oil.

Canada's trade commissioner at Calcutta has reported that there would seem to be "a good opening" for the sale of Canadian canned pilchards in Burma in normal times, if packers will take care to meet the requirements of the market. In North America pilchards are sometimes called "California sardines," and it is as sardines that they must be put on the Burmese market.

BUSINESS GROWS IN HALIBUT LIVER TRADE

Fishermen of Both Canadian Coasts Making Sales in New By-product Field

Halibut livers used to be only so much waste, or perhaps they were sometimes included in fish scrap used in reduction plants in making fish meal and commercial fish oil, but now they're worth real money in their own right, and last year 2,200 hundredweights of them were marketed from British Columbia's fisheries. Some sales were also made by Atlantic coast fishermen.

The halibut's liver took on value a year or two ago when science found out that, like the liver of the codfish, it has a vitamin richness which makes its oil an effective builder and protector of health. Medicinal halibut liver oil was put upon the North American market and some of the producing firms looked to both coasts of the Dominion for steady sources of liver supply. The main Canadian purchases have been made in British Columbia, whose halibut fishery is on a big scale, but last year some livers were also bought in Atlantic areas. Presumably the business on each coast will expand with the years. The price paid for the livers fluctuates more or less, of course, but the average amount obtained by British Columbia sellers in 1932 was about 13 cents a pound.

New B.C. Development

It is interesting to note, too, that in addition to doing a fairly substantial business in halibut livers last year some of the British Columbia fishermen also marketed cod livers for use in oil production. Hitherto the cod liver oil business of Canada has been centered on the Atlantic coast where the output has sometimes been more than 100,000 gallons in a year. British Columbia's sale of cod livers in 1932 was not large—approximately 250 hundredweights with a marketed value of a little less than \$4,700—but now that a start has been made the business may grow, although the cod fishery is on a much smaller scale on the Pacific coast than it is in the Dominion's Atlantic waters.

An authoritative cook-book, "Fish and How to Cook It," is obtainable from the Department of Fisheries, Ottawa, at ten cents a copy. Both English and French editions have been issued.

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IMPROVED METHODS BUILD UP SALES FOR MARITIME PROVINCE FISHERMEN

Orders for 3,000,000 Pounds of Pickle-Cured Cod Placed by Buyers who Stipulate Product Must be Prepared According to Method Shown by Demonstrators Sent out by Dominion Fisheries Department

For the past three or four years the Dominion Department of Fisheries has annually sent several experienced and expert men into different codfishing areas in the Maritime Provinces to demonstrate the most approved method of preparing pickle-cured fish, and one striking result is seen this year in the fact that Massachusetts importers have placed orders for some 3,000,000 pounds in Prince Edward Island and Eastern Nova Scotia on condition that the product is prepared in accordance with the instructions the department has been giving.

In Prince Edward Island one of the big Massachusetts firms will make purchases in at least ten areas, whereas in 1932 its island buying was done at only two points. At certain places in Cape Breton contracts have been made for the season's output of pickle-cured cod. United States buyers, impressed by the satisfactory quality of the fish produced last year in districts where the department's instructors had been at work, have placed substantial orders at several points on the eastern mainland of Nova Scotia where, otherwise, operations would have been negligible or virtually so.

Pickle-cured fish is used in the production of boneless cod but, of course, the curing must be properly done or the finished product will be of inferior quality. In various Atlantic coast areas the curing has been very well done for many years past but in parts of the Maritime Provinces the situation was not so satisfactory a few seasons ago and in some other places pickle-curing of cod was not undertaken at all. Prince Edward Island was a province where buyers found difficulty in obtaining satisfactory supplies of pickle-cured, and the island was actually im-

porting boneless cod for its own use, so in 1929 the Fisheries Department began demonstration work there. The demonstrators showed men in the fishing communities approved methods of handling their fish by bleeding them and splitting them carefully and they also gave expert advice as to cutting, salting, etc. Before long Prince Edward Island producers were supplying Prince Edward Island demand for boneless codfish, and sales were being made to the United States. In 1930 over a million pounds of pickle-cured cod from the province was sold to United States buyers who had not previously been making purchases in the island.

Extended to Nova Scotia

Demonstration work was continued in the island province—for a time it included the use of departmental demonstration boats to show improved methods of fishing—and a year or two ago it was extended to Cape Breton and some other parts of Eastern Nova Scotia. In some of these places the production of pickle-cured cod for use in preparing the boneless commodity had not been carried on, and elsewhere the fishermen had not followed the most efficient method. The fishermen in all these areas, like those of Prince Edward Island, showed keen interest in the demonstrations and they have been very intelligently applying what they learned so that, as noted, they are turning out a product which commends itself highly to the buying companies and thus are opening up an improved outlet for their catches.

Demand for pickle-cured cod will, of course, always fluctuate with the times. But the demand for the properly cured fish will always be better than that for

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ATLANTIC SALMON CATCH RISES SHARPLY

Landings of Valuable Food Fish Increases in all Eastern Provinces

Featuring commercial fishing results in the Atlantic coast provinces in June was a sharp rise in the landings of salmon.

All told, the catch for the month in the four provinces was 25,787 hundredweights as compared with only 19,391 in June of last year and it had a landed value to the fishermen amounting to \$243,382 as compared with \$170,935.

In New Brunswick, the biggest producer, the catch was 15,137 hundredweights, an increase of about 34 per cent over the figures for June, '32. Quebec's commercial fishermen landed 5,901 hundredweights and in Nova Scotia the catch was 4,731 hundredweights, a gain of nearly 1,600 hundredweights in the one case and 1,008 in the other. Salmon are never taken in large numbers in Prince Edward Island's fisheries and the June catch was only 18 hundredweights, but that represented an increase, too.

In British Columbia, the great salmon producing area of the Dominion, most of the annual catch is marketed in the canned form but on the Atlantic coast practically all of the salmon taken in the commercial fishery are sold fresh or frozen. While the Atlantic salmon—*Salmo salar*, to give the fish its scientific name—is important from the commercial standpoint it is also one of the best of the Dominion's sport fish. Large numbers of sportsmen from the United States, and some from farther afield than that, come to Canada each year to fish for salmon on various well-known streams in the Atlantic provinces, and, of course, many Canadians are also among the anglers. It is because of the importance of this fish, both from the standpoint of the angler and the standpoint of the fishing industry, that the Dominion Department of Fisheries gives a good deal of attention to conserving and building up the salmon stocks.

FISHERY EXPERIMENTS INDICATE WAY TO PREVENT DRYING IN COLD STORAGE

Experimental Operations Show Dehydration of Frozen Fish Held in Air-Tight Boxes with Air-Locked Lids Less than One-Seventieth as Great as in Ordinary Cold Storage Room

Studying the important question of how to prevent dehydration, or drying, in the case of frozen fish held in storage, investigators working under the Biological Board of Canada, which operates under the control of the Dominion's Minister of Fisheries, have carried out experiments in which dehydration was practically eliminated in an ordinary cold storage room through the use of air-tight boxes equipped with oil-sealed or air-locked lids.

As is pointed out in a report by the investigator who was in charge of this particular work at the board's Pacific Fisheries Experimental Station at Prince Rupert, B.C., these experiments made it clear that for a given area of exposed surface "the rate of dehydration in an ordinary cold storage room is nearly seven times that of a 'jacketed' room in which there was an air leak and over seventy times that which took place in an air-tight box in which the loss was 0.02 pounds in 33 days or 0.004 pounds per week."

These results point to the possibility of using shallow air-tight boxes equipped with air locks to prevent dehydration in the ordinary cold storage chamber. While they could not be adapted very well to the storage of fish frozen whole they would be suited to the handling of packaged products.

To Preserve Quality

To prevent food products such as fish from drying out while they are held frozen in storage is, obviously, of first rate importance—though far from being as simple a matter as the layman might perhaps suppose—and the information brought out by the Prince Rupert experiments, and by other cold storage studies by the Biological Board's research workers, is at the disposal of refrigerating engineers and the fishing industry for application in storage operations. Similarly, of course, the results of research done by the board's staff in other fisheries fields have also been freely at the disposal of the fishermen and fish companies. The board exists to further Canadian fisheries progress by means of scientific study and experimentation and much of the work which it has done in the past has proven valuable to the fishing industry.

Prevention of dehydration of frozen products is largely dependent upon the maintenance of uniformity of temperature within the cold storage room. In the ordinary cold storage room, however, "the air adjacent to the (refrigerating) pipes is cooled below its dew-point, so that some of the moisture previously picked up from the product is deposited on the coils, and the cooled air, on subsequent warming, is free to pick up more moisture from the product, thus acting as a conveyer of moisture from the product to the coils." Working on this temperature problem a year or two ago, one of the board's Atlantic coast investigators devised a method of producing uniformity by means of the "jacketed" cold storage room, the main feature being a moisture-proof chamber surrounded by a jacket through which refrigerated air is circulated mechanically. Theoretically, such a room should eliminate dehydration but tests of one type of construction did not show this result, and the Prince Rupert station undertook further experiments.

These experiments consisted of studies of the effect of the jacketed system of cooling upon the distribution of temperature within the room, the effect of exchange between inside and outside air upon dehydration, and the influence which variations in the exposed area of the product has upon dehydration. The details of the work, some of them rather technical, need not be given here. Suffice it to say that in the first and second studies a jacketed room was used but in the third the investigation was carried out with "the room operating as it would be operated commercially, namely, with the inner door gasketed." The equipment used also included, of course, very exact thermometers, etc.

In addition to indicating the possibility of using air-tight boxes with oil-sealed or air-locked lids to prevent dehydration in the ordinary cold storage room, the experiments showed, among other things, that temperature within the jacketed room could be kept uniform to within 0.44 degs. Centigrade; for the room investigated, dehydration "was found to vary with the surface

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HOLD 1,600 SALMON IN PONDS FOR EGGS

Holding Parent Atlantic Fish in Retaining Pools for Spawning Important Fish Cultural Step

Over 1,600 "early run" Atlantic salmon are now being held in various salmon ponds operated by the Fish Culture Branch of the Dominion Department of Fisheries in the Maritime Provinces and from them there will be obtained in the autumn a supply of eggs for incubation in departmental hatcheries so that next year desired fry will hatch out for distribution in maintaining and building up the commercial and sport fisheries. Precisely what number of eggs these fish will yield remains to be seen, of course, but the fish culture people estimate that there will be 7,000,000 or more, and the number will be increased by other quantities collected from later run fish at several points.

Of these sixteen hundred and more parent fish which were captured in June and placed in the ponds, nearly 200 are being held in the Margaree River, a famous angling stream in Cape Breton, slightly more than 200 are in the Nictaux pond in Western Nova Scotia, close to 500 are at New Mills in the Chaleur Bay area of New Brunswick, and 740 in the St. John pond, which is in the mouth of Little River. All of them, except those in the Nictaux pond, were obtained from local commercial fishermen, and, of course, care was taken to see that the fish were satisfactory specimens in first rate condition. The salmon for Nictaux were taken by fish culture employees as the fish made their way up the fishway in the Nictaux River. When spawning time comes, the eggs will be stripped from the female fish, fertilized with milt from the males, and then placed in the hatcheries for incubation. The spawned fish will be freed after stripping.

At the Margaree pond an experiment is being tried this year in retaining the salmon in twine enclosures at a selected spot near the mouth of the river instead of in the regular salmon holding pond which has been used in the past. There is a brisk current at the chosen spot and tests have shown that the water temperature there is rather lower than that normally obtaining in the regular pond. The use of twine enclosures for holding salmon has been

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FISH THAT USES SWORD AMONG FARES TAKEN IN FISHERIES OF DOMINION

Swordfish of Canada's Atlantic Waters, Excellent Food Fish Taken by Harpoon Thrust from "Pulpit" —Big, Powerful Creature Sometimes Pierces Boats with Savage Sword Blow

"And in the afternoon," wrote an Old World adventurer in 1674 in the course of his 'Account of Two Voyages to New England,' "We saw a great fish called the Vehulla or Sword-fish, having a long, strong and sharp fin like a sword blade on top of his head, with which he pierced our ship, and broke it off with striving to get loose."

Perhaps Nova Scotia boats, like the explorer's vessel, will be pierced by savage thrusts from some of these "great fish" in the next few weeks, for this is the season for taking swordfish off that province and it is not a rare thing for one of them to drive its "sword" into the planking of the fisherman's craft as it battles fiercely against capture.

Big and powerful, rivalling the larger sharks in size and strength, and sometimes weighing as much as 800 pounds, though considerably less heavy than that on the average, of course, the swordfish is "a worthy antagonist," as one authority has put it in writing of the swordfishery in North American waters, "and many a (fishing) vessel has limped into port leaking badly as a result of attacks by wounded swordfish. Occasionally a small boat is attacked and the sword rammed clear through its side. Once the sword punctured two inches into the heel of a sailor standing in a boat." Another authority speaks of the fish as striking with the force of "fifteen double hammers and with the velocity of a swivel shot."

Its size and strength, and its possession of a "sword" of its own—which, by the way, is not a "fin on the top of its head" but a prolongation of the upper jaw—makes the swordfish an interesting sea creature, but it is more than that. It is an excellent food fish, with tasty, firm, nourishing flesh. In the Dominion's fisheries it is taken commercially off Nova Scotia only. Except in Atlantic coast areas it is not as well known to Canadian consumers as it deserves to be on its merits as an attractive food, but it is highly regarded in the United States market, as well as in various other countries, and much the greater part of Canada's annual catch goes to such cities as Boston and

New York. In each of the last two years more than 1,000,000 pounds of Nova Scotia swordfish were sold across the international boundary.

This sword-carrying fish, which was named *Xiphias* by Aristotle many centuries ago and is now known scientifically as *Xiphias gladius*, occurs in different parts of the world and on North America's Atlantic coast. Its range is from Cuba to Cape Breton. It is off the latter island that much the larger share of Nova Scotia's catch is taken, and in 1931, for instance, two of the island counties, Cape Breton and Victoria, accounted for about 1,198,000 pounds of provincial landings totalling 1,263,000 pounds.

Harpoons from "Pulpits"

The Nova Scotia swordfish season is, roughly, from June to October, but it is in August that most of the catch is ordinarily made. Then the fleet of swordfishing vessels are all on the alert. The lookout on each boat scans the sea closely. When Fortune favours and a fish is sighted, its tail fins and the tips of its back breaking water, the boat's course is set for it. One of the fishermen takes his place in the "pulpit," a stand at the end of the bowsprit, and waits with his harpoon ready.

When the boat is within a few feet of the big fish, the harpoon is rammed home, and the struggle is on. In course of time the fish is conquered, brought along side, and given its final quietus. A little later on, with head, tail, and entrails removed, it is ready for shipment to market, all of Nova Scotia's swordfish catch being marketed in the fresh form. Shipments are made in large wooden boxes, with ice packed about the fish to ensure good marketable condition when the destination is reached. Like every other variety of fish, the swordfish has its own distinctive flavour and broiled, or prepared for the table in various other ways, a piece of this big fellow makes excellent fare.

Four per cent more people were employed in New Brunswick's fisheries in 1932 than in the preceding year, or a total of 15,764.

BIGGER JUNE CATCH BY SEA FISHERMEN

Increased Quantities of Commercial Fish and Shellfish Landed on Dominion's Coast

Canada's sea fishermen brought ashore more fish and shellfish in June than they had landed in June, 1932.

On the Atlantic coast there was a gain of 9,780 hundredweights and in British Columbia a gain of 8,133, with the total catch for the two coasts amounting to 702,352 hundredweights.

The landed value of the fish and shellfish to the fishermen was \$1,598,200, in round figures, which meant a small increase, about \$4,900. This dollars-and-cents betterment was chiefly due to enlarged returns from the Pacific coast salmon and halibut fisheries and from the salmon fishery of the Maritime Provinces and Quebec. British Columbia landed value was "up" about \$89,000 in the aggregate but on the Atlantic coast there was a decrease of \$84,150, chiefly because of a sharp drop in lobster production.

All of the figures, which have been collected by the Dominion Department of Fisheries, are subject to final revision but they may probably be taken as approximately correct.

The outstanding result of the June operations in British Columbia waters was the improved showing in the halibut fishery. About 25,100 hundredweights of halibut were taken, or some 5,950 hundredweights more than were landed in June of last year. Their landed value total, \$111,820, showed a gain of over \$37,000. The other Pacific coast feature, as already indicated, was an increase in the salmon fishery returns. The catch of the salmon for the month was not as large as a year ago but landed value rose to \$238,400, as compared with something under \$193,000. There were gains, too, both in catch and value, in the case of British Columbia's herring and ling cod fisheries and one or two others. Altogether, 81,585 hundredweights of fish and shellfish were taken by the fishermen of the province and the landed value of the catch amounted to \$308,950.

In Eastern Waters

On the Atlantic side of the country the New Brunswick fishermen were more successful than in the preceding June, landing a bigger catch and getting an increased money total for it as landed.

(Continued on page 4)

DOMINION'S FISHERIES OUTPUT FOR LAST YEAR VALUED AT \$26,000,000

Canada's fisheries production in the calendar year 1932, as shown by statistics prepared for publication by the Dominion Department of Fisheries and the Dominion Bureau of Statistics jointly, had a marketed value of nearly \$26,000,000—to be exact, \$25,997,133. Of this total, \$21,763,111 came from sea fisheries production and \$4,194,022 from the inland or freshwater fisheries.

The year's aggregate was less by \$4,560,173 less than the 1931 total, and the falling off is explained, of course, by the disturbed world economic conditions which prevailed. Fish were as plentiful as ever in Canada's vast extent of fishing waters but marketing was difficult and prices low. The Domin-

ion's fisheries figures will climb again as normal world conditions return.

Fisheries production value showed a decrease in each of the provinces and in the Yukon Territory in 1932, although in Alberta there was a drop of only a couple of hundred dollars and the Manitoba decrease was relatively small. By provinces, the marketed value was as follows:—

British Columbia.. . . .	\$9,909,116
Nova Scotia.. . . .	6,557,943
New Brunswick.. . . .	2,972,706
Ontario.. . . .	2,147,990
Quebec.. . . .	1,815,544
Manitoba.. . . .	1,204,892
Prince Edward Island.. . . .	988,919
Saskatchewan.. . . .	186,174
Alberta.. . . .	153,789
Yukon Territory.. . . .	20,060

WARNS HERRING MEN OF IMPORTER'S FRAUD

Writing to Ottawa one of Canada's trade commissioners abroad has recently given warning that a firm in his territory has been obtaining some shipments of herring bloomers from several different producers in New Brunswick and failing to make payment for the fish. Cases of this kind are fortunately not common but one of them is enough to emphasize the point that Canadian exporters receiving orders from foreign buyers with whose financial standing and business reputation they are not acquainted should take steps, before making shipments, to obtain reliable information as to the buyers' good faith and ability to pay. Such information is obtainable from Canadian Government Trade Commissioners as to importers in their respective territories, and the commissioners make no charge, of course, for supplying it to Canadian exporters.

NEW PORTUGUESE DUTY ON FRENCH CODFISH

Under a recent decree the government of Portugal, a country which is one of the markets for Canadian dried codfish, has levied a special anti-bounty duty equal in Portuguese money to the French export bounty of eighty francs per 100 kilograms. The duty also applies to cod caught by French vessels and taken into Portugal directly from the fishing grounds.

IMPROVED METHODS (Con.)

fish put up in more or less haphazard or slapdash fashion, and the experience of the fishermen in the districts where the departmental demonstrators have been working proves the point. Further demonstration work in this particular field is being done this year. Other educational work done by the department with a view to assisting the fishermen to maintain high quality of production includes demonstration of the "Gaspé cure" method of drying cod in appropriate districts, spreading of information by fisheries inspectors who have been required to take special courses of study to qualify them to explain and demonstrate different fish handling and processing methods, and the holding of an annual instructional course for fishermen which is given by the Biological Board of Canada at its Fisheries Experimental Station at Halifax, N.S.

Over 5,000 drift nets, valued at nearly \$868,000, were used in British Columbia's fishery operations in 1932.

CAVIAR, SALMON ROE IN FISHERIES OUTPUT

More than 320,000 pounds of salted salmon roe and about 2,780 pounds of caviar made from sturgeon eggs were included among the by-products of the Dominion's fisheries operations in 1932. The caviar, all of it put up in Ontario, although in some years there is also caviar production in one or two other provinces, had a marketed value of a dollar a pound, and the salmon roe was worth, in all, \$3,640. All of the drysalted salmon roe was prepared in British Columbia but the output was much smaller than in the year before. Fifteen Pacific coast plants processed roe in the course of their other operations.

FISHERY EXPERIMENTS (Con.)

exposed to drying approximately as the cube root of the area;" and in a jacketed room a horizontal hatchway instead of the ordinary type of vertical door "would permit the use of an oil seal or air lock, in place of gaskets, and would decrease (temperature) disturbances due to the opening and closing of doors."

HOLD 1,600 SALMON (Con.)

tried out successfully for several years in fish cultural operations by the department in the Morell River, Prince Edward Island, and like results are hoped for from the Cape Breton trial. The Margaree enclosure is 45 feet by 20 feet in size and has a depth of 10 feet.

BIGGER JUNE CATCH (Con.)

The situation was otherwise in each of the other provinces—Quebec, Prince Edward Island, and Nova Scotia—but, so far as catch was concerned, the New Brunswick gain offset the decreases elsewhere and for the coast as a whole the landings were 620,765 hundredweights as compared with less than 611,000 hundredweights a year ago. Total landed value, however, was only \$1,217,235 as against \$1,301,385 in the 1932 month. There was value gain in the case of several of the fisheries but the landed value of the lobsters taken, \$479,785, showed a decrease of more than \$199,000. Lobster landings fell off in each of the four provinces except Quebec and totalled approximately 109,300 hundredweights as compared with 128,200 hundredweights last year.

In Nova Scotia the catches in most of the principal fisheries, except the halibut, herring, and mackerel fisheries, were smaller than a year ago. In Prince Edward Island the mackerel catch increased but other catches diminished. Quebec's fishermen increased their landings of cod and salmon and lobster but took fewer herring, mackerel, etc. Gains in the landings of sardines, salmon, and cod featured the New Brunswick operations. The sardine catch, more than 12,300 barrels, was not very far short of being three times as large as the catch in June, '32, and 21,460 hundredweights of salmon were taken as compared with only 11,335 hundredweights.

FISHERIES NEWS BULLETIN

Acting Minister:

Hon. A. DURANLEAU, M.P.

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W. A. FOUND

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YEAR'S INSPECTION OF FISH PRODUCTS COVERS MORE THAN 1,200,000 PARCELS

Great Quantity of Canned and Cured Fish Inspected by Expert Dominion Officers in 1932 in Safeguarding Quality of Canadian Fisheries Production

In the course of last year more than 1,202,000 cases, barrels and boxes of Canadian fish products were inspected, before marketing, by officers of the Dominion Department of Fisheries and members of the federal Board of Canned Salmon Inspection.

Such inspections—some of them made under the Fish Inspection Act and some under the Meat and Canned Foods Act—are a major part of the program continually in operation by which the department seeks to ensure quality fisheries production and thus, at one and the same time, to safeguard the consumer's interests and to aid the fishing industry in marketing its goods to advantage both at home and abroad.

In addition to the inspection of these 1,202,000 packages and cases of finished products, a great many million pounds of fish foods, the 1932 work included inspection of fish canneries and curing plants in areas where the fisheries are administered by the Dominion authorities, inspection of the raw materials and processing methods used in canning and curing, grading of lobster canneries, and the inspection of some 46,000 barrels and other containers intended for use in marketing certain products which come under the Fish Inspection Act.

On the Atlantic coast (in the three Maritime Provinces and the Magdalen Islands) the department's regular Fisheries Inspectors passed upon the following quantities of different products which are subject to the Fish Inspection Act:—

	Packages
Smoked Round Herring.....	158,915
Pickled Mackerel	12,455
Pickled Alewives	6,307
Pickled Herring	4,583
Oysters in shell	4,458

These officers, all of them trained for inspection work by special courses of study taken at one of the stations of the Biological Board of Canada, also

carried out the inspection of fish barrels and other containers under the Fish Inspection Act, and gave attention to the sanitary and operating conditions of the curing plants. Applying the Meat and Canned Foods Act, they inspected the fish canneries of their territories, the canneries' raw materials and methods, etc.

On the Pacific Coast

In British Columbia the biggest accomplishment of the year, in the inspection field, was the effective institution of a system whereby every shipment of canned salmon was made subject to inspection before its movement to market. This system became operative in the early summer of 1932 and by the end of the year the number of cases of salmon which had been inspected had reached almost 968,500.

This canned salmon inspection is conducted by a permanent board of experts appointed by the Dominion Government, and it is a gratifying evidence of the excellence of the British Columbia pack that out of all the 968,500 cases inspected last year less than 12,000 were below certificate standard, and of this 12,000 only 1,893 cases were under "Second Quality" and, therefore, could not be allowed to be sold. ("Second Quality" salmon may be marketed but only if each can bears the quoted words in conspicuous letters of specified size.)

During the year inspection of dry-salted herring was continued by the department's Fisheries Inspectors in British Columbia under the Fish Inspection Act, and fish canneries and curing plants were also inspected under the federal laws. The pack of dry-salted herring, however, was far below normal—a result of the disturbed conditions in China, where this product is marketed—and the number of boxes inspected by the officers was only 47,150.

LOBSTER STIMULUS FOR STOMACH JUICES

Significant Point Brought Out by Investigation by Dominion Fisheries Scientists

Investigation carried on by Dominion fisheries scientists has disclosed that the flesh of the lobster is a powerful stimulus for the juices of the stomach.

Previous work done in this field at the Atlantic Biological Station of the Biological Board of Canada—the fisheries research body operating under the control of the Dominion Minister of Fisheries—had shown that the flesh of the haddock causes the stomach to secrete its juices in much the same fashion as beef, and the later studies have now revealed that lobster causes considerably more juice to be secreted than is the case when haddock is eaten. Lobster meat, says a progress report by the Biological Board research worker who has been dealing with this particular problem, "stimulates the stomach glands to produce a much greater volume of the juice and also a higher amount of the digestive enzyme."

Four Species Studied

In carrying on the research the investigator did not consider lobster and haddock only, but cod and mackerel as well. What he found was that "a far greater amount of juice was poured from the stomach walls upon 250 grams of lobster than upon the same amount of cod, haddock, or mackerel. It is therefore believed," he writes, "that this large amount of juice should greatly facilitate the digestion of lobster. This fact"—and here is one of the important points—"should be of great value to people suffering from a functional depression of the stomach juice."

So far as volume of juice secreted is concerned, the tests showed lobster flesh the greatest stimulus, then mackerel, then haddock, then cod. Lobster ranged well ahead but there was not a very great spread between mackerel and

(Continued on page 2)

DOLLARS AND CENTS RETURNS TO SEA FISHERMEN SHOW INCREASE FOR JULY

Rise of Half Million Dollars in Landed Value of British Columbia Salmon Catch Major Factor in Gain—Salmon Returns on Atlantic also Up—Halibut Fishery Better East and West—Other Changes

Landed value of Canada's catch of sea fish and shellfish in July was greater by almost \$538,000 than it was in July, 1932, thanks, chiefly, to a sharp rise in the return from the British Columbia salmon fishery.

Salmon prices generally in British Columbia were higher than a year ago and though the landings, 244,000 hundredweights, were only some 3,000 hundredweights larger than in July of 1932, their value to the fishermen, as landed, was slightly more than \$1,469,000, a gain of nearly \$503,000.

On the Atlantic coast, too, the salmon catch was bigger than in the preceding July and in its landed value to the fishermen showed an increase of more than \$29,300.

Landed value also increased in several of the other important fisheries—as, for instance, the halibut fishery both east and west and the lobster fishery of the Atlantic area—and the total sea fisheries figure for the Dominion was \$2,291,600, as compared with less than \$1,754,000 in July, 1932. On the Pacific coast there was a value gain of nearly \$539,650, but in the Atlantic provinces a decrease of about \$1,680.

Catch Not So Big

Total catch for the month—it should be remembered that it is results from the sea fisheries only which are dealt with here—was less than a year ago, 89,314,000 hundredweights, in round figures, as compared with something more than 96,571,000 hundredweights. The drop was due to smaller landings on the Pacific coast, where the pilchard fishery was virtually a failure.

The quantity of pilchards taken by the British Columbia fishermen during the month was only 6,253 hundredweights, relatively a trifling catch, as compared with 128,060 hundredweights in July, 1932, and this decrease more than offset gains in other fisheries, with the net result that the total landings of all species of Pacific fish and shellfish fell off by 112,895 hundredweights. On the other hand, the Atlantic fishermen increased their total catch by 40,320 hundredweights.

On Two Coasts

Atlantic coast results were featured by a tidy gain, about \$32,400, in the landed value of New Brunswick's catch, and by increased returns from the halibut, mackerel, salmon, and lobster fisheries in Nova Scotia, the sardine, salmon, hake, and herring fisheries in New Brunswick, and the salmon and lobster fisheries in Quebec. In the case of Prince Edward Island there was a gain in cod, hake, and mackerel catch but value figures did not increase. New Brunswick's gain in landed value aggregate was chiefly due to increases in the catches of hake, sardines, and salmon. The hake landings, 29,308 hundredweights, were more than three times as great as a year ago, and 21,290 barrels of sardines were taken, as against only 3,830 barrels.

As already indicated, the rise in salmon landed value was outstanding in British Columbia operations, with the drop in pilchard fares the unfortunate feature. An increase of some 2,300 hundredweights in halibut catch, which amounted in all to 24,410 hundredweights, and a gain of \$41,150 in landed value, was another noteworthy Pacific coast result. Herring, ling cod, clam, and crab figures were also somewhat better in British Columbia than a year ago.

LOBSTER STIMULUS FOR STOMACH JUICES—Conc.

haddock or haddock and cod. In the case of the digestive enzyme the greatest stimulus to output was given when lobster was taken, but both haddock and cod had more effect than mackerel.

"After cod and haddock there was a much larger volume of juice secreted in the first hour than in the second hour. After lobster and mackerel the volume of secretion was less in the first hour than in the second hour, that of lobster being only slightly less but that of mackerel being decidedly reduced."

More than sixty different kinds of food fish and shellfish are taken every year by Canada's commercial fishermen. No Canadian need buy imported fish.

INLAND FISHERIES 1932 OUTPUT \$4,195,000

Ontario Production First on Value Side of Account with Manitoba Second

Twelve different varieties of food fish were taken in Ontario's commercial fishing operations in 1932, or, rather, to be strictly accurate, the catch was made up of these twelve varieties plus landings of two or three other kinds which were not sufficiently important from a business standpoint for the species to be listed separately.

Here are the twelve, named in order of marketed value: Trout, whitefish, perch, pickerel, blue pickerel, herring, tullibee, sturgeon, pike, catfish, carp, and eels. In point of size of total catch, perch were in first place, with whitefish, trout, and blue pickerel following in turn. The smallest catch was of eels.

Altogether, and including certain relatively unimportant fish which in the catch statistics are grouped under the heading "Mixed Fish," the provincial landings for the year aggregated 308,600 hundredweights, in round figures, and their total value on the market was \$2,148,000. Trout catch accounted for nearly a quarter of the value total, and whitefish for not much less than that. The number of fishermen engaged in the year's operations was 3,816 and they used vessels, boats, nets, piers, etc., representing a capital investment of a little over \$2,920,400.

In Other Provinces

Ontario is one among seven divisions of the Dominion in which freshwater fishing is carried on commercially, the others being the three Prairie Provinces, the Yukon Territory, Quebec, and New Brunswick. (The two latter provinces, of course, also have important sea fisheries resources.) Last year the total value of the production from these inland fisheries was something under \$4,195,000. As already indicated, the marketed value of the Ontario catch was \$2,148,000, and next to Ontario in this respect came Manitoba—\$1,204,900, roundly stated. Quebec came after Manitoba with a value total of \$452,565, then Saskatchewan, \$186,175, Alberta, \$153,790, New Brunswick, \$28,550, and the Yukon Territory, \$20,060. In some other years, when general economic conditions were more favourable, the return from the inland fisheries has been substantially larger than it was in 1932.

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PACK OF SOCKEYE AND PINK SALMON BY BRITISH COLUMBIA CANNERS INCREASES

Total Cannery Output for Period Ending in Early August Reduced When More Salmon Used for Fresh Fish Markets and Mild-Cured Trade

Reports received by the Dominion Department of Fisheries from its British Columbia officers show that up to the early part of August more sockeye and pinks were processed in the salmon canneries of the province than were packed in the corresponding period of 1932 but that other species of salmon were put up in smaller quantities than a year ago. The net result of gains and decreases was that the total pack, as of August 5, was about 384,650 cases, or approximately 37,800 cases, below the 1932 figures. The canning season, of course, will continue for two months or more yet.

While the pack so far has been smaller than in the like period of last year, it is noteworthy that one reason for this condition has been that substantial quantities of fish which in other seasons would have been canned have this year been prepared for sale in the fresh and frozen forms in order that advantage might be taken of improved marketing opportunities in the United Kingdom. A sharp expansion in the production of fresh and frozen salmon has been taking place. There has also been expanded production of mild-cured salmon.

Canning Results

So far as the pack of canned salmon is concerned, slightly more than 220,500 cases out of the total production of 384,650 cases at August 5 were sockeye. This sockeye output represented a gain of nearly 17,000 cases over the pack at the same date in 1932. The production of pinks was 101,230 cases, a gain of about 27,200 cases. The run of pinks in some areas such as the Naas and Skeena rivers was greater than expected and the packs in these districts exceeded the quantities put up there in the brood year for the run, 1931.

The sockeye is the most valuable salmon of the Pacific. The pink does not have such richly coloured flesh as the sockeye and does not command as high a price but it is an excellent, nourishing fish, as are all salmon, and it sells in large quantities.

The pack of springs, up to August 5, showed a sharp decrease, dropping to slightly more than 9,900 cases, as compared with 48,622 cases in the corre-

(Continued on page 4)

FISH CULTURE BUILDS UP ALBERTA'S TROUT

Results of Dominion Fish Culture Seen in Expanded Western Angling Resources

Word comes from Alberta of thrilling sport fishing in different waters where the trout supply has been built up through the action of the Dominion fish culture workers in stocking these areas with rainbow and cutthroat eggs and fry a few years ago. Until this stocking was undertaken, some of these waters held neither rainbow nor cutthroat and in others the fishing was poor.

One of the spots where splendid fishing has been developed is Marvel Lake, which lies within the boundaries of Banff National Park and was stocked with cutthroat eggs and fry by the Fish Culture Branch of the Dominion Department of Fisheries in the period from 1926 to 1930. One angler who went to Marvel early in August brought home with him a trout measuring 21 inches in length, as well as other fish. Another sportsman went the first chap one better and after a great battle he landed a cutthroat which made the tape measure stretch to 25 inches. Others have had to be content with somewhat smaller fish but everybody has had the same story—excellent sport, with the trout showing persistent fighting spirit.

Barren No More

Similar reports come from Southern Alberta where the Dominion authorities distributed trout fry, etc., in different streams several years ago when the administration of fisheries of the province was still in federal hands. Writing to Ottawa recently the Alberta Director of Fisheries said that "Excellent fishing is being obtained in the Bow river from Calgary to six miles east of Carlsbad, and fish up to 4½ pounds are being taken quite frequently. Before the rainbow were introduced, this part of the Bow was practically barren of trout.

(Continued on page 4)

FISH VAGARIES COST FISHERMEN DEARLY

Eccentric Wanderings of Pilchards of Pacific Coast Puzzling and Costly

What whim of fancy has seized the pilchards?

Where are their wandering "schools" this year?

Ordinarily the pilchards strike in off Vancouver Island, B.C., in abundant quantities in July and make brisk work for seine boat fishermen, workers in plants producing fish meal and oil, and employees of several canneries, but this year the fish haven't appeared except in very small numbers, or, at all events, up to a short time ago the big schools had not shown up. In July the fishermen landed only 6,250 hundredweights as compared with 128,000 hundredweights in July, 1932.

The case is another example of the difficulty which may confront the fishing industry because of conditions entirely beyond its control and beyond the power of man to forecast with certainty. The failure of the pilchards to appear as usual is a serious matter for something like 400 wage-earners—about 240 seine boat fishermen and the others the employees in pilchard plants ashore—as well as for those with capital invested in pilchard undertakings.

Where the pilchards are wandering instead of frequenting their usual waters nobody yet knows. Vigorous search has failed to locate the schools. What vagary has led them elsewhere nobody knows, although light on this point may be obtained by investigations into the life history and habits of the fish which federal fisheries scientists have been carrying on for several years.

Search Wide Area

When the fish did not appear at the beginning of the season in early July, seine boat crews scoured the seas off the west coast of Vancouver Island where pilchards are ordinarily present in greatest abundance during the summer, but they searched without success. They went out to sea as far as 100 miles in an effort to locate the schools but they didn't find them. One of the ships of the Dominion Department of Fisheries, the *Givenchy*, went to aid the fishermen in the search, but had no luck. Later on another departmental ship, the *Malaspina*, was despatched to the

(Continued on page 4)

SEA-GOING DOCTOR BOON TO FISHERMEN

**260 Fishermen Treated by Doctor Sent
With Deep Sea Fleet by Dominion
Department**

Deep sea fishermen must face many hazards but for Canadians whose vessels go to the great banks off Newfoundland each year some of the risks are diminished by the action of the Dominion Department of Fisheries in sending a doctor with the fleet so that cases of sickness or accident may have prompt attention by a qualified physician and surgeon.

Last year this sea-going doctor treated 260 patients on the banks, which, by the way, are upland or hill portions of the ocean bottom and prolific sources of cod and some other kinds of fish. In 115 of the 260 cases surgical treatment was required, and the other patients were fishermen who had been taken ill with one sickness or another. In the preceding year, when the bank fleet was somewhat larger than in 1932, the doctor's cases numbered 362. Some of the cases handled each year are, of course, not serious but in others dangerous conditions would doubtless follow if treatment by a qualified practitioner was not promptly available.

The doctor travels on the fisheries protection vessel which the department sends to the banks with the fishing fleet each year. The fleet is away from port for a number of weeks, making catches for use in the dried fish industry, and while the vessels remain on the banks the departmental ship stays with them, not only that the doctor may be at hand but in order to render any assistance that may chance to become necessary. The other Canadian vessels engaged in the fishing industry are not at sea for any such length of time as this bank fleet and, hence, a doctor's presence with them is not necessary.

PACK OF SOCKEYE—Conc.

sponding period of last year. A large part of the catch of this species of salmon went into the fresh fish trade and the mild-cured trade.

Chum pack also decreased. So did the output of cohoes and bluebacks. The cannery handled somewhat more steelheads than last year, but the steelhead pack is never large.

Production from Quebec's cod fishery in 1932 was valued at approximately \$648,725. Most of Quebec's cod catch is marketed in the dried form.

MANY FISH DESTROYED BY SEA LION HERDS

Many fish bones lying about the sea lion rookeries west of Rivers Inlet, British Columbia, when the Dominion Department of Fisheries vessel *Givenchy* went to that area this summer on the annual lion hunt, gave further proof of the mammals' rapacity and the injury they may do to the fisheries. It is because these sea lions are a threat to the fisheries, especially the valuable salmon fishery, that the *Givenchy* is sent to the Pearl and Virgin rookeries every year to carry on a hunt for a few days and thus to keep the herds within something like reasonable limits. A great many people in British Columbia are dependent on the salmon fishery for a livelihood and in their interest the salmon runs must be safeguarded.

Although weather conditions were favourable during this year's hunt, at the middle of June, and more landings could be made at the rookeries than ever before, the number of lions destroyed was smaller than in 1932, or 923 as compared with about 1,100. The frequency of the landings probably made the lions even more wary than usual. Of the total number killed this year 710 were mature lions and 213 were pups.

FISH VAGARIES—Conc.

grounds, with four experienced pilchard boat captains aboard, to carry the "prospecting" further.

The pilchard fishery is normally one of the "Big Four" among Canada's Pacific coast fisheries, the others being the salmon, halibut, and herring fisheries. Most of the pilchards taken are used in making fish meal and oil, some are canned, and a few are sold fresh. The movements of the schools have always been more or less uncertain, for reasons not yet fully understood, but the present situation has come as a surprise. Next year the fish may abandon their 1933 eccentricity and be around Vancouver Island as usual.

The marketed value of the fisheries production of the Yukon Territory in 1932 was slightly more than \$20,000. Salmon, whitefish, trout, and suckers were the principal fish taken by the 38 men employed on fishing boats in the territory's waters.

FISH CULTURE BUILDS—Conc.

This season the fishing for rainbow in the Highwood river is good from the junction of the Bow westward to the Forest Reserve boundary, and I am informed by some of the best anglers in that district that as high as 80 per cent rainbow are taken by some of the fishermen." Word to the same general effect has also been received as regards sport fishing in such other Alberta waters as Willow creek and the Crow's Nest river. Anglers report that in the Crow's Nest the fishing has been better this year than for a great many seasons past.

Fish culture is not always an easy job by any means. Sometimes natural conditions make it impossible to stock streams successfully, and it is because they know that this is so that the fish culture officials invariably make very thorough examination of any area before going ahead to stock it. Canada's experience, however, and Canada, by the way, was the first country on this side of the ocean to undertake fish culture as a public enterprise, has been that intelligent, careful fish cultural effort produces gratifying results, both in maintaining and building up supplies of commercial fish, the branch of the work on which most emphasis is placed, and in extending and improving angling resources.

INLAND FISHERIES—Conc.

and when the world gets back to normal again the figures will increase once more for the freshwater fishery resources of the Dominion are extensive and capable of much greater production than has yet been taken from them in any year.

The fish which these inland waters produce are of excellent quality and well worthy of frequent place on the Canadian table. They're good eating, and good for you. They are appreciated, too, in the United States market, and in 1932 the exports of freshwater fish to the republic had a value of approximately \$2,950,000. Practically all of the Dominion's catch of these freshwater fish is marketed in the fresh and frozen forms, although in the case of goldeyes, which are taken principally in Manitoba, most of the yearly catch is smoked, and small quantities of tullibees and whitefish are also put up in the smoked form.

Sturgeon caviar is a by-product of the inland fisheries, but in 1932 Ontario was the only Canadian producer of this delicacy. Small quantities, however, are sometimes prepared in one or two of the other provinces.

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TAGGED FISH TELL STORY OF SEA TRAVELS OF SALMON FROM RIVERS OF DOMINION

Wanderings of Canadian Salmon and Some other Fish Traced by Means of "Tagging" Experiments Conducted by Fisheries Authorities and Research Scientists of Dominion

Mark a salmon from the St. John River in New Brunswick, then set it free again, and where is it most likely to be recaptured, if it is retaken at all?

The answer is, "Somewhere in the waters of the St. John district."

But tag a salmon from the Nictaux, a Nova Scotia river just across the Bay of Fundy from St. John, and when it sets out on its seaward travels it will probably head for Newfoundland.

Salmon spawn in fresh water and the Atlantic fish then go to sea (Pacific salmon die after spawning) but tagging experiments by Canadian fisheries authorities have indicated that there is marked variation in the distance that the salmon from different streams will go when they migrate to the salt water. For some reason or other, the St. John salmon do not seem to go far asea, but, on the other hand, their relatives from some other Maritime Province streams travel much farther away before shaping their course back to the spawning grounds again.

Home-stayers and Travellers

Last year, for instance, thirteen St. John River salmon which had been tagged by the Fish Culture Branch of the Dominion Department of Fisheries in 1930 were recaptured by fishermen in the ordinary course of their fishing, and every one of these fish was taken in the St. John district, which, of course, does not necessarily mean that they were taken right at St. John itself. In the case of Nictaux salmon tagged in 1931, however, four of the five which were retaken in 1932 were caught off Newfoundland. The only salmon recaptured last year from among the fish tagged at River Philip, Nova Scotia, in 1930 was also taken in a Newfoundland fisherman's net. Of nine fish from the

Morell River, Prince Edward Island, which were tagged in '30 and retaken in '32, five were caught in Newfoundland areas and four near their native province.

Fish marked in the Matapedia and New Mills areas of the Northern New Brunswick in 1930 were caught again last year in the same locality and none were reported as being taken farther afield. Six salmon from the Margaree River, Cape Breton Island, which had been tagged two years previously were recaptured in 1932 while visiting Newfoundland, three others were caught off the eastern part of the mainland of Nova Scotia, showing that there is some movement of Margaree salmon in that direction, and twenty-three were landed off the coast of Inverness, the county in which the Margaree is situated.

On Both Coasts

Tagging experiments have been conducted by the Dominion for a good many years past, both on the Atlantic coast and in British Columbia, and there have been interesting and useful results. The Fish Culture Branch has been dealing only with salmon in its tagging operations but tagging is also carried on by the federal fisheries research body, the Biological Board of Canada, which has tagged such fish as cod in addition to salmon. In brief, the purpose of the salmon tagging experiments is to gather further information as to the migrations of salmon, frequency of spawning, and the soundness of the "parent stream" theory, which is the theory that as the spawning season approaches the salmon, by instinct, always makes its way toward the same river system where its own life began.

Tagging itself is done by affixing a small, light metal marker in such a way

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OYSTERS SOURCE OF HEALTH MINERALS

Research Shows Shellfish Rich in Substances which Build up Blood

Consider the oyster for a moment.

It's looks may be a bit odd but "handsome is as handsome does" and the oyster, so scientific research has shown, stores up for those who eat it appreciable quantities of all the minerals which have been found essential to the normal functioning of the animal body. In other words, the oyster is an excellent food because not only does it supply protein, etc., but it also supplies necessary inorganic constituents, some of which are lacking in most other foods.

In Canada oysters may be obtained from both Atlantic and Pacific coast sources. New Brunswick is the biggest producer among the provinces, with Prince Edward Island normally ranking second, British Columbia third, and then Nova Scotia. The oysters from all of these areas are of good quality.

Research in Wide Field

Questions concerning oysters are only a few among many subjects which fisheries research workers in different countries have been carrying on in recent years, primarily with a view to assisting the further development of fisheries resources and the fishing industry. What gives cod liver oil its great health value, why is it that people who eat sea foods are less likely than others to develop goitre, what route do salmon take when they migrate, what's the likely abundance of mackerel in the Atlantic waters of North America from season to season, why are shellfish helpful in the diet of persons disposed to anæmia, what part does water temperature have in determining the movements of different kinds of fish, how may the "yellowing" of halibut after landings be prevented or the "blackening" of canned lobster—these and a host of other questions have commanded the attention of the research people, and in many cases with very useful results.

(Continued on page 4)

LARGE INCREASE IN HERRING CATCH ON ATLANTIC COAST, MORE SALMON LANDED IN BRITISH COLUMBIA

Increased Catches of Cod, Halibut, Sardines Also Reported on Atlantic Coast as compared with same Month of 1932

The fishermen on the Atlantic coast landed some 54,000,000 pounds of fish of all kinds during the month of August, for which they received approximately \$663,000. On the Pacific coast, there were landed slightly more than 52,300,000 pounds of all kinds, for which the fishermen received some \$1,257,884. While the increased landings on the Atlantic coast were largely in cod, herring, hake, sardines and the less expensive varieties of fish, the increase on the Pacific coast was in the landings of salmon, which accounts for the increased value. The increase on the Pacific would have been much larger had there been a normal catch of pilchards, but for some unexplained reason these fish did not show up and so were not taken in their usual quantities.

The following table shows the catch and landed value figures of the sea fisheries by provinces for the month of August as made up from the unrevised returns compiled by the Dominion Department of Fisheries:—

	Catch lbs.	Landed Value \$
British Columbia.....	52,332,800	1,257,884
Nova Scotia.....	26,823,100	312,032
New Brunswick.....	18,038,700	199,297
Quebec.....	9,887,700	110,753
Prince Edward Island.....	1,466,400	40,654

Atlantic Coast

In Quebec, New Brunswick and Prince Edward Island, large catches of cod were made, the increase in Quebec being somewhat over a million pounds. In Nova Scotia where the largest quantity is taken, there was a slight decrease. The total cod catch on the Atlantic coast was some 22,797,000 pounds, as compared with 22,000,000 pounds.

There were increased catches of hake and cusk, the Nova Scotia catch of 2,039,500 pounds being an increase of nearly half a million pounds and the New Brunswick catch of 3,515,200 pounds was nearly 2,300,000 pounds greater than in August, 1932.

The halibut catch of Nova Scotia, 374,600 pounds, was an increase of almost 140,000 pounds.

Each of the Atlantic provinces except Prince Edward Island showed an increased herring catch. The Nova

Scotia catch of 4,689,800 pounds was considerably more than double the same month last year. New Brunswick's landings of 2,698,900 pounds were not quite double while the catch for Quebec, 1,072,800 pounds, represents an increase of more than 200,000 pounds.

The sardine catch of New Brunswick was one of the features, some 26,136 barrels being landed compared with 11,175 barrels.

The swordfish catch of Nova Scotia, 962,000 pounds, shows an increase of more than 100,000 pounds.

The catch of lobsters dropped off and each province shows smaller landings. Nova Scotia's catch of 102,100 pounds was less by 78,300 pounds; Prince Edward Island's catch 501,600 pounds less by 305,500 pounds; and New Brunswick's catch 1,436,800 less by 1,263,300 pounds. Fishing was carried on only in the Northumberland Strait area in what is known as the fall fishing season.

Pacific Coast

There were 47,734,200 pounds of salmon landed on the Pacific coast with a value of \$1,096,653 to the fishermen. This represents an increase of 361,600 pounds in catch and slightly more than \$106,000 in value.

Next to the salmon came the halibut fishing. The catch of 2,486,700 pounds shows a drop of nearly 350,000 pounds while the value to the fishermen of \$134,385 gives an increase of almost \$32,000.

Normally the catch of pilchards at this time is fairly large but, for some reason, these fish were only taken in small quantities so that there was a substantial drop in both catch and value.

Manitoba is the big Canadian producer of "goldeyes," a small and delicious freshwater fish which finds ready sale in the smoked form. A few goldeyes are also taken in Saskatchewan and Alberta.

Canada's production of medicinal cod liver oil in 1932 totalled 38,721 gallons. Cod liver oil, of course, is one of the best of health-builders.

FISH USED AS CANDLE BY PACIFIC INDIANS

Oulachon Sometimes Serves Singular Purpose in Indian Camps in British Columbia

Commercially, the oulachon is not among the more important of Canada's many food fishes, although as a matter of fact it is a choice pan-fish and finds ready sale when on the market, but it is valued by the Indians of British Columbia since to them it is not only a food in itself, as well as a source of a fat which may be used in place of lard or butter, but it may also do duty as a candle.

It's a fish which may reach a length of ten inches or a foot and it carries a long scientific name—*Thaleichthys pacificus*. But the remarkable thing about the oulachon (sometimes the name is spelt "eulachon" and sometimes "oolachan") is the great quantity of oil contained in its flesh. This oil, which at ordinary temperatures may be solid and like lard, is exceptionally abundant all through the body of the fish but instead of being strong in taste, as perhaps might be expected, it is very delicate in flavour. It is this delicately-flavoured oil which makes the flesh of the fish so toothsome. In external colouring the oulachon is "of a whitish ground colour, the upper parts being covered with dark marks."

The range of the oulachon is from Oregon to Alaska and large numbers enter different British Columbia rivers. Some of them are taken by British Columbia's fishermen—in the last couple of years the annual commercial catch in the province has averaged between 19,000 and 20,000 pounds—but a great many more are caught by Indians for their own use. The Indians eat some of the fish fresh. From others they extract the oil by drying piles of oulachons in the sun, collecting the oil as it runs out and storing up the resultant lard-like fat for future eating and cooking purposes. Still others, partly dried, sometimes find service in the camps as workable substitutes for oil lamps or candles, and for this reason the oulachon is sometimes known popularly as the candlefish.

The oulachon is an interesting fish, but it is only one among sixty or more food fish and shellfish taken in Canada's great fisheries. All through the year Canadian fish and shellfish are available to the Canadian consumer in great variety of species and in many different market forms.

COOKERY SPECIALIST TELLS SOME OF WAYS OF PREPARING FISH FOR TABLE

Baking Whole Fish and Frying Method Discussed by Expert of Federal Department's Staff—Many Other Ways of Cooking Tasty Dishes from Canadian Products

Mrs. Evelene Spencer, the cookery specialist of the Dominion Department of Fisheries, was asked the other day what fat she regards as best to use in frying fish.

"Oil," she replied at once, "oil, for several reasons. For one thing, as the cook book issued by the department points out, oil may be heated to a higher degree than other cooking fats without burning. For another thing," she went on, "oil gives off less disagreeable fumes, and that is quite an important consideration, from the standpoint of comfort, especially if the kitchen isn't very large.

"If you're using oil for frying," Mrs. Spencer continued, "allow two or three tablespoons to a panful of fish, and it is best to use fresh oil for each panful. If the housewife tries to fry two pans of fish with the same oil she is likely to find that the flour in which the fish has been rolled for cooking will burn and stick to the pan, spot the flesh, and make it difficult to remove the fish to the platter without breaking.

"There's another important point about frying fish. When the fish is rolled in flour you should always mix a little salt in the flour. If you do this the fish will not have a 'flat' taste. The frying process itself, of course, is very simple. Get the oil to a high point of heat, then put in the floured fish, turn it carefully with a pancake turner so that it will brown nicely on each side, and that's all there is to it.

Baking a Fish

"But, Mrs. Spencer," she was asked, "suppose that instead of having fried fish you were going to bake a fish, a whole fish, what method would you follow?"

"First of all," she replied, "I would get one of the oily-meated fish if possible—say, a salmon or a whitefish. Fish, you know, are of two classes, oily-meated and dry-meated and the oily-meated varieties, which have their oil distributed through the flesh instead of concentrated chiefly in the liver are best for baking whole since they cook in

their own fat and do not require basting. If you want to bake a dry-meated fish, such as the cod, for example, you should gash its sides at least three times and insert fat pork, and baste it quite frequently in the cooking process. Oily-meated fish should be baked without any water being put in the pan; they will baste in their own fat.

"Well, having got my fish I first clean it and scale it and cut off the fins, if this has not been done for me at the fish store. The head and tail are left on. Then I rub the cleaned fish with salt inside, and stuff it with whatever stuffing I happen to fancy. (If the fish is a long one it should be fastened with a skewer in the shape of the letter 'S,' or it may be shaped in a semi-circle, and it should be tied with string from head to tail to hold it in shape.)

"With stuffing completed I brush the fish all over with oil (I use a pastry brush) and place it on its belly in an oiled dripping pan. Then I pop the pan into an oven which I keep very hot for the first ten or fifteen minutes, until the fish has begun to brown satisfactorily. After that I reduce the heat and continue the cooking for thirty minutes or three-quarters of an hour, according to the thickness of the fish; I allow ten minutes for each pound up to four pounds and five minutes for each pound over that. When cooking is finished I put the fish on a hot platter, cut off the string, and add a bit of garnishing. Sometimes I fill the space within the semi-circle made on the platter by the fish with some potato balls in a cream sauce with minced parsley. And though I do say it myself, it's a tasty dish.

"It's good for you, too, for science has discovered in comparatively recent years that fish foods contain very important health-making elements, as well as being easy of digestion. It would be a good thing for everybody if they ate more fish, and especially good for the growing children. There are so many different kinds of Canadian fish and shellfish, moreover, and so many different dishes may be made from them,

(Continued on page 4)

OVER 104,000 NETS USED BY FISHERMEN

Producing Equipment of Various Kinds for Fisheries Gives Many Canadians Work

Fisheries operations were not as brisk in Canada last year as in some other seasons, thanks to the fact that unfavourable conditions in world markets kept the fishermen from carrying on as vigorously as usual, but, even at that, the quantity of equipment used in the industry was so large that some of the figures may surprise a good many people. The figures ought to prove interesting, too, both as giving some indication of the size of the industry and some indication of the extent to which the fishermen's operations help workers in other Canadian enterprises by drawing on them for needed supplies.

Probably most Canadians know that the Dominion's lobster fishery is very important, but how near could the average non-fisherman come to guessing the number of traps used in making the catch? Last year, 1932, there were 1,833,689 of these traps, and they represented a good many bundles of laths from the lumber plants and a good deal of netting from the cordage people, for it is of these materials that the traps are made.

Altogether more than 104,000 nets and seines, and 71,986 lines, miles on miles of nets and lines, all told, were used by the commercial fishermen during the year. A good many artisans in cordage plants remote from the fishing settlements found employment in producing this part of the equipment the fishermen had to have.

What about vessels and boats? There weren't very many steam craft in use, only about 130, including quite a number of tugs, but they represented an outlay of considerably more than a million dollars. It's a different story, however, in the case of sailing and gasoline vessels, gasoline boats, and sailboats and rowboats. More than 900 sailing and gasoline vessels were at work (932, to be exact), 19,373 gasoline boats, 18,616 sailboats and rowboats, and 670 scows and carrying smacks, and their total value was more than \$12,113,000. Lumber, engines, gear of different kinds, the product of the labour of many workmen in many different parts of Canada, all went into these

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COOKERY SPECIALIST NOW IN MONTREAL

Since hot weather days are rather unsuitable for cooking meetings the series of fish cookery demonstrations which the Dominion Department of Fisheries has been carrying on in different parts of the country was suspended during part of the summer but it is now being resumed in Montreal. Later on, Mrs. Evelene Spencer, the cookery specialist who conducts the demonstrations for the department, will probably be in the Maritimes for a number of weeks. Previously she has done work under the department's program in Ontario, Quebec, each of the three Prairies Provinces, and in British Columbia. In all of these provinces the demonstrations aroused a good deal of interest and it is believed that they have been very useful in widening public knowledge of the value of fish foods and in adding to housewives' knowledge as to the best means of preparing fish and shellfish for the table.

During the period in which demonstrations were suspended Mrs. Spencer gave numerous radio broadcasts in Central Canada.

OYSTERS SOURCE—Cont.

Canada, of course, has not lagged behind other countries in this field. On the contrary, the Dominion has been well to the fore, and some outstanding pieces of work have been done by the permanent staff of scientists employed under the Biological Board of Canada.

So far as the oyster is concerned, some of the latest research has been done in the United States. These particular investigations have extended over quite a length of time, and among other points which they have established, according to the official report, is that the effectiveness of oysters in cases of nutritional anaemia is due to the fact that they contain iron, copper, and manganese in a form easily available for building up the red corpuscles of the blood. It was also found that not only do oysters contain these essential substances in readily available form but that they are equalled or excelled only by liver in the amounts of iron and copper which they may furnish in an average serving. Then, too, oysters contain other inorganic constituents which are required by the human body, but these latter substances are obtainable in satisfactory quantities in some other foods as well.

PACIFIC PILCHARDS HAVE KIN ABROAD

Important British Columbia Fish Close Relative of Sardines of European Waters

British Columbia and Europe are a long way apart, but there are family ties between some of their fish.

For instance, British Columbia's pilchard, a tasty food, is a close relative of the transatlantic fish whose young are the sardines of European commerce.

Both species belong to what the scientists call the *Clupeidae* family, whose other members, by the way, include such well-known Canadian fish as the alewife or gaspereau, the herring, the shad. To call it by its full scientific name, the British Columbia pilchard is *Chupanodon caeruleus* and its close relative of European waters is *Chupanodon pilchardus*. In colour the Canadian fish, as described by the former Naturalist of the Dominion Department of Fisheries, is "dark bluish with black spots above and silvery beneath, and the lower part of the back and the tip of the lower jaw are yellowish."

A small part of the British Columbia pilchard catch is marketed in the fresh form and some is canned, but by far the greater part is used in the reduction plants in producing fish meal and oil. Even in 1932, when market conditions were unfavourable, there was an output of about 1,316,000 gallons of pilchard oil and nearly 8,850 tons of meal. Both these commodities are very useful in stock and poultry feeding, and the oil also has other uses, as, for example, in the production of domestic shortening.

OVER 104,000 NETS—Cont.

vessels and boats which the fishermen had to have.

Fishermen's vessels and boats, nets and lines and seines, eel traps and lobster traps, weirs, spears, fish wheels, fishing piers and wharves, freezers and ice houses, small fish houses and smoke-houses—they meant a capital investment of nearly \$24,800,000 last year, and hundreds of Canadians had found work in creating them because the fishermen required them for their labours. In addition, of course, the plant of the fishing industry in 1932 included more than 600 canneries and curing establishments which, with their machinery and utensils, were valued at about \$16,000,000.

FISHERIES EXHIBITS DRAW MUCH ATTENTION

Designed to increase popular interest in Canada's fisheries and to stimulate the use of Canadian fish foods, attractive exhibits were displayed by the Dominion Department of Fisheries at this year's Canadian National Exhibition at Toronto and at the Central Canada Fair at Ottawa. Last year the department also had exhibits at several other fairs.

The main feature of this year's display at the Central Canada show consisted of a number of prepared specimens of Canadian fish and at Toronto there were shown 150 illuminated plates, which were reproductions of paintings of fish and shellfish in their natural colours. Each painting had been made from a freshly caught specimen so that the plates were accurately true to life in colouring and details of form, although some of the larger fish such as the swordfish and sturgeon were, of course, not shown in life size. The two displays also emphasized the value of fish foods from the dietary point of view and at each booth departmental cook books were available for purchase so that housewives might obtain authoritative information as to the best methods of preparing fish and shellfish for the family table. The exhibits, prepared by members of the departmental staff, attracted a good deal of attention from the people at the two fairs and officers on duty at the booths had many requests for information as to the Dominion's fish and fishing industry.

TAGGED FISH—Cont.

that the fish will not be injured and the tag itself will be unlikely to become dislodged. The practice of the Fish Culture Branch is to attach the tag to the second and third rays of the dorsal fin. Each tag bears a serial number, and a careful record is kept of the time and place where a fish bearing a tag with a particular number was liberated, and the weight, length, etc., of the fish itself so that if it is recaptured its rate of growth during the interval may be ascertained.

COOKERY SPECIALIST—Cont.

that a family can have fish foods frequently without monotony. The department's cook book, 'Fish and How to Cook It,' gives a good deal of information in this regard, and the price is small."

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SEA FISHERIES OPERATIONS BRING INCREASED RETURNS TO FISHERMEN

September Reports to Department of Fisheries Show Dollars and Cents Gains on Both Coasts of Dominion Though Total Landings off when Pilchard Abundance Dropped on Pacific

Canada's sea fishermen landed less fish in September than they had taken twelve months previously but they got more money for it.

Total landings from the sea fisheries were 834,292 hundredweights, as against 1,006,268 hundredweights in September, 1932, but the landed value to the fishermen reached \$1,292,125, a gain of over \$277,700.

On the Atlantic coast there was gain for the month both in catch and landed value and in British Columbia there was an increase in value in spite of a decrease in total landings. Returns for the two coasts for September, 1933, and September, 1932, were as follows:—

	September 1933	September 1932
Atlantic Coast—		
Catch.	488,882 cwts.	439,997 cwts.
Landed Value..	\$632,240	\$488,855
Pacific Coast—		
Catch.	345,410 cwts.	566,271 cwts.
Landed Value..	\$659,885	\$525,535

British Columbia's drop in catch is striking, at first glance, but the explanation is simple. Ordinarily, September is a big month in the pilchard fishery of the province—in September, 1932, the landings totalled nearly 371,470 hundredweights—but this year, for some mysterious reason, the pilchards did not present themselves in anything like their usual numbers at any time during the summer, and the September catch was less than 76,100 hundredweights. That tells why there was decrease in the grand total of British Columbia's fisheries production for the month.

As a matter of fact, the September landings from the British Columbia salmon fishery, the most important fishery of the province, were substantially larger than in September of last year, and this was true also in the case of several of the other fisheries. The net result was that although the

decrease in pilchard landings was more than 295,000 hundredweights, and there were some minor drops, the net decrease in total landings of fish and shellfish by British Columbia fishermen was only about 220,860 hundredweights.

The Pacific coast salmon catch amounted to a little more than 245,000 hundredweights, as compared with approximately 167,000 hundredweights in September, 1932. Salmon landed value, \$524,825, represented a gain of over \$150,000. The men engaged in the halibut fishery, which is next to the salmon fishery in dollars-and-cents importance in British Columbia, did not fare quite as well as a year ago, but it is noteworthy that while their catch for the month, 15,228 hundredweights, showed a decrease of 6,449 hundredweights, the landed value, \$93,495, fell off by less than \$900.

Some Eastern Results

In three of the Atlantic coast provinces—Quebec, Prince Edward Island, and Nova Scotia—the month's sea fisheries figures, both for catch and landed value, reached higher levels than in September, 1932, and in the case of the fourth, New Brunswick, there was a gain in value notwithstanding a decrease in catch. Landed value for the provinces for the two months have been as follows:—

	September 1933	September 1932
Nova Scotia.....	\$279,740	\$205,900
New Brunswick.....	210,050	187,490
Quebec.	80,780	61,200
Prince Edward Is- land.	61,690	54,260

In Nova Scotia during September, according to statistics gathered by the Dominion Department of Fisheries, there were increased landings from most of the principal fisheries and accompanying gains in landed value. The

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LIVER-COCOA MIXTURE TASTELESS, HEALTHFUL

Canadian Experimenters' Work Makes Cod Liver Oil Benefits Available in New Way

There's a new way now of making the beneficial properties of cod liver oil available to the human system.

Canadian experimenters have devised a method whereby the fresh cod livers can be mixed with cocoa in such a way that all the health-promoting properties of the livers are retained without oiliness or objectionable taste or odour remaining, and the mixture can be successfully used in the manufacture of a chocolate-coated confection.

Manufacture of the candy has already been undertaken and although a small bar contains the equivalent of a tablespoonful of cod liver oil, persons who have eaten it declare that it is impossible to notice any taste of the oil. The liver-cocoa mixture has also been used in making ice cream and milk and egg shakes. On the other hand, while the mixture carries no taste or smell of oil, it is produced by a "cold process" and it is stated that there is no impairment of the livers by chemical or physical changes and they therefore retain, unchanged in quality, their natural maximum quantity of Vitamin A, the growth vitamin, and Vitamin D, the anti-rickets preventive, "as well as substances for pernicious anaemia and goitre therapy."

Breaking New Ground

Hitherto it had been believed that there was no means of preserving fresh raw fish livers but the Canadian experimenters have found that by their method the livers may be preserved for at least 12 months, and the method is very simple in principle, too. The livers are first put through sieves to remove skin and muscle, then they are mixed with cocoa in varying ratios (the ratios varying with certain factors), and the resulting heavy dough is passed through rollers or grinders. The mixture as it comes from the rollers has the appear-

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SEEKING REASONS FOR DIFFERENCE IN COD BEHAVIOUR IN ADJACENT WATERS

Different "Peaks" of Cod Abundance off Nova Scotia Coast Subject of Study as Dominion Scientists Seek Information as to Stocks and Movement of Fish

Off the Sambro peninsula, which is, roughly, at the middle of the Lunenburg-Ship Harbour area of the Nova Scotia coast and has the city of Halifax on its northeastern side, the cod fishery has two "peaks" of abundance, one in June and the second and much lower peak in November, with a slack season in between.

Nothing remarkable about that? Taken by itself, no, for there are times in all fisheries when the fish are normally more abundant than at other seasons.

But the remarkable point is that along the coast in either direction from Sambro, at the extremities of the Lunenburg-Ship Harbour area, the cod fishery apparently behaves in a different way altogether—improving in the spring to a summer peak and dropping off gradually in the autumn. That is to say, there is a summer slack season in the middle of the area and a summer peak elsewhere.

Why the difference? Perhaps the answer is that there are two different populations or stocks of fish frequenting these different waters. Perhaps the summer fishery off the Halifax section is dependent only upon a "native" stock, so to speak, and cod from elsewhere are not moving into these waters at that time.

That the difference in "peak" seasons does exist has been established by investigations carried on during the past couple of years under the Biological Board of Canada, and exactly why it exists is one of the questions which the investigations seek to answer. It is obvious, of course, that definite information brought out by scientific investigators as to the movements of fish and the factors determining where the fish are likely to be most abundant at particular times must be valuable to the commercial fishermen, who depend upon catches for their bread and butter, and investigators working under the Dominion Government are continually engaged upon problems of this kind and other fisheries questions.

Some Results

One possible explanation of the "summer slack" off the Halifax district

which suggests itself at once is that diminished catch might be due to the fishermen giving greater attention to other fisheries during the summer and less to cod fishing. Work done by R. A. MacKenzie, Biological Board worker engaged in the investigations, has shown, however, that the actual number of cod taken per unit of gear is larger in the peak months, June and November, than in the summer period. That the cod are not present in any abundance in this particular region during the "summer slack" is also indicated by the fact that during this period in 1933 no considerable quantity of the fish could be located in the investigations between Lunenburg and Ship Harbour, nor as far offshore as Sambro and Emerald banks, although various kinds of gear were used in endeavouring to make catches and although westward and eastward along the coast there was good cod fishing reported at the time. Failure to make substantial catches was not proof positive, of course, that the cod were not on hand in numbers but it pointed to this being the case.

Scarcity of cod food in this area during the summer season, and consequent migration of the fish to other grounds, has been considered in seeking an explanation for the apparent absence of cod but over against the possibility that this is the determining factor there appears the other point that stomach analyses made in the MacKenzie studies have shown that the cod in this region feed chiefly on bottom fauna, which does not migrate to any extent. Nor does water temperature give the explanation for the investigators have found that almost any temperature in which cod are ever present can be located in the region.

Differences in Fish

In spite of the presence of three different layers of water—warm surface water out to approximately thirty fathoms, then cold intermediate water out to fifty fathoms, and deeper warm water—the cod seem to behave the same in each layer, that is, few can be caught in these layers during the slack period.

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MARINE MYSTERY CUTS MEAL-OIL OUTPUT

Pacific Pilchard Puzzle Emphasizes Importance of Scientific Fisheries Study

What's happened in British Columbia's production of fish meal and oil this year emphasizes in striking fashion how the fishing industry and its subsidiary enterprises are at the mercy of uncontrollable factors. Indirectly, it emphasizes, too, one reason for scientific study of fish life.

Most of the meal and oil produced in British Columbia is made from pilchards but this year's output of these pilchard by-products will total only a fraction of the quantity turned out in 1932, and for the simple reason, simple and at the same time inexplicable, that the fish did not show up in anything like their usual abundance. Up to the end of September, when all save one of the processing plants stopped operating, only 1,105 tons of pilchard meal and 270,225 gallons of oil had been manufactured, and figures yet to come will not increase these totals very much. In the complete 1932 season, on the other hand, there was an output of 8,842 tons of pilchard meal and nearly 1,316,000 gallons of oil. In some other years, when market conditions were more favourable and meal and oil production was therefore on a larger scale, the 1932 figures were substantially exceeded.

Why in the world the pilchards were so scarce off British Columbia this summer no one can say. Some influence which Man was unable to determine sent the fish in some other direction, or most of them. The fishermen and oil and meal makers, assuming that there would be plenty of pilchards as usual, had prepared for the season's operations accordingly but, as it turned out, part of their preparation was only time and money expended to no effect. If scientific study of the pilchard and the factors determining its movements had been previously carried far to enable the investigators to forecast 1933 abundance the industry could have made its preparations on a scale in keeping with the probable size of catch available. Pilchard study, however, has not yet gone that far, although an investigation has been in progress for several years by research workers under the Biological Board of Canada, with the provincial authorities of British Columbia lending some co-operation.

NATURE CARRIES ON WHERE FISHERIES DEPARTMENT BEGAN IN BARREN LAKES

Gamey Trout Breeding Now in Lakes 4,000 Feet Above Sea Level in British Columbia Mountains Following Stocking with Eggs and Fry by Dominion Authorities in Waters Previously Devoid of Fish

Seven years or so ago people from Courtenay on Vancouver Island "discovered" a chain of lakes in a wildly beautiful mountain setting on the Forbidden Plateau, 4,000 feet above sea level. A sportsman's paradise in every respect save one—the lakes had no fish in them!

Now the deficiency has been ended, and the lakes hold goodly quotas of gamey Kamloops trout. Sportsmen are beginning to take notice and the citizens of nearby Courtenay are busy telling others about it.

The stocking of these barren waters is an interesting example of one of the many ways in which the Dominion Department of Fisheries helps in building up and conserving Canada's commercial and sport fishing resources.

In 1926 the city clerk of Courtenay, Mr. C. S. Wood, while investigating the source of Browns River on the Forbidden Plateau, took note of a number of small lakes known as the Goose Lake system. With their magnificent setting and their easy access from Courtenay during summer months, Mr. Wood thought, these waters should be a powerful lure for tourists.

But there were no fish. Subsequently, Mr. Wood placed the matter before the Department of Fisheries. Would the department try to stock the lakes?

The question was given careful consideration. Stocking is never undertaken by the department until there has been close examination to determine the suitability of the waters concerned from every standpoint. The local inspector of the department was sent to make a tour of the Goose Lake system. In most of the lakes he found that fish food was plentiful, and there were clean, gravelly beds where future parent fish could spawn.

Blocked Trails

The lakes were suitable for game fish, but how to stock them was the question. Trout spawn early in the year and at that season the trails and passes leading to the Goose Lake area are all but impassable, with deep snow and

treacherous drifts offering serious obstacles to the passage of pack-laden men and beasts. How could the eggs or fry be taken into the lakes?

It was suggested that a seaplane be utilized to carry in fry, flying high into the mountains and landing on one of the lakes. But that couldn't be done because there is a good deal of ice on the lakes at the time of year when the fry must be handled. The foot trails would have to be used.

An early attempt was made to stock the system with cut-throat trout, but it was unsuccessful. Then the Fisheries Department decided upon Kamloops trout as the most suitable species and bent its efforts upon the task of getting adequate supplies of fry up to the plateau and into the lakes.

The first successful trip was made in June, 1929, when four men under the direction of a fisheries inspector ascended the hazardous trails with pack horses. They planted 90,000 Kamloops eggs, at the "eyed" stage development, in McKenzie and Panther Lakes. The trip was a tough job but it was carried through sturdily. Next year the operation was repeated and 200,000 eyed eggs were introduced on excellent beds in Circle, Isobel, Meadows, Mariewood, Frances, Johnston and Helen McKenzie lakes. Another 200,000 eggs were taken up in 1931, when additional lakes in the Goose system were stocked, and last year 250,000 were planted.

Nature Takes a Hand

Since the first seeding, these waters have been carefully watched by departmental officials and there is now ample evidence that the once barren lakes are replete with trout. Many a fine fish has been taken, after the game battle that the Kamloops trout are wont to put up, and numbers more have been seen in various lakes of the system.

Now it has been found that a specimen recently captured and sent to the Pacific Biological Station at Nanaimo for examination had spawned this year. Nature, in other words, is carrying on where the Department of Fisheries began.

GET BETTER PRICE FOR BETTER FISH

Fishermen Reap Benefit from Instructional Work under Dominion Department

More confirmation of the advantage which fishermen gain from following improved methods of curing:—

A few weeks ago a large shipment of pickle-cured codfish was exported to Gloucester, Massachusetts, from a Nova Scotia district where the fishermen have been following curing methods indicated by expert demonstrators sent into different fishing settlements by the Dominion Department of Fisheries. Back came word from one experienced observer at Gloucester that the cargo was "the best that has been landed here in a long time," and Gloucester handles a lot of fish. From the president of the purchasing firm, one of the bigger United States companies, came a letter describing the shipment as "one of the nicest cargoes of fish I ever saw." If all the fish the firm buys were "as good quality as this," he added, "we could increase the salt fish business." And, perhaps still more to the point, the firm paid the shippers an increased price for the cod.

For several years past the Dominion department has been sending instructor-demonstrators to different places along the Atlantic coast where the fisheries are under its administration to help the fishermen in applying the most approved ideas in certain curing operations. In some cases the demonstrators have been showing the "Gaspe cure" method of preparing dried cod; in others their work has had to do with pickle-curing. There has been a gratifying measure of success in both fields, and the fishermen have been most appreciative.

A good deal of the work in pickle-curing has been done in Prince Edward Island and sales were built up as a result. So far as this year's operations are concerned, the officer in charge of the instructional program recently reported to Ottawa that there would be shipped "from the island this season considerably more cod than last year, and from a number of different places," one settlement alone "shipping nine or ten cars, about 40,000 pounds each. This is all cash business," he added, "and the money goes direct into the hands of the fishermen, which, coupled

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B.C. CANNED SALMON OUTPUT SHOWS GAIN

British Columbia's salmon canneries have been turning out increased output this year and the pack is already larger than the production for the full year 1932.

Up to October 7th the packers had put up 1,110,073 cases, or nearly 110,000 more cases than had been processed at the same date in 1932 and 29,062 cases more than were canned in all of last year. The final pack figures for 1933 will be increased by some thousands of cases over the October 7th figures, although, of course, the peak in canning operations for the year has been passed.

A gain of 100 per cent in the pack of pinks was the chief factor in raising this year's figures above those for 1932. At October 8th, 1932, the pack of pinks amounted only to 215,339 cases but on October 7th of this year the output had gone just beyond the 531,000 mark. On the other hand, fewer chum salmon have been processed so far this year than were canned in the corresponding period of 1932, fewer cohoes, and a much smaller quantity of springs. The reduction in the pack of springs, by the way, has been due in part to the utilization of increasing numbers of these fish in the "fresh and frozen" trade. The pack of sockeye, too, was smaller at October 7th than it had been at the same date last year, or 255,640 cases as against 275,235.

It may be noted, incidentally, that all canned salmon put up in British Columbia is now subject to compulsory inspection, which is carried out by a permanent federal board of experts. None of it may be marketed until it has been inspected, this condition making it certain that the consumer will obtain sound quality fish. Since April of this year packers have also been required to mark each can of salmon with a letter indicating what particular variety of salmon it contains. "S" indicates sockeye, "P" indicates pinks, "C," cohoes, "K," chums, "T," springs, "B," bluebacks, and "H," steelhead trout.

Canada's export trade in fisheries products fell off last year as a result of the world's disturbed economic conditions but even at that it totalled \$18,752,000, in round figures, as compared with imports valued at \$1,862,000.

Canadian fish and shellfish are builders of body and health. The wise family has them frequently on the table.

LIVER-COCOA MIXTURE—*Conc.*

ance of cocoa. The operation takes only a short time, and, as already noted, it is asserted that there is no loss or impairment of the vitamins and the carbohydrates and salts of the livers remain intact.

The preservation property of the cocoa is thought to act through ability to "bind" the moisture of the liver in such a way as to stop its use either by enzymes, which are an inherent part of the natural structure of liver cells, or by bacteria. The new method is stated to stop the loss of food value of the proteins and oils, rancidity of the oils, and fishy taste and odour.

Of course, it is not only the livers of codfish which can be treated by this method. Other species of fish which store up their oil in the liver instead of having it distributed through the body would also be a source of supply, the halibut as a case in point, and an important effect of the experimenters' work may be the enlargement of the demand and, hence, an additional opportunity for the fishermen to add to their earnings.

SEA FISHERIES OPERATIONS—*Conc.*

increased success of the swordfish operations was one of the interesting features—landings of 6,690 hundredweights and landed value of \$47,800, as against only 1,452 hundredweights and \$8,750 a year ago.

Bigger returns from the sardine and lobster fisheries were mainly responsible for New Brunswick's gain in landed value. In Prince Edward Island the herring, mackerel, lobster, and oyster fisheries all made improved showings, as did one or two others. Quebec's outstanding betterments were in the cod and smelt fisheries.

GET BETTER PRICE—*Conc.*

with the employment in handling, is certainly a great benefit to the community."

In Eastern Nova Scotia, where the pickle-cured instruction has also been carried on at several places, one of the big importing companies in Gloucester is buying, this year, at every settlement where the demonstrators have been at work. Certain districts, for instance, where two years ago the firm would not buy fish because the quality did not meet requirements, have this year effected sales of all their output.

Fish foods are valuable sources of vitamins, and that's one reason why they are excellent fare for growing children as well as for grown-ups.

RAINBOW THRIVING IN EASTERN LAKE

Rainbow trout, Pacific coast fish, cannot be successfully introduced in every case into areas to which they are not indigenous but they are evidently finding Giants Lake in Guysboro county one of the eastern waters very much to their liking. At all events, an inspection of the lake this summer showed that rainbow were to be "observed everywhere, frequently in small schools," although it was only in 1931 that this species of game fish was first introduced there by the Fish Culture Branch of the Dominion Department of Fisheries as one of the department's numerous steps toward enlarging fisheries resources.

Large numbers of rainbow fingerlings, the result of the natural propagation of the two-year old stock, were seen by the inspecting officer, while the largest of the two-year old fish that he saw had reached an estimated weight of more than three pounds. Most of the two-year olds were apparently about a pound and ten ounces in weight and slightly more than seventeen inches in length. Yearling fish were "very abundant," ranging in length from eight to eleven inches. The rainbow, which is described as an exceptionally fine game fish, is bluish in colour above, silvery on the sides, and plain below, with spots on the back, vertical fins, and sides. There are red lateral bands, extending one on either side, over the entire body.

SEEKING REASONS—*Conc.*

At the same time, the investigations have shown, the fish in the different layers do exhibit some differences. Those in the inshore or upper layer are smaller than the others, generally speaking, darker in colour and even reddish. There are also some systematic differences, such as the number of vertebrae and gill-rakers per gill arch, which have indicated to the investigators that fish in the water of less than thirty fathoms or so in depth are different, on the average, from those in the deeper water. Apparently, too, the shoal water group have an earlier spawning season (autumn) than the others, which spawn in the later winter or early spring.

In view of the differences between the groups it is possible, though there is as yet no certainty on the point, that the fish in the two deeper layers are more closely related to the Bank cod than the inshore group or "native" fish.