FISHERIES NEWS BULLETIN

Minister: Hon. EDGAR N. RHODES, M.P.

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Deputy Minister W. A. FOUND:

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LARGE NEW SCALLOP BEDS LOCATED OFF COAST OF NOVA SCOTIA, NEW BRUNSWICK

Investigations Carried on during Year by Department of Fisheries Reveal Additional Resources of Shellfish in Atlantic Waters of the Dominion

Large new beds of scallops—tasty, nourishing shellfish—have been located in Maritime Province waters this summer through investigations carried on by the Dominion Department of Fisheries, which had three boats carrying on experimental dragging at various places.

Two adjoining beds found off Brier Island, Digby county, on the Nova Scotia side of the Bay of Fundy, are estimated by the master of the *Nova IV*, one of the investigating boats, to cover an area measuring from twelve to fourteen miles long and from two to four and a half miles wide. Near the Murr Ledges, westerly from Gannet Rock, off Charlotte county, New Brunswick, a bed was located which apparently measures about three miles in length and three-quarters of a mile in width. Eastward of North Rock, north of Machias Seal Island, the *Nova IV* found a bed about a mile long by three-quarters of a mile wide. On all these grounds the scallops were well meated. Several other promising beds were also found in Bay of Fundy waters, but investigations in Cape Breton and along the shore of the eastern mainland of Nova Scotia did not have such satisfactory results.

Scallop fishing on a commercial scale is carried on in all four of the Dominion's Atlantic coast provinces, but much the largest production is off the shores of Digby, Annapolis, and Lunenburg counties in the western part of Nova Scotia. The total landings in 1930 were 18,636 barrels—Nova Scotia accounting for 16,488 barrels—and they had a marketed value of a little more than $95,500. A substantial export business in fresh scallops is done with the United States, and as it is believed that the trade in scallops, both domestic and export trade, is capable of expansion the discovery of new beds is an important occurrence.

The method employed in scallop fishing is "dragging," or, in other words, so-called "scallop dredges" or "drags" are pulled over the beds by gasoline boats, or sail boats. The drag is a simple device consisting of a bag of netting attached to an iron framework and as it is pulled along the scallops are scooped up by the bag, which is hauled to the surface from time to time so that the catch may be emptied. When the scallops are taken ashore they are shelled and the adductor muscle is cut out for shipment to market, for it is only this muscle which is eaten ordinarily, although, as a matter of fact, the other parts of the scallop are also edible. This muscle is a firm white piece of flesh of excellent flavour, and makes a delicious food. A small part of the Canadian scallop catch is put up in the canned form but the great bulk of the landings are used for marketing fresh.

This Year's Investigations

Experimental dragging carried on by the three boats employed for this purpose by the Department of Fisheries was a continuation of earlier scallop investigations under departmental auspices. The *Nova IV* began work at the entrance to Passamaquoddy Bay, off the New Brunswick coast, in the early part of July and continued its operations until late in October, going into various waters. Beds were located around the Murr Ledges and eastward of North Rock, as already stated, and a fair sized bed was found east of White Head. A number of scallops were also taken westward of the Wolves Island, but they were small and apparently the stock was not suitable for fishing at present.

The *Nova IV* then carried on investigations eastwardly along the Bay of Fundy shore as far as Cape Chignecto, and into Minas Channel and Minas Basin, but draggings in these areas were not productive of important results. Moving along the Nova Scotia side of the bay, from Cape Split to Digby Gut, dragging was done both inshore and off-

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FEWER FISH PRICE OF ILLEGAL FISHING

Earlier Law Breach, Followed by Smaller 1931 Run in Area in B.C.

Reports to the Dominion Department of Fisheries have indicated that this season's run of 5-year sockeye salmon to the Quashela Creek spawning grounds in the Smiths Inlet area of British Columbia was relatively small, and thereby hangs a tale—a tale of the serious consequences which illegal fishing may have upon future stocks of fish.

Here's the story, given in some detail because of its importance in pointing a moral: The life cycle of most sockeye is four years but an important proportion of the fish are 5-year salmon whose return to the spawning beds to reproduce their kind is made in their fifth year. Quashela Creek and its expansions made up the sockeye spawning grounds of Smiths Inlet and in 1926 the progeny of the 1921 run of 5-year fish were making their way thither to deposit and fertilize their eggs. Fishing is forbidden in Quashela Creek but, through unfortunate mischance, some transient fishermen who went into the Smiths Inlet area in 1926 found and seized an opportunity to violate the prohibition, and captured a considerable quantity of salmon in the Quashela waters. What this meant, of course, was that many parent fish, whose escapement was contemplated under the fisheries regulations, did not get to the spawning beds, the beds were inadequately seeded, and the number of sockeye hatched out a few months later was reduced.

Came 1931. Their life cycle nearing completion, the 5-year sockeye which had begun their existence in Quashela Creek turned there again to spawn.

But there weren't so many of them as there would have been had the illegal fishing not occurred in 1926. Because fish were taken illegally five years ago, the run of 1931 was cut down and there were fewer fish to deposit eggs from which future runs will come.

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HALF A HUNDRED KINDS OF FOOD FISH AND MORE TAKEN IN CANADIAN WATERS

Remarkable Variety of Health-Making Foods to Suit All Tastes Available to Consumers of Dominion from Atlantic and Pacific and Great Inland Waters

More than 20 different kinds of food fish and shellfish are taken in commercial fishing operations on Canada's Pacific coast, more than 30 in Atlantic waters, and over 20 varieties of fish in the great inland or freshwater areas.

Taking into the reckoning once only such varieties as occur both in Atlantic and Pacific waters, there are over 50 different kinds of food fish and shellfish available to the Canadian consumer from the sea and inland fisheries of the Dominion.

Tastes vary, of course, but there's food to suit every palate in the wide range of fishstuffs landed every year from Canadian waters by Canadian fishermen.

Canadian fish foods are available all the year round, too, in a number of different forms (although not all of them in every form) such as fresh or frozen, canned, dried, smoked, pickled. Rich in nourishment and easily digested, they are very valuable in the diet because they are more abundant in vitamines than many other foodstuffs and because they contain important health-guarding elements such as iodine and iron.

Wide Range of Choice

How wide a variety of foods is obtainable from the Dominion's fisheries resources is indicated by accompanying lists which set out the different kinds of fish and shellfish landed by the men of the fishing industry every year. The lists given below include, too, such mammals as whales and seals and several kinds of fish, such as squid and greyfish, which are not used for food in this country but are utilized for other purposes. In the Sea Fisheries list the letter "A" is used to indicate varieties of fish and shellfish taken by fishermen of the Atlantic coast provinces, and "P" indicates varieties which are caught off British Columbia. The Inland Fisheries are carried on principally in Quebec, Ontario, Manitoba, Saskatchewan, and Alberta, although there are also small scale operations in New Brunswick, British Columbia, and the Yukon Territory.

Here are the lists:—

Sea Fisheries—Fish—		
Alewives (or Gaspereau)	A	
Bass	A	
Black Cod		P
Caplin	A	
Catfish	A	
Cod	A	P
Cusk	A	
Eels	A	
Flounders, Brill, Plaice, etc.	A	P
Greyfish (or Dogfish)	A	P
Haddock	A	
Hake	A	P
Halibut	A	P
Herring	A	P
Ling Cod		P
Mackerel	A	
Octopus		P
Oulachon		P
Perch	A	P
Pilchards		P
Pollock	A	
Red Cod		P
Salmon	A	P
Sardines	A	
Shad	A	
Skate	A	P
Smelts	A	P
Soles	A	P
Sturgeon	A	P
Squid	A	
Swordfish	A	
Tomcod	A	P
Trout	A	P
Tuna	A	
Whiting		P
Fur Seals		P
Hair Seals	A	
Porpoises	A	
Whales		P
Sea Fisheries—Shellfish—		
Clams and Quahaugs	A	P
Cockles	A	
Crabs	A	P
Lobsters	A	
Oysters	A	P
Scallops	A	
Shrimps		P
Winkles	A	

Inland Fisheries—

Alewives,
Bass,
Blue Pickerel,
Carp,
Catfish,
Eels,
Goldeyes,
Herring,
Maskinonge,
Mullet,
Perch,
Pickerel or Dore,
Pike,
Salmon,
Saugers,
Shad,
Smelts,
Sturgeon,

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CANNED SALMON COLOR AS NATURE MADE IT

No Artificial Coloring, Nothing but Fish in Canadian Salmon Cans

Contrary to what some of the uninitiated may have thought, there's no artificial colouring matter added to Canadian canned salmon to give it the shades of red and pink which are familiar to the users of this nourishing sea food.

There is nothing in a tin of Canadian canned salmon except the fish and some of its juices, and a dash of salt.

The colour is as Nature made it, except that the shade may be less pronounced than it was in the fresh-caught fish. Canned sockeye is a rich red. The other varieties of salmon are of different shades of pink. But pink or red, the colours are natural.

Research carried on in recent years goes to show that the colour of salmon flesh is composed entirely of red and yellow pigments. In the canning process the colourings become somewhat less marked, although it is not yet certain whether an actual fading occurs or only an apparent fading as the proteins become coagulated.

Most Excellent Food

Canadian salmon are rich in protein, which is essential in the human diet since it is not only a source of energy but a builder of tissue as well. "Neither the growth of the young nor the satisfactory nutrition of adults can take place without an adequate source of proteins in the diet." Salmon also contain various chemical elements helpful to health, among them iodine, which is an effective preventative of goitre. Recent research has also shown that they have vitamin content comparable to cod liver oil.

Some canning of salmon is carried on in Atlantic coast areas but the pack is very small, most of the salmon taken by commercial fishermen of the eastern provinces being marketed in the fresh form. In British Columbia the salmon canning industry is conducted on a very large scale in normal years, the record pack for the province being approximately 2,220,000 cases, and sales of the product are made in something like a hundred different countries.

Fish are excellent food for children for this reason, among others, that they are rich in the vitamin which tends to prevent such ills as rickets.

BIGGER SEA FISH LANDINGS ON BOTH COASTS IN OCTOBER THAN YEAR AGO

Large Increase in Production of Dry-Salted Salmon in British Columbia Feature of Sea Fisheries Operations for Month—More Herring East and West —Some Lobster Gain

Canada's sea fishermen made a bigger total catch in October than they landed in October, 1930.

On the Pacific coast the catch of sea fish and shellfish increased by more than 13,300,000 pounds and in Atlantic waters by approximately 1,175,000 pounds.

The big gains were in the salmon catch in British Columbia and the herring fares on both coasts.

The feature of the month was the great increase, in British Columbia, in the production of dry-salted salmon, a commodity intended chiefly for export to the Orient. Market conditions being less favourable for the canned salmon industry than at some other times, increased attention was turned to dry-salting and more than 29,300,000 pounds were processed as compared with slightly more than 4,500,000 pounds in October of last year. The great gain in production was in District No. 3, which is made up of Vancouver Island and the mainland waters opposite. In different parts of this district there were very large runs of chums, the variety of salmon most suited for use in dry-salting, and more than 23,150,000 pounds of these fish were packed by the salteries. There was also a larger production of dry-salted salmon in District No. 1, which includes the Vancouver and Fraser River areas, but in District No. 2, the northern part of the province, the output was smaller than a year ago. The total catch of salmon for the three districts was 39,250,000 pounds, in round figures, as against some 31,285,000 pounds in October, 1930, a gain in District 3 offsetting decreases in the other two districts.

Results in Outline

Told in figures which have been compiled by the Dominion Department of Fisheries but are subject to revision, the story of the results of Canada's sea fisheries operations in October, 1931, and October, 1930, is as follows:—

	Oct., 1931 lbs.	*Oct., 1930* lbs.
Atlantic catch ..	22,153,600	20,979,000
Pacific catch.. ..	62,840,000	49,497,600
Total catch ..	84,993,600	70,476,600

Although the catch in October just past was larger than the catch of the preceding October, the landed value of their fares to the fishermen this year was only $999,572 as compared with $1,314,-650, a condition attributable, of course, to the depressed state of world markets.

In Pacific Waters

The herring fishery, as well as the salmon fishery, was more productive in British Columbia in October than a year ago. Nearly 16,890,000 pounds of herring were landed, a gain of over 6,700,-000 pounds. Herring landed value for the month, $130,765, showed a gain of nearly $74,000.

Pilchard landings of approximately 4,343,000 pounds also showed some increase, but the halibut catch, on the other hand, fell off sharply. In October, 1930, the halibut landings for the province were about 2,960,000 pounds; this year only 1,488,000 pounds were taken. There were minor fluctuations in the less important fisheries of the province.

On the Atlantic Coast

As in Pacific waters, so on the Atlantic coast the month brought a gain in herring landings. The gain was spread over all four provinces, the greater part of the catch being taken by New Brunswick fishermen. All told, more than 4,059,000 pounds were landed, or not very far short of twice as large a quantity as was caught in the previous October.

Cod catch for the coast increased slightly, a condition due to the larger catch made by New Brunswick fishermen, and amounted in all to 7,130,400 pounds. The haddock landings, 2,249,-000, were about 61,000 pounds greater than a year ago. Mackerel figures were little changed from October, 1930, so far as catch was concerned. More smelt were taken than last year, and more clams, but fewer oysters, pollock, hake and cusk. The sardine fishery, which is carried on almost entirely in southwestern New Brunswick, showed a drop in catch, 775,600 pounds being taken as compared with a little more than 1,000,000 pounds.

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LARGE NEW SCALLOP—*Conc.*

shore. From Cape Split to Margaretville much of the sea bottom was found unsuitable for scallop fishing. Between Parkers Cove and Hampton fairly good grounds were found. Some scallops were taken between Parkers Cove and Digby Gut, but the numbers were not as great as from Parkers Cove eastward. Search off Brier Island then revealed the large beds already referred to, but from these areas to the region southwest of Yarmouth buoy no scallops were found.

Dealing with his investigations on the Nova Scotia side of the Bay of Fundy the master of the *Nova IV* has reported to the department that in his opinion the beds in the bay "run from Margaretville westerly to the east side of Digby Gut, from one mile to five miles off shore; also from Point Prim, Digby Gut, westwardly to the east side of Sandy Cove, from one to ten miles off shore. In this area scallops can be found all over the bottom, and in places to a great extent and in large quantities—large scallops and well meated. There are no scallops from Sandy Cove east to Flower Cove, that I could find. At Moors Ledge there are a few small beds of some value."

At Other Places

In Cape Breton, where the *Black Robin* began investigation in July and continued them until the latter part of October, some scallops were found in such waters as Mira Bay, Spanish Bay, St. Ann's Bay, St. Peter's Bay, Lennox Passage, and at one or two other places. The numbers taken were not large, however, although suitable sea bottom occurred in different areas.

Working along the Nova Scotia shore between Halifax and Canso the *A. Halkett* found the greater part of the sea bed rough and rocky and unsuitable for scallop fishing. Only negative results were obtained in the dragging that was done. In further draggings along the shores of Chedabucto Bay and into the Strait of Canso the *Halkett* found a few scallops but no grounds were discovered which seemed likely to support a commercial fishery.

FEWER GOLDEYES

Manitoba fishermen marketed fewer goldeyes last year than in 1929. They sold about 115,000 pounds of the fish in the fresh form and 275,800 pounds smoked. Goldeyes, very tasty fish, are also caught in Saskatchewan and Alberta, but the chief fishery is in Manitoba.

SALMON BY HUNDREDS TAKE FISHWAY ROUTE

There has been some brisk traffic up the new fishway which the Dominion Department of Fisheries built this summer at Skutz Falls on the Cowichan River, British Columbia, to assist salmon and trout to reach their spawning grounds on the upper reaches of the river.

On October 23, for instance, an average of 300 salmon an hour went up the fishway during an 8-hour period when the numbers were checked by the fisheries guardian on duty at the falls. Three days later the average was 480 an hour and next day it was 635. Later on, a rise of water made it possible for fish to get past the falls without the aid of the fishery, which was constructed especially for the purpose of enabling salmon to ascend the river at times when water conditions make it difficult, and sometimes impossible, for them to use the natural channel. By works of this kind, which have been built in different parts of the country where the fisheries are administered by the federal authorities, the Department of Fisheries helps in ensuring adequate seeding of spawning grounds and the perpetuation of the runs of various kinds of fish.

25 POUND LOBSTER

Canada's lobster fishery is the biggest in the world but, even at that, it doesn't often yield giants like the 25-pounder which was caught off Digby county, N.S., a week or two ago. This big fellow—its actual weight was 25 pounds 6 ounces—was three feet long with huge claws. Lobsters of unusual size, however, are not great prizes for their meat is coarse and tough and not nearly as tasty as that which is found in the smaller chaps of a couple of pounds or less. It is the lobsters of normal size which are used in producing the Dominion's pack of canned lobsters—as excellent a sea food as man could wish.

HALF A HUNDRED—*Conc.*

Trout,
Tullibee, and
Whitefish.

All the varieties of fish taken in the Inland Fisheries do not occur, of course, in every province where freshwater fishing operations are conducted. To cite only two cases in point, alewives are taken in New Brunswick only and goldeyes are not caught outside the Prairie Provinces.

FEWER FISH—*Conc.*

Put in another way, breach of the regulations by a few men in 1926 has had the effect of lessening, in that particular region, the size of the run of 5-year sockeye upon which the salmon fishermen must depend for part of their livelihood. In course of time, careful conservation efforts by the Department of Fisheries may build up the run again but, meanwhile, the fishery suffers.

The incident is worthy of attention by all classes of fishermen all over the country—anglers and commercial fishermen alike. If sufficient parent fish do not get to the spawning grounds, there'll be fewer fish of the next generation to catch, whether game fish or commercial fish. That is certain enough, and what has happened in regard to the 5-year sockeye in Smiths Inlet gives the point sharp emphasis. The fisheries regulations framed by the Dominion authorities for observance in the different provinces have as a cardinal purpose the adequate conservation of fishery resources. They are based on experience and on study by scientists and expert observers. The man who disregards them may enlarge his catch today, and "get away with it" if he manages to escape detection, but he will find fewer fish to catch in subsequent seasons.

BIGGER SEA FISH—*Conc.*

Lobster landings for the month totalled 657,800 pounds, an increase of nearly 48,000 pounds. The gain was in New Brunswick, where the principal lobster fishing operations in October are carried on, and Nova Scotia and Prince Edward Island figures showed slight decreases. No lobster fishing goes on in Quebec waters in October. The New Brunswick catch for the month was 434,700 pounds, the Prince Edward Island catch 149,000 pounds, and the Nova Scotia catch 74,100 pounds.

Results by Provinces

All of the Atlantic provinces except Quebec had larger total catches of fish and shellfish during the month than in the October before, and in the case of New Brunswick there was also some gain in landed value. By provinces the catch figures for the two Octobers have been as follows:—

	Oct., 1931 lbs.	*Oct., 1930* lbs.
Nova Scotia	9,384,400	9,338,600
New Brunswick. ..	8,844,100	7,545,500
Prince Edward Is.	1,198,400	1,132,700
Quebec	2,726,700	2,962,200

Fish foods are valuable in the diet of persons who suffer from a tendency to anaemia.

IRON IN THE OYSTER AS WELL AS THE MINE

Secretive folk may be "as mum as an oyster," but the oysters themselves haven't kept their secrets from the research worker, who has discovered, among other things, that these shellfish, which are taken on both of Canada's coasts, are rich in iron in an assimilable form, and are, therefore, valuable dietary aids in preventing anaemia. Another of the oysters' inmost secrets, which has ceased to be a secret as the scientist has continued his probing, is that they also contain copper, which is necessary or helpful to the fixation of iron in the blood. But all the story isn't told yet. In addition to containing such health-making elements as iron and copper, the oyster is also a source of those mysterious vitamines which modern science has found to be essential to sound bodily vigour.

Last year nearly 24,000 barrels of oysters were taken in Canadian waters, as shown by reports made to the Dominion Department of Fisheries. The largest landings were in New Brunswick, where the catch totalled more than 13,800 barrels. Prince Edward Island produced nearly 4,900 barrels, British Columbia about 3,200, and Nova Scotia a few barrels less than 2,000. Canadian oysters are of excellent quality and considerable quantities are exported every year to the United States, where they command favour. In food and health value, as well as flavour, they are fully equal to those obtainable elsewhere.

STURGEON TIPS SCALE AT OVER 850 POUNDS

Seventy-five pounds of caviar were obtained from a huge sturgeon which was caught in the Fraser River, British Columbia, a few weeks ago, when it became entangled in an Indian's salmon gill net. The fish weighed 853 pounds but, curiously, made little resistance when it found itself in the net. Sturgeon are taken commercially in the waters of several of Canada's provinces but ordinarily the largest production, by far, is in the freshwater areas of Quebec and Ontario. The fish are marketed in the fresh form.

Fish canning is one of Canada's big industries. In 1930 there were 434 canneries putting up fish (including shellfish) and they represented an investment of nearly $20,800,000.

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Deputy Minister W. A. FOUND:

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DOMINION FISHERIES SCIENTISTS SOLVE PROBLEM OF NAAS SALMON MEN

Biological Board Investigations Show Mixture of Jellyfish and River Silt Cause of Loss of Nets in British Columbia Area at Particular Seasons

Mud has its uses and jellyfish no doubt have theirs but investigations made by the Biological Board of Canada have revealed that a combination of the two, and certain water movements, have been the cause of loss met with by Naas River salmon fishermen in British Columbia through the destruction of nets which became so heavily fouled that they sank to the bottom and could not be salvaged.

In addition to revealing the cause of loss, however, the investigations have also brought out suggestions as to steps whereby the fishermen may avoid future set-backs of the kind.

Study of fisheries problems in different parts of the Dominion is carried on continuously by research workers on the staff of the Biological Board, which operates under the control of the Minister of Fisheries, and in numerous cases the work has been of much value to the fishermen and other fisheries groups.

Nets Worth $200 Each

The Naas River case was very interesting, but it was serious, too, for a salmon gill-net is worth $200 or more and in one recent season the mud-and-jellyfish combination cost the fishermen between 30 and 40 of these pieces of gear. That season was 1930 when the troublesome condition was worse than in 1929, the first year of investigation, or in 1931.

The trouble occurs in the area near the mouth of the Naas and was first reported as serious in July and August, 1929. A theory advanced in same quarters was that the mud weighting the nets was due to discharges of milled rock from the Anyox concentrator, which is on Observatory Inlet, about 30 miles from the mouth of the Naas, but at the request of the Dominion Department of Fisheries the Biological Board began an investigation in 1929. Mr. C. C. Lucas, of the Board's staff, made analyses and came to the conclusion that the net mud and the concentrator tailings were different substances. In the following year Mr. D. B. Finn undertook further investigations, assisted by Mr. C. H. Vollum and Mr. H. B. Marshall. The troublesome condition was found to be so complex, however, that the services of a chemist specialized in the study of finely dispersed material were deemed desirable, and this year the investigation was pursued for the Board by Dr. W. H. Martin, of the Department of Chemistry of the University of Toronto.

What Happens

Dr. Martin found that "without any doubt the net mud is Naas River silt and is not from the Anyox concentrator." But why does it stick to the nets so tenaciously and in such quantity? That's where the jellyfish and other organisms come in, and their abundance at a certain time in the season explains why the net trouble occurs at that time only. "The mud on the nets," says a passage in Dr. Martin's report, "is found to be attached to gelatinous fibres of jellyfish and other marine organisms. This gelatinous material binds the mud to the net. Algae, including diatoms, also are involved in the mud, though the gelatinous fibrous material seems to be chiefly responsible for the trouble and to have its source in an organism, apparently a jellyfish."

It has also been noted that the "mud attack," so to speak, has always followed exceptionally high tides and the consequent rapid mixing of river water containing silt and sea water containing much marine life. The fresh water kills the marine organisms, the salt water causes precipitation of the silt, and the precipitating silt and gelatinous organic matter, sticking together, collect on the nets.

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HERRING WORTH MUCH TO DOMINION YEARLY

Taken in Atlantic, Pacific and Inland Waters Fish are Used in Many Ways

Herring are perhaps of too common occurrence to be rated as aristocrats among the fishes but they're worth a good many hundred thousand dollars to Canada every year.

The 1931 catches, of course, will not represent as large a sum as has been obtained for the herring landings in times when normal economic conditions have prevailed in the world but in the recent past the annual marketed value of the Dominion's production of herring and sardine herring has gone well beyond the $2,000,000 mark. It may be expected to be back to such figures again when the economic situation has improved.

Herring are taken in the sea fisheries of both Canada's coasts as well as in the inland fisheries of Quebec and Ontario and in some waters of the Prairie Provinces. The largest production is in British Columbia. The common herring of the Atlantic is described by Halkett as "blueish, being shining silvery below; it may reach a length of about sixteen inches." The same authority says of the Pacific herring that "like the common herring it is blueish in colour, is silvery on the sides and below, and may reach a length of about a foot and a half."

Have Many Uses

Herring taken in the freshwater fisheries are all marketed fresh, but the sea herring are sold in many different forms. For use as food they are sold fresh, canned, smoked, drysalted, boneless, and pickled, and they are tasty eating. In British Columbia the greater part of the yearly catch is drysalted for export to China, although there is some production of smoked herring. Canning, pickling, etc., are done on the Atlantic coast but no drysalting. On both coasts there is some utilization of these fish in the manufacture of fish meal and oil, and in New Brunswick an

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SEA FISH CATCH FOR NOVEMBER LARGER THAN LANDINGS OF TWELVE MONTHS AGO

Big Gain in Herring Fares in British Columbia Main Factor in Putting Dominion Fisheries Production for month above Figures for November of Last Year

Total landings from Canada's sea fisheries in November were greater by 98,600 hundredweights than in November, 1930.

The actual gain was in British Columbia. On the Atlantic coast there was a decrease of about 46,800 hundredweights.

British Columbia fares for the month totalled 532,700 hundredweights, in round figures, as compared with 387,280 hundredweights in the previous November. The catch made by the Atlantic fishermen was 175,320 hundredweights, as compared with 222,130.

Both east and west, however, there was a decrease in the landed value of the catch and the total for the two coasts was a little less than $875,000, a drop of about $169,000.

The net gain in Dominion catch was chiefly due to a large increase in British Columbia herring landings. Herring were abundant and over 369,000 hundredweights were brought ashore, a gain of approximately 136,000. Landed value also showed a substantial gain. Most of the herring taken in British Columbia waters, it may be noted, are drysalted for exportation to China, which annually buys them in very large quantities.

November salmon catch in British Columbia was also larger than a year ago. All told, more than 139,000 hundredweights were taken, a gain of better than 25,000 hundredweights, but landed value decreased. The halibut catch for the month was much smaller than in November, 1930, or 6,240 hundredweights as against 15,900. The landed value total, of course, also dropped sharply.

In Atlantic Areas

Prince Edward Island fishermen and their New Brunswick comrades were successful in taking more fish during the month than they had landed in the previous November, but in the other two Atlantic coast provinces the catches fell off. There was a small gain in landed value in Prince Edward Island, but there was a decrease in each of the other provinces.

The month's landings in Prince Edward Island were 9,950 hundredweights, with a value as landed of about $31,160; in November, 1930, the catch for the province amounted to 8,517 hundredweights and landed value was a little more than $29,000. The gains this year were chiefly in the smelt fishery.

New Brunswick fishermen increased their November catches of such fish as cod, haddock, hake, herring, lobsters, and clams. Smelt landings were smaller than in the same month of 1930. The total catch of all varieties of fish for the month was 38,840 hundredweights, with a landed value of $91,580, as compared with 37,768 hundredweights and $102,650 last year.

The Quebec catch for the month amounted in all to 4,920 hundredweights, which represented a decrease of about 11,300 hundredweights. Landed value, which had amounted to something more than $41,000 in the previous November, dropped to $15,900. Cod and smelts are the two chief varieties of fish taken by Quebec fishermen in November. The smelt catch fell off and the cod catch was less than a third as large as a year ago.

In Nova Scotia the month's catch was 121,600 hundredweights, a decrease of approximately 37,000, and landed value, $213,250, was $113,000 below the figures for November, 1930. Mackerel landings were 9,935 hundredweights, a gain of nearly 4,900 hundredweights, and mackerel landed value also increased. Herring catch and value increased. Other important fisheries, however, were less successful than in the preceding November. Cod catch dropped from 57,500 hundredweights to 41,220; haddock catch, 41,275 hundredweights, decreased by slightly more than 10,000 hundredweights; fewer pollock, smelts, and clams were taken than last year; hake and cusk totals fell off sharply. Here, as elsewhere, lessened intensiveness of operations because of adverse world economic conditions is the chief explanation of reduced catches.

Vitamin D., the element which gives cod liver oil its exceptional health value, is present in the body oils of salmon and other fish. The household which eats fish foods regularly is certain to get the Vitamin D. which it requires.

16 COUNTRIES BUY CANADIAN ALEWIVES

Salted alewives from Canada were exported last year to sixteen different countries, which is another way of saying that these countries were purchasers of salted or pickled alewives processed in Nova Scotia and New Brunswick. It is only in Maritime Province waters that alewives are taken commercially, and the small catch landed by Prince Edward Island last year was all marketed fresh.

The alewife, by the way, is one of the Canadian fishes which inhabit both salt water and fresh water. Known to the scientists by the name of *Pomolobus pseudoharengus*, and popularly called gaspereau as well as alewife, the fish is of blueish colour with silvery sides and is variegated with dark stripes. It is not one of the most valuable of the Dominion's fishes, judged from the standpoint of dollars and cents, but the yearly catch is worth more than $100,000 on the market. In 1930, a year when prices were not very favourable, the landings of alewives had a total marketed value of a little more than $112,600. The Nova Scotia production accounted for $38,780 of this total and the New Brunswick output for about $73,590. This year's value will be somewhat less than the total for 1930.

While salted alewives were exported to sixteen countries last year the sales to Jamaica were much the largest, or 16,669 hundredweights. The United States purchased 10,616 hundredweights. Haiti and Dutch Guiana each purchased more than 2,400 hundredweights, and there were substantial sales to British Guiana, Trinidad and other West Indian islands in addition to Jamaica, as well as scattered sales elsewhere.

Co-operative buying of fishing gear is among the activities of the Prince Rupert Salmon Fishermen's Co-operative Association. The association, which was incorporated under the British Columbia law a few months ago, has a membership of approximately 100.

Herring meal production in New Brunswick increased substantially in 1930 and amounted to 1,125 hundredweight with a marketed value of $40,300. As compared with 1929 figures, there was an increase of over 400 hundredweight in quantity of output and of more than $10,000 in value.

FISH CULTURE WORK MAKES BARREN PARK WATERS RICH IN SPECKLED TROUT

Eastern Sport Fish now Abundant in Jasper following Action by Dominion Fisheries Department—Three Year Old Tops Six Pounds—Major Fish Culture Work done in Commercial Fisheries

Action taken by the Dominion Department of Fisheries, is making Jasper National Park what promises to be "one of the best fishing places on the whole North American continent."

Until three or four years ago the famous Medicine-Maligne lakes system was barren of fish, although trout were present in some other parts of the park, but in 1928 the Fish Culture Branch of Fisheries Department began to stock these waters with Eastern speckled trout and now these fine gamey fish are abundant.

On the southern part of Maligne Lake on one calm evening in last September the surface was so ruffled by the splashes of young trout as to give "an appearance of heavy rain," and that is not the 'fish story' of a careless fellow but the statement of Dr. A. Bajkov and Dr. F. Neave, scientists on the staff of the Biological Board of Canada, who have recently made a report on the results of the steps taken in stocking Jasper waters. "The stocking of the Maligne-Medicine system with speckled trout," the report says further, "has given results second to none in the history of fish culture."

Using rod and line for test fishing in Maligne, Dr. Bajkov and Dr. Neave found sport "so good that three or four hours with one rod produced over 100 pounds of fish." In Beaver Lake, which lies about a mile from the southern portion of Medicine Lake, "as soon as the spoon struck the water the trout rushed from all directions." In order to get some further idea as to the abundance of the fish the investigators set a 30-foot gill net in Beaver Lake. "Over 400 fish were caught in about two hours, so that most of the next two hours had to be spent in cutting the meshes of the net and releasing the fish into the lake again."

They're Big Fellows

The trout are growing to be big fellows, too. The first fry put into the Medicine-Maligne system by the fish culture people were distributed in 1928. That's only three years ago, but a trout taken in Maligne Lake a few weeks ago tipped the scale at six pounds, an exceptional weight for a 3-year old speckled trout. This fish was twenty inches long, seven and a half inches deep, and sixteen inches around the middle. Food is plentiful in the Medicine-Maligne waters, of course, and natural enemies are lacking, so the trout have excellent chance to thrive. As the Bajkov-Neave report puts it, "in three and a half years' time some specimens have reached a weight of six pounds or more, have spawned three times, and fry are very abundant throughout the system." There's going to be plenty of sport for anglers in Jasper Park, thanks to the fish culture work.

The distribution of speckled trout fry in Jasper Park by the Fish Culture Branch has totalled about 580,000. In 1928, the first year, approximately 190,000 fry were freed; in 1929 distribution was 208,000, in round figures, and in 1931 the total was 179,000. No fry were distributed in Medicine-Maligne in 1930. In 1929 there was also a distribution of some 45,000 Rainbow trout fry in Cabin Lake, another Jasper area, and this autumn Dr. Bajkov and Dr. Neave found that some of the fish weighed two and a half pounds or more.

Propagation of game fish in order that the angling resources of the country may be kept up, and built up, is, of course, not the major work of the Fish Culture Branch. The major work is the propagation of different varieties of commercial fish so that the fishing industry of the Dominion may be assisted. At the same time, the attention to sport fish is of much importance, both because it improves the recreational opportunities for citizens of Canada and because it helps to stimulate tourist travel and thus add to Canadian business.

Useful results are flowing from the work of Dominion fisheries inspectors in assisting Maritime Province fishermen in the employment of the most efficient methods of processing fish. One Nova Scotia officer, for instance, recently reported to the Department of Fisheries that much improvement was noticeable in the quality of the pickled mackerel put up in his district.

11-MONTH CATCH OVER 800,000,000 POUNDS

Size of Landings in Unfavourable Year Emphasizes Canada's Wealth of Fisheries Resources

Canada's wealth in fisheries resources is emphasized by the fact that in the first eleven months of 1931 approximately 8,313,500 hundredweights of sea fish and shellfish were landed by the sea fishermen of the Dominion, although the adverse world-wide economic conditions naturally lessened the intensiveness of fishing operations. When conditions have again improved the production from Canadian fisheries can be made several times as great as the output in recent years.

Out of the total landings made in the 11-month period just past, 4,418,800 hundredweights, in round figures, were caught by the sea fishermen of British Columbia. Herring, halibut, pilchards, and salmon accounted for most of the Pacific coast total. The landings for the Atlantic provinces were as follows, round figures again being given in each instance:—

	Cwts.
Nova Scotia	1,957,700
New Brunswick	1,087,600
Quebec	615,650
Prince Edward Island	233,750

The total landed value of the catch, as well as the catch itself, was smaller, of course, than in the corresponding period of 1930. A very large part of Canada's annual fisheries production must seek sale in export markets and, with those markets badly upset this year, not only were fishing operations in the Dominion less intensive than in other years, but the prices obtainable for the catches were lower than at other times.

DOMINION FISHERIES—*Cont.*

The presence of considerable numbers of jellyfish in this region after July 1st, Dr. Martin advises the fishermen should be taken as a warning of trouble and the danger zone should be avoided or the nets watched very closely. By watching the abundance of marine life, the amount of silt apparent in the Naas, and the time of exceptional high tides the fishermen may avert loss. Dr. Martin also says that "thorough oiling of all nets in this region seems necessary."

1931 CATCH IN DOMINION'S LOBSTER FISHERY LARGEST MADE SINCE 1917

Increases made in Nova Scotia, New Brunswick, Prince Edward Island, with some Drop in Quebec, and Total Landings More than 424,000 Hundredweights

If size of catch were sufficient by itself to determine a fishery's success, 1931 could be written down now as the most successful year that the Canadian lobster industry has known since 1917.

In the first eleven months of 1931 more lobsters were taken by Canadian fishermen than were landed in any of the previous thirteen years, and December's catches, of course, will lift this year's total somewhat higher still.

Unfortunately, the world economic depression has affected the lobster market situation adversely and the industry has not reaped the advantage which otherwise might have been gained from the larger landings. Nevertheless, the increase is a cause for satisfaction since it is an evidence that the Dominion's lobster resources—the most important resources of their kind in the world—are being well maintained.

Glancing back a bit, statistics show that in 1917 the lobster fishery of the Dominion amounted, in round figures, to 474,870 hundredweights. In the following year the catch dropped sharply and was only about 265,000 hundredweights. In 1919 it was up again to 345,800 hundredweights. Fluctuations followed from year to year, and in 1927 the figures were 316,831 hundredweights.

In 1928 there came an increase, in 1929 another increase, in 1930 still another, and now 1931 is out-doing its predecessor.

A few years ago apprehension was expressed in some quarters that the lobster stocks were being depleted, but the recent catch showings should tend to allay fears of that kind. Incidentally, it may be noted that the apparent maintenance of the lobster stocks may be credited, in part at least, to measures taken by the Dominion Department of Fisheries to protect and conserve the fishery and to the realization by most fishermen that observance of the lobster fishing regulations is in the permanent interest of all those engaging in the lobster industry.

Figures by Provinces

The lobster fishery of Canada is entirely on the Atlantic coast, with Nova Scotia the largest producer among the four Atlantic provinces. In the January-November period just past (actually the January-October period, for lobster fishing is not permitted in Nova Scotia in November), the Nova Scotia lobstermen landed a catch of nearly 212,500 hundredweights, or some 3,000 hundredweights more than they caught in the corresponding period of 1930.

In the same period the Prince Edward Island men caught 96,870 hundredweights, and the Quebec fishermen 24,055 hundredweights. In the case of Prince Edward Island there was an increase of about 16,600 hundredweights over the total for the 1930 months, but the Quebec catch showed a drop of over 6,000 hundredweight.

Lobster fishing is permitted in certain parts of New Brunswick in November and the total catch for the province in the eleven months was 2,500 hundredweights greater than a year ago, or approximately 90,920 hundredweights as compared with 88,400. The figures touching New Brunswick results, as well as all the 1931 statistics quoted, are unrevised returns compiled by the Department of Fisheries. They may be taken as approximately correct, though revision may change them somewhat.

With the total catch larger, there has naturally been an increase this year in the output of canned lobster, although market conditions have not been favourable. All told, about 143,780 cases of canned lobster have been packed in 1931, or 4,660 more than in 1930. Nova Scotia packers accounted for 65,770 cases, Prince Edward Island for over 37,720, New Brunswick for some 31,420, and Quebec for 8,868.

HERRING WORTH—*Cont.*

interesting feature of the herring industry is the use of the scales in producing an essence which is employed in making artificial pearls. It is in New Brunswick, too, that the important sardine canning industry is carried on. Canned sardine output runs into several hundred thousand cases annually, under normal conditions; in 1929, for example, it totalled over 329,000 cases. Large sales of the sardines are made in various foreign countries, as well, of course, as in the domestic market.

MANY DIFFERENT FISH IN QUEBEC'S WATERS

Over 15,000 Employed in Landing Them in Commercial Operations of Last Year

Over sixteen different varieties of fish and shellfish are taken in the sea fisheries of Quebec and a similar number in the inland fisheries.

In carrying on these fisheries last year slightly more than 15,000 persons found employment. About 1,500 were engaged in inland fisheries operations and the remaining number were at work in the sea fisheries.

Listed in order of their marketed value for 1930 the sea fish taken in Quebec waters include cod, lobsters, herring, salmon, mackerel, smelts, clams, caplin, scallops, halibut, eels, squid, tomcod, sturgeon, and sardines, with cod leading the others by a wide margin. Quebec dried cod, by the way, is much in favour in certain important foreign markets. Hair seals and porpoises are also caught by the salt water fishermen of the province for their skins and the oil which may be extracted from the bodies.

Fish taken in the inland fisheries are eels, smelts, sturgeon, pickerel or dore, catfish, carp, herring, perch, whitefish, pike, bass, shad, salmon, and maskinonge. Several other fish such as grayling and ouananiche are also taken commercially in the inland fisheries but not in very great quantities.

Nearly 70,170,000 pounds of fresh, frozen, and smoked fish were carried from Maritime Province fishing districts by railway express and freight in 1930 to points in Canada and points in the United States.

Praise for the fine quality of the New Brunswick salmon which has been shipped to Great Britain this season is given by a leading firm of importers in Liverpool in the course of a letter which has been received by the Dominion Department of Fisheries. The New Brunswick salmon, the letter states, are of altogether exceptional quality. "Up to the time of writing (early July)," the letter adds, "the shipments we are receiving from that quarter exceed any weight that has ever happened previously."

FISHERIES NEWS BULLETIN

Minister: Hon. EDGAR N. RHODES, M.P.

Published Monthly by the Department of Fisheries, Ottawa, Canada

Deputy Minister W. A. FOUND:

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UPSET WORLD ECONOMIC CONDITIONS LESSEN 1931 FISH CATCH

During 1931 the total quantity of sea fish landed in the fisheries of Canada's two coasts was about 888,901,000 pounds, with a landed value to the fishermen of $14,560,900, in round figures, according to unrevised statistics prepared by the Dominion Department of Fisheries.

Both catch and landed value fell off, as compared with the 1930 totals. There is no doubt that more fish than were taken were in the sea ready to be caught, and the fishermen would have been glad to capture them if there had been opportunity to sell them to advantage, but the disturbed world economic conditions so upset the markets that fishing operations were naturally curtailed. Unfavourable world conditions explain the decreases on both sides of the account.

The drop in the year's catch was more than 113,000,000 pounds, and the decrease in landed value about $9,798,000. The smaller catch, however, does not mean that there were decreased landings of all varieties of sea fish and shellfish. In a number of instances the catches were larger than in 1930. The lobster landings, for example, showed increase. So did the catches of herring, mackerel, smelts, swordfish, and of some varieties of the less important fish.

Some Pacific Coast Results

In 1930 a record catch of salmon was taken in British Columbia waters but last year the situation changed and the landings of approximately 135,620,500 pounds showed a decrease of some 94,000,000 pounds. This decrease was not due to unsatisfactory runs of salmon; the falling off was traceable to the very adverse situation created in the canned salmon markets by the world-wide economic disturbance. With these markets unfavourable, the salmon-catching effort was lessened and, at the same time, the fishermen had to take a lower price for their fish.

The drop in salmon catch and value was the main factor in reducing the total British Columbia sea fish figures for the year. Altogether, 478,341,200 pounds of the different varieties of fish and shellfish were brought ashore. Landed value amounted to something over $6,096,100.

Catches of halibut and pilchards, like salmon catch, were smaller than in 1930, although the pilchard decrease was relatively small. The pilchard landings would probably have been equal to those of the year before if conditions in the fish meal and oil markets had justified normal pilchard-catching operations. Halibut production was affected by some internal difficulties which arose in the halibut industry early in the 1931 season and reduced fishing operations to small scale proportions for several weeks.

If some other catches decreased, the landings of herring rose considerably. All told, over 145,480,000 pounds were taken, a gain of more than 23,000,000 pounds. Notwithstanding the catch increase, however, the landed value decreased. This condition was chiefly due to the unsettled conditions prevailing in the markets of China, which ordinarily absorbs very large quantities of British Columbia dry-salted herring.

In Atlantic Areas

On the Atlantic coast the total landings of sea fish, by provinces, and their landed value to the fishermen, were as follows:—

	Catch lbs.	*Landed Value* $
Nova Scotia	211,083,900	4,789,500
New Brunswick..	113,456,300	1,952,240
Quebec	62,176,300	940,560
Prince Edward Island	23,843,400	782,460
	420,569,900	8,464,760

These unrevised figures show a drop of some 49,000,000 pounds from the Atlantic coast catch of 1930. The larger decreases in 1931 were in the landings of groundfish (cod, haddock, hake and cusk, and pollock). These fish are used in the dried fish trade, although, of course, they are also marketed in other forms, and the world's dried fish markets were most unsettled

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WILL WIDEN DEMAND FOR CANADIAN FISH

Federal Department Initiates Campaign on Behalf of all Branches of Fishing Industry

Detailed plans are now being put in shape by the Dominion Department of Fisheries for the campaign decided upon by the minister, Hon. E. N. Rhodes, M.P., to widen Canadian popular knowledge of the value of fish foods and to increase the demand for the products of the Dominion's fishing industry.

The campaign will include radio addresses, a series of fish cookery demonstrations in different parts of the country, and the publication of an authoritative booklet on fish cookery. Plans already mapped out make provision for a program covering the next few months.

Mrs. Evelene Spencer, recognized as one of the continent's outstanding authorities on fish cookery, has been engaged by the department to begin the radio talks and cookery demonstrations, and, should circumstances warrant, a second expert may also be employed. Mrs. Spencer, a Canadian woman of wide and successful experience in such work, both in Canada and the United States, reported for duty at Ottawa some two weeks ago and plans have been completed for the earlier part of her program. Her first demonstrations are being given in Ottawa at the beginning of February. Subsequently, she will go to numerous other places, giving addresses on fish foods and demonstrating proven methods of utilizing them in preparing tasty dishes. Extensive use of the radio will be an important part of her work, and among the first of the addresses which she will give over the air will be one which will be broadcast early in February over a nation-wide "hook-up." On this occasion Mrs. Spencer will be introduced to the radio audience by Hon. Mr. Rhodes.

Important fisheries groups in the Dominion have expressed their wholehearted approval of the general plan of

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VALUABLE STUDIES, EXPERIMENTS, BY SCIENTISTS TO AID FISHING INDUSTRY

Federal Research Stations Continuously at Work on Various Problems of Practical Importance—Air Conditioning for Fish Drying one of Interesting Recent Investigations

Canada's fisheries research stations, conducted by the Biological Board of Canada under the authority of the Minister of Fisheries, aren't given to self-advertising but if they were they could tell of being continuously at work upon many problems of direct importance to the Dominion's fishing industry.

Here, for instance, is a list of some of the subjects which were under investigation by the four main stations of the Board during the past year:—

The use of air-conditioning apparatus for drying fish for smoking; the control of halibut discolouration; the "rusting" of frozen fish; improved cold storage rooms; the nutritive value of canned salmon, and the vitamine potency of canned salmon oil; the discolouration of lobster muscle after canning; the effects of freezing and cold storage temperatures on marine bacteria; the drying properties of pilchard oil, and the decolouration of fish oils; the deliquescence of salt fish under tropical conditions; the industrial use of dogfish liver oil; the preparation of meal from oily fish by several different means of extraction.

Every one of these questions is of importance to some branch or branches of the Canadian fishing industry, and successful research and experimentation by the federal scientists in dealing with them means fisheries benefit and profit. Numerous other subjects were also under investigation by the staffs of the stations during 1931, some of them practical problems of the industry, others scientific studies in connection with fish life. Throughout the present year various investigations and experiments will be in progress, some of them new studies and others further steps in work already begun.

One Valuable Study

One of the interesting and useful pieces of research work that was under way in 1931 was an investigation of the use of air-conditioning apparatus in drying fish for smoking. Fish drying is a very important part of fisheries activity on some parts of Canada's coast and successful investigations in this field must therefore be of much value. In brief, the 1931 experiments showed, among other things, that, by the use of air-conditioning apparatus, fish may be dried for smoking in a shorter time than by the use of the ordinary wood drying fires, and dried satisfactorily. Certain further work in regard to smoking remains to be done but the investigations of last year were eminently useful.

The 1931 drying experiments were conducted at the plant of a Nova Scotia fish company under the direction of the Halifax Fisheries Experimental Station. The story is summarized in a progress report by A. S. McFarlane, one of the station's staff. The experiments had several objects. One of them was to determine whether or not fish could be dried uniformly in a commercial smoke-house by using heated conditioned air. Another was to prove that "a quantity (of fish) equal to almost twice the quantity ordinarily put in could be dried in the same time as was necessary for drying by wood fires under favourable conditions, and that drying could be done under unfavourable weather conditions." There were also several other objects, such as determining whether or not the sheen of fish dried by the air-conditioning plan would be equal to the appearance of fish dried by means of wood fires.

What Was Done

In carrying out the experiments an air conditioner capable of cooling and conditioning 20,000 cubic feet of air per minute was installed. Water was used as the cooling agent. Connected to the conditioner was an aero-fin steam heater capable of heating the air to the desired temperature. A fan was attached to this aero-fin, the air was pulled through the conditioner and fin and forced into the drying chamber 17 feet deep, 13 feet wide, and 12 feet high. The duct leading into the chamber was connected with a header so made as to distribute the air uniformly in the chamber. The air was returned to the conditioner by another duct opening into the bottom of the chamber.

Cod fillets were used for the most part, although some haddock fillets, with the skin still on, were also used. Using large cod fillets on a good drying day, 4,300 pounds of fish were satisfactorily dried in two hours and a half, while, with ordinary wood fires, three hours

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CANADA WORLDS' BIG PRODUCER OF SMELTS

Small but Very Tasty, Smelt Important in Fishery Operations of Atlantic Coast

Fishermen on Canada's Atlantic coast land about three-quarters of the world's annual production of smelts and during the year just past their catch totalled approximately 6,840,000 pounds.

Smelt are small fish but very tasty and in normal times they find ready market in large quantities. Many of them are exported from Canada's Atlantic provinces to United States cities, and, all told, the marketed value of the catch sometimes exceeds a million dollars a year.

Smelt are taken, too, in British Columbia waters but the Pacific species is different from the Atlantic fish and is not caught in such large quantities.

The Atlantic smelt is known scientifically as *Osmerus mordax* and in Canada it is taken in greatest abundance in the waters of Northumberland county, New Brunswick, although quantities are caught in other parts of New Brunswick and in Nova Scotia, Prince Edward Island, and Quebec. The fishery is at its height in the winter months.

The smelt is an excellent panfish of fine flavour. Its average length is probably eight or ten inches but it may reach a length of a foot. The fish enters the streams from the sea to spawn but regularly returns to the sea with the outgoing tide. Halkett points out, however, that apart from its spawning habits it is not strictly a marine fish "for it also exists land-locked in fresh water lakes in New Brunswick, Nova Scotia, and the State of Maine." Its coastwise distribution is from Labrador to Virginia. "In colour the smelt is greenish above and silvery on the sides, and the body and the fins are beset with fine dark spots. The lateral line is interrupted and does not extend much beyond the pectoral fins when extended upon the sides." The Pacific smelt (*Osmerus thaleichthys*) is olivaceous in colour, with silvery sides, and is translucent in appearance. It spawns in the sea and attains a length of about nine inches.

Landings of smelt during 1931, on the two coasts, were as follows, round figures being given: New Brunswick, 4,718,000 pounds; Nova Scotia, 787,000 pounds; Prince Edward Island, 752,000 pounds; Quebec, 581,000 pounds; and British Columbia, 160,000 pounds.

SHELLFISH RESOURCES ADD TIDY SUM TO CANADA'S ANNUAL FISHERIES RETURN

Valuable Areas on Both Coasts of Dominion Yield Tasty Shellfish Rich in Elements which Aid in Building Health

Canada not only possesses the world's most important lobster fishery but is also the possessor of other very valuable shell fish resources both on the Atlantic coast and off British Columbia.

Abalone, clams, cockles, crabs, lobsters, oysters, scallops, shrimps, and winkles, all are taken in the Dominion's commercial fisheries and add some millions of dollars yearly to the country's fisheries production.

Abalone and shrimps occur, in Canada, in Pacific waters only and lobsters and scallops are Atlantic dwellers. All the other species named in the list are taken on both sea coasts. They have their own peculiarities, too, these shellfish. Lobsters, for instance, as probably most people know, change colour on being cooked; in the sea they are dark green, the familiar brilliant red which makes them conspicuous in the fish store is induced by nature in the boiling process. Abalone is a one-shell chap. Sometimes it reaches a size of six inches and may weigh a couple of pounds. The edible part of this shellfish is the "foot" or muscle with which it holds itself to the rocks on the sea bottom. In the case of scallops, too, it is only the muscle portion which is eaten. Oysters also have their own little ways—notably, the habit of changing sex. The clam does not look like a traveller, but it can move along, just the same, by standing on edge and extending its muscle, crawling along or burrowing in the sand.

Excellent on Table

All of the shellfish taken by Canada's commercial fishermen are of high quality and, of course, make very tasty food. They have added value in the diet, moreover, because of their content of iodine and copper and their consequent virtue as preventatives of such diseases as goitre and anaemia. From the housewife's point of view they have the further merit that they may be used in a number of different ways and are not difficult to prepare for the table.

The oysters, shrimps, cockles, and winkles taken in Canadian fisheries are all put upon the market in the fresh form. The abalone catch is all canned, while lobsters, clams, scallops and crabs are sold in both forms—fresh and canned. There is also some use of lobsters in producing "tomalley," or lobster paste, and, as a point of interest, it may be added that in the past year or two there has been some experimental utilization of lobster shells and waste in manufacturing a fish meal which is stated to have been used with satisfactory results as a food for foxes on commercial ranches in Eastern Canada.

From the standpoint of the marketed value of the annual production, the lobster fishery far exceeds the other shellfish fisheries in importance, but there is very substantial business done in clams, oysters, and scallops, and somewhat smaller business in shrimps. The trade in abalone amounts to several thousand dollars in an average year, and the trade in crabs to a similar amount. The business in winkles and cockles is never large. Figures for 1931 are not yet available but the total marketed value of the Dominion's catch of shellfish in 1930 was about $5,890,000 with lobster production accounting for some $5,200,000. Lobsters also bulk largely in the Dominion's export trade in fisheries products. Canned lobster is exported to numerous foreign countries, where it is highly esteemed, and large shipments of live lobsters are made every year to the United States.

Hair seals taken in Canada's fisheries are used in making oil and some business is done in the sale of their skins. In 1930 the skins and oil had a marketed value of nearly $28,000.

Squid, valuable for bait purposes, are taken in considerable quantities off various parts of the Dominion's Atlantic coast. In 1930, for instance, the catch totalled some 6,570 barrels. Squid, an edible mollusk, is also in favour for food in some oriental countries.

Glue of good quality can be produced from the waste liquors from reduction plants manufacturing meal from fish waste, according to experiments made by Canadian scientists engaged in fisheries research under federal auspices.

DECEMBER SEA FISH CATCH SHOWED DROP

Effect of Unfavourable World Market Conditions Still Felt in Fishing Industry

Continued effect of the world-wide disturbance of economic conditions was manifested in a decrease in the December landings from Canada's sea fisheries.

With markets much unsettled, curtailment of fishing operations was to be expected and curtailment was reflected in lessened landings by the sea fishermen on both the Dominion's coasts.

All told, the month's catches—as shown by unrevised statistics gathered by the Dominion Department of Fisheries—totalled 45,902,200 pounds, a decrease of nearly 6,771,000 pounds as compared with the landings for December, 1930. The landed value of the month's fares, $683,085, also showed some decline, but not a large one—$21,430. There were decreases both in catch and landed value in most of the principal fisheries, although the landed value in the case of the British Columbia herring fishery showed a gain of over $85,000.

By provinces, the totals of catch and landed value for the month were as follows, decreases occurring on both sides of the account in each province:—

	Catch lbs.	*Landed Value* $
British Columbia...	35,194,300	309,350
Nova Scotia	7,227,200	252,750
New Brunswick ...	3,165,200	107,635
Prince Edward Isld.	307,800	12,810
Quebec	7,700	539

(So far as Prince Edward Island and Quebec are concerned, it is to be remembered that December fisheries operations are never on a large scale in these provinces.)

Some of the Results

On the Atlantic coast, the combined catch in the four provinces, 10,707,900 pounds, was more than 5,650,000 pounds below the figures for Decmeber, 1930. Decreased landings of cod by Nova Scotia fishermen was a big factor in pulling down the total. Atlantic landed value was $373,735, a decrease of $56,400. In British Columbia the total catch showed a drop of only a few thousand pounds while landed value decreased $35,000.

British Columbia's salmon landings were 276,800 pounds as compared with over 765,000 pounds in the previous December. The herring fishery, the

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ADDING TO STOCKS OF ATLANTIC SALMON

More than 31,000,000 Atlantic salmon eggs were collected during the autumn of 1931 by the Fish Culture Branch of the Dominion Department of Fisheries and the resultant fry will be distributed in suitable streams next spring and summer. It is by work such as this that the fish culture experts help to maintain and build up the stocks of Canada's commercial fish and sport fish.

These particular eggs were obtained at the seven salmon ponds which the department operates in the Maritime Provinces, and although most of the ponds yielded larger collections than in 1930 the grand total was not quite as high as in that year. A feature of the year's work was a record collection of landlocked salmon eggs at the Chamcook lakes, New Brunswick. All told, over 346,700 of these eggs were obtained.

UPSET WORLD ECONOMIC CONDITIONS—*Conc.*

and unfavourable during the past year. The catch of groundfish, for the coast as a whole, was about 187,000,000 pounds, as compared with 244,000,000 pounds in the year before. In New Brunswick the catches of cod and haddock increased, showing a gain of nearly 4,500,000 pounds in the case of the former fish and over 148,000 pounds in the case of haddock but these gains were offset by decreases elsewhere.

The quantity of lobsters taken was 43,760,300 pounds, or an increase of more than 3,000,000 pounds. Some part of this increase, but, relatively, not a large part, was due to operations in western Nova Scotia in latter weeks of the year, when no lobster fishing had been permitted in 1930. Leaving this special 1931 season out of the reckoning altogether, however, the year's lobster catch for the coast as a whole was much larger than the 1930 landings. Each of the four provinces, except Quebec, showed greater catch than in the previous year.

Smelt catch, 6,839,000 pounds, also showed a gain, increasing by more than a million pounds. The greater part of the annual smelt catch is taken by New Brunswick fishermen. In 1931 they landed about 4,718,000 pounds, a gain of over 879,000 pounds.

Larger catches of mackerel, shad, swordfish, and tomcods were taken. Clam landings also increased. So far as New Brunswick was concerned, the herring fishery was also more productive than in 1930.

ORIENTAL TROUBLES HURT HERRING MEN

British Columbia producers of dry-salted herring put up a bigger pack in the October-December portion of the current season than they had processed in the like period of 1930, but they were faced by a very difficult market situation as a result of trouble in the Orient, where virtually all of the output is ordinarily sold.

The export of drysalted herring is to China, but much of the business is in Japanese hands. One of the results of the recent Chinese-Japanese clashes has been a Chinese unwillingness to purchase, and the British Columbia industry has suffered seriously in consequence. Prospects for the immediate future are still confused.

The pack at the end of last December amounted to about 34,000 tons. That was a substantial increase over the output at the end of December, 1930, but less than the production at the end of 1929. The drysalting season begins each year in October and continues until early in the following February.

WILL WIDEN DEMAND—*Conc.*

campaign which has been decided upon by the department and have pledged their co-operation. It is believed that the campaign will be productive of a great deal of benefit in making Canadians better acquainted with their country's wonderful wealth of fisheries resources and, by stimulating the demand for fish and shellfish, will further the progress of the fishing industry directly and, indirectly, the progress of the many other Canadian industries which produce the supplies necessary to fisheries operations.

VALUABLE STUDIES, EXPERIMENTS BY—*Conc.*

were taken in drying 2,400 pounds. On another day, when drying conditions were not so favourable, the time required in handling a run of medium-sized cod fillets by the air-conditioning method was an hour and a half. On the same day small cod fillets required two hours when wood drying was employed.

The sheen produced with air-conditioning was "in all cases equal to the sheen produced by wood drying fires, and in some cases superior to it."

About 25 different varieties of food fish are taken commercially in Canada's inland, or freshwater fisheries.

SKINNING SOCKEYE FOR CANNING NEW VENTURE

Trying a new venture last year, with apparently satisfactory results, one of the salmon canneries on the Fraser River in British Columbia skinned part of the sockeye catch before putting the fish through the canning process and reported obtaining a price premium for the product.

Salmon are ordinarily canned without removal of the skins and the advantage obtained by the cannery which has been experimenting with the use of skinned fish is said to lie in an added attractiveness in the appearance of the finished product.

The skinning process, as outlined to officers of the Dominion Department of Fisheries by the manager of the cannery, is not difficult or complicated, and is estimated to cost about three cents per fish. It is carried out by hand workers with the use of a knife and a wooden clamp tool, which consists of two pieces about three-quarters of an inch square fastened together at one end by a light metal bolt and rounded at the other end to fit the hand. After a cut has been made in the skin of the fish, near the tail, the clamp is attached and rolled toward the head. As it is moved along, it peels off a strip of the skin in each operation. After the fish has been cut into pieces of suitable size and packed in cans, the containers are sealed and the cooking process is carried out in the usual way.

Simply a point of incidental interest, it may be noted that sockeye skins weigh several ounces each. For example, ten skins weighed this summer averaged a little more than a third of a pound each.

DECEMBER SEA FISH—*Conc.*

other major Pacific coast fishery in progress during the month, yielded 33,898,200 pounds, or not much less than in 1930, and a gain in landed value, already noted, brought the return to the fishermen up to $260,605.

In Atlantic waters the catches of most of the principal varieties of fish decreased. Catches of cod, haddock, hake, and cusk, pollock, and smelts all fell off. Lobster landings gained both in New Brunswick and Nova Scotia, the only two provinces where lobstering is in progress in December. In Nova Scotia, however, the greater part of the gain was due to an opening of a special season in the western part of the province.

FISHERIES NEWS BULLETIN

Acting Minister: Hon. A. DURANLEAU, M.P.

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Deputy Minister W. A. FOUND:

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SOME GAINS IN SEA FISH CATCHES IN JANUARY BUT DOMINION TOTAL DROPS

Landed Value of Catch to Fishermen only Slightly below Figures for Preceding January—Total Fares for Month on Atlantic Coast show Increase

Catches of several varieties of sea fish, such as haddock, hake and cusk, herring, pollock, salmon, scallops, and smelts, were larger in January than they had been in January, 1931, but there were decreases in other cases with the net result that the total landings from the month's sea fishery operations showed a drop. With world marketing conditions continuing unfavourable, it was to be expected that the landed value of the catch would fall off somewhat, but the actual decrease was small —between $13,000 and $14,000.

On the Atlantic coast the month's catch was 12,599,000 pounds, a gain of about 34,000 pounds over the total for the preceding January but the British Columbia fishermen did not do quite as well as last year, landing 20,326,000 pounds as compared with 21,914,000 pounds. Altogether, on the two coasts, the catch totalled 32,925,000 pounds, in round figures, or 1,554,000 pounds less than in January, 1931.

Total landed value was approximately $468,000. On the Pacific coast the landed value, $142,400, was eight thousand dollars or so under the figures for last year and for the Atlantic provinces it was $325,400, a decrease of some $5,500.

Nova Scotia operations produced a gain in landed value and in New Brunswick there was a gain in catch. In the other three sea fishery provinces there were decreases on both sides of the account. So far as Nova Scotia is concerned, the landed value betterment was due to a rise in lobster figures, which followed from the opening of a special lobster fishing season in the western part of the province.

By provinces, the January results were as follows, as shown by unrevised statistics gathered and compiled by the Dominion Department of Fisheries:—

	Catch lbs.	*Landed Value* $
British Columbia ..	20,326,100	142,385
Nova Scotia..	9,150,400	211,269
New Brunswick. ..	3,121,000	102,365
Prince Edward Isld.	318,300	11,380
Quebec	9,700	388

Haddock fares—taken by Nova Scotia and New Brunswick fishermen only —showed a tidy gain, totalling almost 3,429,000 pounds as compared with 2,937,100 pounds in January, 1931. There were increased catches in both provinces, but the Nova Scotia catch of haddock is always very much larger than the New Brunswick landings. Nova Scotia's cod landings fell off; the New Brunswick catch increased. More hake and cusk were taken by the fishermen of these two provinces than were landed a year ago. The pollock catch, all taken by Nova Scotia fishermen, was a little more than 971,000 pounds, a gain of over 150,000 pounds. The catch of smelts increased substantially both in New Brunswick—the largest producer —and in Prince Edward Island, but Nova Scotia and Quebec landings were smaller than in January of last year.

In British Columbia

On the Pacific coast the month's herring landings totalled more than 19,746,000 pounds, a gain of over 190,000 pounds. Landed value showed a slight increase.

January, of course, is not one of the important salmon fishing months in British Columbia and the catch is never large. In the month just past, however, the fishermen did better than a year ago, bringing ashore 150,000 pounds as compared with some 86,000 pounds in the January before. The landings of ling cod were larger than a year ago but red cod catch fell off, as did the landings of crabs and oysters.

INTEREST KEEN IN FISHERIES CAMPAIGN

Dominion Department's Efforts to Widen Canadian Demand for Fish Well Under Way

Seating accommodation was unequal to the demand when Mrs. Evelene Spencer, a Canadian specialist who has been engaged by the Dominion Department of Fisheries to conduct fish cookery demonstrations in different parts of the country and deliver addresses on the food and health values of fish, gave the first series of demonstrations in Ottawa early in February.

Even on one of the demonstration days when the weather was most inclement, the standing room, too, was all taken up and several scores of women could not find place. Members of the audiences expressed the greatest satisfaction with the demonstrations, and there were many requests that others be given.

Mrs. Spencer is at present in Montreal. After a month or six weeks' work there she will go to Toronto, and thence to various other centres, although her later itinerary has not yet been definitely arranged. In Montreal she has the assistance of Miss May Maguire, who has been retained by the provincial Department of Colonization, Game and Fisheries to work with her in the Quebec part of the campaign. Radio talks, both English and French, have important place in the Montreal program, and, indeed, radio is to be used as much as possible. During her time in Ottawa, Mrs. Spencer gave several local broadcasts and on one occasion she spoke over a "hook-up" which covered Ontario and Quebec, and some other areas.

The purpose of the Fisheries Department's campaign is to widen Canadian knowledge of the tastiness and food and health values of fish foods and, thus, to increase the consumer demand for the products of the Dominion's great fisheries. The course adopted by the department in engaging Mrs. Spencer,

(Continued on page 3)

INTERNATIONAL COMMISSION FINDS OUT LIFE SECRETS OF PACIFIC HALIBUT

Investigations by Scientific Workers Followed by Regulations Designed to Conserve Valuable Fishery of North Pacific under Treaty between Canada and United States

Continuing the work entrusted to it under the Pacific halibut treaty of 1930 between Canada and the United States, the International Fisheries Commission has adopted several regulations designed to conserve the very important halibut fishery of the North Pacific and Bering Sea.

Under these regulations, which have now been approved by the Governor General of Canada and the President of the United States as required by the treaty, certain areas frequented by immature halibut are closed to halibut fishermen and in certain other areas catch limitations are set for this year.

Another of the regulations requires all halibut fishing vessels to be licensed for statistical purposes (although no fees will be charged for licences) and to furnish the commission with detailed information as to their catches. A fourth regulation—duly approved but not to become effective until next year—puts the end of the annual halibut close season at January 15, instead of February 15 as at present.

The "nursery" areas where fishing is forbidden under the new regulations are one at Massett Inlet in the Queen Charlotte Islands, and another, somewhat larger, off Timbered Islands.

Dividing the treaty waters into four areas, the commission has established a catch limit of 22,500,000 pounds for 1932 in the waters between Cape Shoalwater lighthouse, State of Washington, and Cape Spencer, in Southeast Alaska, and a limit of 23,500,000 pounds in the waters north and west of Cape Spencer which are south of the Alaska Peninsula and the Aleutian Islands. No limitation has been set, for the present at least, in the other two areas, which are, respectively, the waters south of Cape Shoalwater lighthouse and the waters of Bering Sea.

Where Halibut Spawn

While the present treaty was signed less than two years ago, and ratifications were exchanged last spring, a similar convention had been in effect since 1924 and valuable research work had been done under the commission's direction. This work has continued under the new pact so that the commission has now gathered much interesting and useful data as to the halibut's life history.

One point established is that the eggs of the halibut are laid along the deeper edges of the fishing banks, where they are fertilized by the male sperm and then float in the water at depths varying from surface level down as far as 400 or 500 fathoms. While floating the larvae undergo development and are carried along by the ocean currents, so that each spawning bank produces young which later populate other banks. The location and distance of the banks which the larvae reach varies, of course, with the rate and flow of the currents, and varies also with the length of time taken by the young to develop to the stage of life at which they take the form of the adult and settle on the sea bottom. This stage is ordinarily reached when they are slightly more than an inch long. Marking experiments have shown that during the latter two-thirds of its immature life the halibut moves no great distance and does not become truly migratory until the onset of maturity.

Since the larvae are carried about by the ocean currents, the course of the currents is, of course, a subject of prime importance in the study of the halibut's life story and it has been receiving much attention from the commission's staff. Study in this connection has been carried on by means of drift bottle experiments conducted by the *Dorothy*, a vessel used by the commission in its investigation. Eighteen hundred bottles have been put out from the *Dorothy*, and the returns have indicated that during the summer there is a southerly current along the Vancouver Island and State of Washington coasts and a northerly current along the Queen Charlotte and Southeastern Alaska shores. The northerly current joins the great eddy that carries eggs and larvae along the shore of the Gulf of Alaska and southwestward along the Alaska Peninsula.

During her 1931 investigational cruises the *Dorothy* travelled more than 10,000 miles and made net hauls at 226 sta-

(Continued on page 4)

JAPANESE OYSTERS THRIVE IN B.C. AREAS

Biological Board Carries on Investigation to Assist Pacific Oyster Industries

Japanese oysters seem to like British Columbia waters.

That's one of the points that has been brought out in the course of oyster investigations which have been carried on in British Columbia areas in the past few years by the Biological Board of Canada with a view to assisting the further development of the oyster industry of the province. Japanese oysters have been distributed in different localities during the investigation and in 1931, to quote C. R. Elsey, of the Pacific Biological Station at Nanaimo, who has been conducting the oyster study, they continued to demonstrate their ability to grow under conditions entirely unsuited to the growth of other species. "There is evidently no limit," said Mr. Elsey, "to the quantity of this species which can be matured on the coast."

There are three species of oysters in British Columbia—Native, imported Eastern, and imported Japanese. All have been the subject of study in the Biological Board's investigation. At present the oyster fishery of the province yields a production of several thousand barrels annually, the output for 1930, for instance, amounting to 3,197 barrels with a marketed value of over $58,000.

In 1931, the investigators found, unfavourable natural conditions interfered with satisfactory reproduction of Native and Eastern oysters. The bulk of the Native oysters spawned rather earlier than usual, and natural cultch, as well as quantities of shell which had been spread out, were thickly set with young oysters, but then came weather which resulted in a general lowering of water temperatures and densities and caused the spat to die. On the other hand, however, natural cultch and shells which had been placed in some experimental dykes at Ladysmith and suspended from floats in wire sacks collected a satisfactory set. "It is evident," says a Summary Report of the year's work, "that the difference in results was due to the fact that the very young set, which become attached at the time when the lowest daylight tides of the year were accompanied by hot weather, was protected in the dykes and

(Continued on page 3)

HALIBUT LIKE COD AND OTHER FISHES FOUND RICH IN CONTENT OF VITAMINES

Body Oils and Livers of Various Fish taken in Canadian Waters Abundant in Elements Necessary to Maintenance of Sound Human Health

Science is opening up a new source of money-making for Canada's halibut fishermen.

What's happened is that research has revealed that the halibut liver, like the liver of the codfish, is rich in Vitamine A and Vitamine D, and private enterprise interested in the marketing of health preparations has taken steps with a view to obtaining supplies from halibut fishermen on both of the Dominion's coasts.

Livers were collected last year from a number of the fishermen who landed their halibut at Prince Rupert, B.C., and it is understood that supplies may also be sought this year on the Atlantic coast.

The livers collected at Prince Rupert in 1931 were subjected to dehydration at a local plant and then shipped to laboratories in Eastern Canada and the United States for oil extraction. In the dehydrating process the livers are steamed, to draw out the water, but as they are kept below boiling point little or no oil is lost. After steaming has gone on for two or three hours the livers are spread on a drying rack and when the water has all drained off they are packed in containers, frozen, and then shipped to the laboratories. Prior to the steaming, of course, they are thoroughly cleaned, and the gall bladder is removed.

In Body Oils, Too

It is not only in cod and halibut livers, however, that the vitamines occur in the fish kingdom. Scientists have discovered in recent years that the body oils of different fishes—salmon, to cite just one example—are rich in vitamine content. Indeed, Dr. E. V. McCollum, a noted research authority, has stated that it is only in fish oils, among the foods so far studied, that Vitamine D, one of the more important vitamines, is present in more than minor traces. In eating fish, people may thus obtain through their diet the supply of elements essential to good health.

Of course, the vitamines aren't the only health-making elements which are present in fish foods. Far from it. Fish contain many other substances which are helpful in building strength and guarding health. For instance, sea fish have exceptional content of iodine, and iodine is the great preventive of such diseases as goitre. Then, too, fish contain copper, and recent scientific research has shown that they are therefore valuable food in the diet of persons with a tendency toward anaemia. Calcium, phosphorus, and other elements necessary to a sound body are also present in fish.

Summed up, the situation is that fish and shellfish are not only tasty and nourishing foods but their health-building properties give added reason for including them frequently in the diet. Canadian consumers, moreover, have at their command a wide range of these foods since more than 60 different varieties of fish and shellfish are taken in the commercial fisheries of the Dominion and they are put upon the market in numerous different forms.

JAPANESE OYSTERS—*Con.*

on the suspended cultch. On the natural beds, similar set was subjected for long periods to the direct heat of the sun."

Eastern oysters in the rivers and on the beds at Crescent spawned in late May and early June but rain followed and the larvae did not develop. A survey of the rivers, however, showed that they contained more than 2,000,000 Eastern oysters, which had been set there during the past 15 years.

INTEREST KEEN—*Con.*

who has continental reputation as an authority in her field, has been approved by the Canadian Fisheries Association and the United Maritime Fishermen, whose officers have also endorsed the plan of having the earlier demonstrations in some of the larger cities.

An important piece of work in connection with the campaign is the preparation, under Mrs. Spencer's direction, of a fish cook book. This booklet is now in press. It may be obtained for ten cents a copy from the Department of Fisheries, Ottawa.

149 FOODS EATEN BY PILCHARDS OF PACIFIC

Study of "Menu" Helps in Locating Areas Where Fish Likely Abundant

Investigating the food supply of British Columbia pilchards, a research worker on the staff of the Fisheries Biological Station at Nanaimo has ascertained that the fish eat 149 different kinds of plants and animals.

To be a bit more precise, the pilchards were found to eat 51 different kinds of animals and 98 animal growths.

"But why in the world spend time and effort," says someone, "in finding out what pilchards eat? Who cares what their food is, anyway?"

Not too fast. There's definite and sound economic reason for investigation of this kind.

"In the first place," says a Summary Report of what's been done in this regard, "fish are more often caught in localities where food is abundant. This is the case for two reasons. First of all, schools of pilchards are more frequently found in localities where there is plenty of food material; second, when food organisms are absent the water is clear and the fish are wild, with the result that they are difficult to catch in a purse seine (the kind of net used in pilchard fishing). Finally, it is apparent that the oil for which the pilchard is reduced is dependent upon the fat of the fish and that, in turn, is dependent upon the extent and quality of the pilchards' food supply."

With knowledge of what food the pilchard seeks, it may be possible by examination of various fishing grounds to ascertain where the fish are most likely to be present under conditions which will make their capture least difficult and where they will be of best quality. No one needs to be told what a help to the fishermen further success in the investigations so well begun might be.

One hundred and fifteen different species of algae (or seaweed) were found and identified by an investigator for the Biological Board of Canada in Quebec and the Maritime Provinces last year. Seven other species which were not positively identified were also found. At present the only seaweed put to any commercial use in Canada is dulse, which is marketed dried.

WATERS OF HUDSON BAY, STRAIT, DIFFER

Hudson Bay waters differ markedly from those of Hudson Strait and the open ocean, according to findings of H. B. Hachey, who was the officer in charge of the expedition sent to the bay by the Dominion Department of Fisheries. Hydrographic study, as well as test fishing, was carried out by this 1930 expedition.

Intense stratification in the upper 25 metres, decreasing as the waters of the open sea are approached, gives Hudson Bay the character of a large estuary, Mr. Hachey states. Below 50 metres, he adds, the waters are for all purposes dynamically dead and there is thus a cold saline body of water, "which probably undergoes very little change from season to season." The main water movement is from the James Bay area to Hudson Strait, and thence to the open ocean.

ANCHOVIES, TOO, NOW PLENTIFUL OFF B.C.

Anchovies are not ordinarily found in abundance in Canadian waters but British Columbia officers of the Dominion Department of Fisheries have reported that these little fish appeared in large schools last year off the west coast of Vancouver Island.

For several years past anchovies have appeared off Vancouver Island but not in any such quantities as during 1931 and there is a good deal of conjecture as to the cause of the increase. They have never been fished commercially by Canadian fishermen and some experiments once made in British Columbia in putting them up in bottles, were not profitable.

Whatever the cause of the increased size of the anchovy schools last year, their presence gave the pilchard and herring fishermen no satisfaction, but rather it caused a good deal of annoyance. Many of the anchovies became entangled in the meshes of the pilchard and herring seines and made it necessary for the fishermen to stop and clear the nets. For several days in the Barclay Sound area at one period, for example, every herring seine became "filled with tons of these fish and many hours had to be spent in clearing the meshes of anchovies which had been gilled."

LOBSTERS ASPHYXIATED BY DRIP FROM ICE

Research Worker's Experiments Show Importance of Protecting Shipments in Shell

Experiments conducted as part of the work of the Atlantic Biological Station at St. Andrews, N.B., show why the shipper of live lobsters must see to it that the shipments are protected against drip from melting ice.

In brief, the drip has exactly the same effect as follows from immersing a lobster in fresh water—the respiratory mechanism fails and asphyxiation ensues, though less rapidly than in the case of immersion. Drip and immersion alike are also accompanied by a decrease in the lobster's concentration of blood.

"Experiments were carried out," reports A. F. Chaisson, the research worker in charge, "to determine the effect of drip from melting ice on lobsters under shipping conditions, controls being used which had identical conditions except for the elimination of the drip. The drip was found to affect the lobsters in the same way as immersion in fresh water, though the time required was greater. It produced failure of respiration and decrease in the concentration of the blood. Death occurred in all cases of drip. The importance of protecting lobsters from drip during shipment is thus demonstrated."

In addition to these particular experiments, various other studies of importance to the lobster industry were under way last year under the direction of the Biological Board of Canada, which operates under the authority of the Minister of Fisheries. Four stations—two on each coast of the Dominion—are conducted by the board purely for purposes of fisheries research and experimentation.

More than 81,000 gill nets and seines were used in the fisheries of the Prairie Provinces in 1930—literally miles of nets. They had a value of over $816,000.

Production of drysalted herring on Vancouver Island between the beginning of the season in October and the end of January was 34,480 tons, or 5,200 tons more than had been processed in the corresponding period of the 1930-31 season. Drysalted herring are put up for export to China.

MIGRATING B.C. CRABS COVER MILE A WEEK

Studying the migratory movements of Pacific coast crabs last year in the course of investigations designed to assist the fishery, a scientist, working under the Dominion Government, discovered that some of the crustaceans travelled about at the rate of three miles in as many weeks. Standards of speed differ perhaps in different branches of the animal kingdom. All told, some 800 crabs were tagged in the effort of the investigator to gather data as to the course of crab wanderings in British Columbia waters. Further examination of results is necessary, however, before any conclusive findings can be recorded.

INTERNATIONAL COMMISSION

—*Con.*

tions all the way from Vancouver Island to the Shumagin Islands and far out at sea. On previous cruises the *Dorothy* had shown that halibut eggs and young are produced in quantity along the edges of the banks in the Gulf of Alaska. It had also been found that during their first three months of life the young are borne along by currents and eddies not only to the westward but, to some extent, out into the open sea at considerable distances south of the spawning grounds. During 1931 it was found that, in May, the young which had drifted to sea had practically disappeared, "blasting any hopes," says a statement touching the investigation, "that any number of these would ultimately find their way southward to the banks in Hecate Strait and off Goose Island. But the young, still swimming upright, transparent, and with eyes on both sides of the body, were taken in numbers west of Kodiak Island within 50 miles of shore. And in August they were found close inshore, many even in the surf, others on the bottom already or nearly ready to settle, their eyes both on one side where the skin was darkening as in the adult."

There is still some question as to whether any considerable proportion of the young settle in the Gulf of Alaska and whether any are carried far enough south to enter the Japanese current, if it exists. It also remains to be seen from the commission's further studies "what happens to the spawn, if any, which is produced in the waters off Southeastern Alsaka and British Columbia. The solution of these questions depends in part on a knowledge of currents, as well as net hauls."

FISHERIES NEWS BULLETIN

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LOW TEMPERATURE EFFECTS IN FISH PRESERVATION STUDIED FOR INDUSTRY

Strategic Position of Temperature in Fishing Operations Emphasized by Federal Scientist Relating Experiments with More than 80 Organisms over Wide Range of Thermometer Readings

Laymen may find it difficult to believe but Science has established that some bacteria will survive as low a temperature as -347 degrees Fahrenheit!

How long these organisms will live when the thermometer gets down that far has not been determined, but their survival has been shown.

These are points brought out incidentally in a progress report by Robert H. Bedford, of the Pacific Fisheries Experimental Station of the Biological Board of Canada, Prince Rupert, B.C., who has been carrying on studies of the growth of various organisms at low temperatures in order to gather further information which would be useful to the Canadian fishing industry in keeping its catch in good condition. Scientific work on behalf of the industry is in progress all the time at the Atlantic and Pacific stations conducted by the Biological Board, which operates under the authority of the Dominion Minister of Fisheries.

The two points already cited from Mr. Bedford's progress report strike the layman's eye, of course, but they are only two among many facts which he notes, for in the experimentation which he did last year he tested over 80 bacteria, planting them in separate tubes containing food material and placing them in a chamber or cabinet wherein definite temperature could be maintained. Further experimentation is being continued.

When Temperature Fluctuates

"Low temperature occupies a strategic position in the fish industry," Mr. Bedford points out. "Just as soon as fish are caught, those agencies which cause fish to spoil, among them bacteria, gradually attain ascendancy over the protective factors which are an inherent part of the normal physiological structure of any marine organism. In this phenomenon temperature plays an extremely important role, for if it is gradually raised these destructive agencies become much more active..... By lowering the temperature it slows down their rate of action and the duration of preservation is lengthened. This is the reason why ice helps to keep fish in a fresh condition, why the proper freezing of fish inhibits the destructive agencies entirely, and why storage for long periods at certain low temperatures is feasible. But it must be borne in mind that even freezing fish at very low temperatures, much lower than are ever used in refrigeration plants, will not entirely destroy these destructive agencies. It is true enough that numerous bacteria will be killed, but many will survive. Many survive as low a temperature as -190 deg. C. (-347 deg. F.) although there is no record to show for how long. Freezing at about -5 deg. C. (23 deg. F.) will, in the course of time, destroy some of the weaker bacteria, but many remain—some dormant, others growing slowly but surely."

The significance of his experiment to the fishing industry, Mr. Bedford notes, is just this: To counter the effect of bacteria fish must be "properly stowed in ice so that this temperature is effective over the whole fish, and not stowed in such a manner that parts are left exposed to the warmer atmosphere." If proper stowage has not been practised from the first then this initial carelessness "may have so changed the physical and chemical structure of the tissues that other changes must of necessity follow; what was once a first grade product has deteriorated into a second or

Continued on page 4

TRY BROWN TROUT IN PACIFIC COAST AREAS

Dominion Fish Culture Authorities Make Experimental Introduction of Additional Variety

Brown Trout are not native to British Columbia but the Fish Culture Branch of the Dominion Department of Fisheries proposes to find out whether or not they can be satisfactorily introduced into the waters of the province and the angling resources of the Pacific coast thus enlarged.

Undertaking this experiment, which will probably extend over three or four years, the Fish Culture Branch brought over 300,000 Brown trout fry from Wisconsin a short time ago and placed them in its hatchery at Cowichan Lake, pending their distribution in two selected streams of Vancouver Island during the present spring. Should the fish prove desirable newcomers, other distributions will be made in other British Columbia streams in subsequent seasons so that the Brown trout possibilities of the province may be thoroughly tested out. The experiment has the approval of the provincial authorities, and it will be watched with interest not only by experts interested in fish culture but by British Columbia anglers who have been familiar with Brown trout elsewhere and have been asking that steps be taken to introduce this fish into Pacific coast areas.

This year's distribution will be made in one large stream and one small, where different natural conditions obtain. By choosing streams of different size and characteristics in which to plant the fry it may not only be ascertained whether or not Brown trout will thrive in Vancouver Island waters but what conditions are best suited to their development. In this work the Fish Culture Branch has the co-operation of scientists of the Pacific staff of the Biological Board of Canada, who are selecting the streams for this year's distribution.

SLIGHT GAIN IN ATLANTIC COAST FISH CATCH IN FEBRUARY, DROP ON PACIFIC

Unsettled Market Conditions in Orient Lessening Herring Drysalting Big Factor in Reducing Month's Landings from Sea Fisheries of British Columbia

Notwithstanding a slight increase in the catch of sea fish on the Atlantic coast in February, there was some decrease in the month's landings for the Dominion as a whole, as compared with the figures for February, 1931.

Demoralized market conditions in the Orient affected the British Columbia drysalt herring industry adversely and a substantial decrease in the total landings of all varieties of British Columbia sea fish during the month was chiefly due to the drop in herring catch.

Altogether, as shown by unrevised figures collected by the Dominion Department of Fisheries, the total sea fish catch for Canada during the month was approximately 36,393,000 pounds, with a landed value to the fishermen of $314,680, as compared with 51,343,500 pounds and $476,248 in February of last year. On the Atlantic coast there was an increase of about 86,000 pounds and in British Columbia a decrease of over 15,000,000 pounds—more than 12,000,000 pounds of this decrease occurring in the herring fishery. The statistics for the two coasts for February just past and February, 1931, are as follows, the 1932 figures being given subject to revision:

Pacific Coast

	February 1932 Lbs.	February 1931 Lbs.
Catch	26,637,800	41,674,100
Landed value	$97,781	$236,905

Atlantic Coast

	February 1932 Lbs.	February 1931 Lbs.
Catch	9,755,100	9,669,400
Landed value	$216,899	$239,343

Although the herring catch on the Pacific coast in February was considerably smaller than the catch in February, 1931, this particular fishery accounted for by far the greater part of the total British Columbia landings for the month, or more than 25,000,000 pounds out of about 26,638,000 pounds. Market conditions in China, where virtually all of British Columbia's pack of drysalted herring is ordinarily sold, were so unfavourable, however, that the landed value of the February catch of herring was slightly less than $34,000, as compared with more than $153,000 a year ago.

On the Atlantic Coast

During February more smelts were taken in the Atlantic coast operations than any other variety of fish, or a total of slightly more than 3,799,000 pounds. There were increased smelt catches in New Brunswick, the biggest producer, Quebec, and Prince Edward Island, but Nova Scotia landings fell off. Haddock catch ranked second for the month, in point of size. All told, 3,458,500 pounds were taken, all except a few thousand pounds being brought ashore by Nova Scotia fishermen.

In Quebec and Prince Edward Island there is little sea fishing in February, except for smelts. In both provinces the smelt fishermen made larger catches than they landed in February of last year.

The total Nova Scotia catch for the month, 5,428,900 pounds, was smaller by about 1,800,000 pounds than the catch in February, 1931. The catches of pollock and halibut were slightly larger than in the previous year but cod catch fell off some 700,000 pounds and smelt catch showed a decrease of nearly 500,000 pounds. There were also some other decreases.

New Brunswick fishermen, on the other hand, caught 1,700,000 pounds more fish than they landed in the preceding February, and landed value also increased from $84,200, in round figures, to $102,460. The smelt catch showed a gain of about 2,000,000 pounds.

Experiments recently conducted at the University of British Columbia showed that rats fed with pilchard oil thrived just as well as other rats which were fed a true butter fat ration.

Two big sturgeon have been caught in Fraser Lake, in the Fraser River watershed in British Columbia, within the past few months. Some time ago a huge fellow was taken and, more recently, a fisherman landed a 350-pounder which measured 9 feet 4 inches from nose to tail.

CANADIAN SARDINES RICH IN FOOD VALUE

Little Fish Bulks Large in Fisheries Operations on Dominion's Atlantic Coast

Sardines are one of the smallest fishes taken in Canada's great commercial fisheries, but if the individual fish are small the sardine business is big and, in normal years, the production from the fishery has a marketed value of considerably more than a million dollars.

The business is likely to grow, too, as popular knowledge of the value of fish foods in the diet becomes more widespread for sardines, like other Canadian fish, contain elements which are most useful in building health and strength.

Comparatively recent investigations and experiments have shown that sardine oil contains not only vitamine A. but large quantities of vitamine D., while the vegetable oil which is used in canning a good many of the fish also contains vitamine E. Science, of course, has found that vitamine A. is necessary to normal body growth while vitamine D. is especially important in the prevention and cure of rickets. Sardines are also a source of iodine, which is so effective in preventing goitre.

In addition to containing vitamines, iodine, and ash, the sardines also contain about 20 per cent of easily digestible protein, the tissue-building agent in foods. An ordinary tin of Canadian sardines is stated to provide about 400 calories as fat and protein, or more of fuel value than would be found in considerably larger quantities of various other foods. Recent investigations have shown that not only is the quantity of the ash important but also its quality. The maximum efficiency in the utilization of calcium and phosphorus occurring in ash takes place when their ratio is roughly the same as in bones and in the presence of an ample supply of vitamine D., and since, as already noted, sardine oil contains vitamine D, and the bone of the fish is present in a soluble state the ash content of the fish is considered very satisfactory from the dietary standpoint.

Canada's sardine fishery is conducted on the Atlantic coast only and, indeed, it is practically centred in southwestern New Brunswick. In the average year of normal economic conditions several hundred thousands cases of the canned fish are marketed.

FISH ON AVERAGE CANADIAN TABLE NINE MEALS A MONTH, SURVEY SHOWS

Acting on instructions from the Dominion Minister of Fisheries, a Canadian firm of commercial research specialists—Cockfield, Brown & Company—carried on in 1931 a survey covering the marketing of Canadian fish and fish products, and in the following brief paragraphs are some of the facts which the firm has reported as being brought out in the course of the investigation. The paragraphs are taken from a summary of the report which has recently been issued at Ottawa and they are published here as points of interest in connection with one of the Dominion's most important nation-wide industries. The report, of course, also contains numerous other "Conclusions as to Fact" in addition to those set out in these paragraphs:

Canada has a per capita fish production of 120 pounds, and a per capita fish consumption of 20·7 pounds.

The primary and secondary branches of the Canadian fishing industry employ 80,000 persons, representing a directly dependent population of approximately 400,000, exclusive of those engaged in wholesale, retail, cold storage and transportation activities in regard to fish.

The per capita fish consumption of Great Britain is 40 pounds, of Norway 70 pounds, of Germany 20·7 pounds, of the West Indies about 33 pounds, of Australia 13 pounds, of Ireland only 9 pounds.

Canada now exports over 80 per cent of the tonnage of fish produced, and 70 per cent of its value. Of Canadian exports, canned fish (largely salmon, and followed by sardines and lobsters) accounted for 38 per cent during the past decade; fresh fish for 30 per cent; cured, etc., fish 28 per cent; and fish oil and meal, etc., for 4 per cent.

The United States leads all other markets in the matter of Canadian fish exports, though these are chiefly in the form of fresh and frozen fish. The value of such Canadian fish exports to the United States is slightly more than 11 times the value of Canadian fish imports from the United States.

The most striking increase in any type of fisheries production in recent years has been in the fish oil and meal group, output of which is largely exported.

Fish on the Table

Canadians serve fish at nine meals a month, on the average.

Regional monthly frequency of serving fresh fish at meals in households is in the following order: Maritime Provinces 6·3; Quebec 5·6; British Columbia 4·9; Ontario 4·5; Prairie Provinces 4·1.

Regional monthly frequency of serving canned fish at meals in households is in the following order: Ontario 3·5; Prairie Provinces 2·8; British Columbia 2·7; Maritime Provinces 2·1; Quebec 1·7.

Regional monthly frequency of serving smoked and cured, etc., fish in households is highest in the Maritime Provinces (3·3 meals) and lowest in Quebec (0·7 meals).

Regional monthly frequency of serving fish of all types at meals in households is in the following order: Maritime Provinces 11·7; Ontario 9·2; British Columbia 9·0; Quebec 8·0; Prairie Provinces 7·9.

Monthly frequency of serving fish at meals in households by main types of fish is in the following order: Fresh or frozen 4·9; canned 2·7; cured 1·2.

The greater the frequency with which fish is used, the greater variety in methods of preparation. Thus, lack of variety in preparing fresh fish is apparent in Ontario, but consumers usually practise several methods of preparing canned salmon, which is more popular in this province than in any other area.

The demand for fish is heaviest in spring and winter, and lightest in the fall.

Salmon is the most important species in the Canadian canned fish market, being used by 87 per cent of consumers. Sardines, used by 70 per cent, are next in importance, followed by lobster, which is used by 41 per cent.

Fresh or frozen fish is reported to account for 67 per cent of the wholesale fish dealer's business. Of this 51 per cent is fresh fish; 43 per cent air frozen; and six per cent quick frozen. Air frozen fish comprises as much as 71 per cent of the business of wholesalers in the Prairie Provinces.

As much as one-third of the total fish business of wholesalers is reported to be made up of inland fresh water fish.

The fish business is characterized by a very large number of intermediates, each of whom, however, perform some definite function. This complex system is, in part at least, responsible for the spread of prices between what the fisherman gets and what the consumer pays.

Herring and squid are the most popular types of bait, but sometimes alewives and clams are also used. Both fresh and frozen bait are employed.

The canning industry depends on export markets for 75 per cent of the value and 85 per cent of the volume of its production, the export sales being made almost entirely through brokers.

Marketing Salmon

Of the total Pacific salmon only 12·5 per cent is marketed fresh or frozen, whereas in the Maritime Provinces and Quebec more than 97 per cent of the production is sold fresh or frozen.

The lobster canning industry is distributed in the four Atlantic provinces in the following order of importance: Nova Scotia, 56·4 per cent; New Brunswick, 23·9 per cent; Prince Edward Island, 14·3 per cent; Quebec, 5·4 per cent.

Canada produces more than 90 per cent of the world's supply of canned lobster, but this apparent monopoly is not real, owing to intense competition and substitution of canned crab emanating from Japanese and Russian sources.

Markets in the United States already absorb enormous quantities of the fresh fish produced in Canada. Possibilities of expansion depend upon the maintenance of high quality fish in the New York and inland markets.

Fish oil is the most important product manufactured in fish reduction plants. Fish meal is second in importance, followed by fertilizer and other miscellaneous by-products.

The principal markets for fish by-products are outside Canada.

Of the fish (other than canned) carried by rail in Canada in 1930, 35 per cent was shipped by express, and the rest by freight.

Fish advertising in Canada at the present time is negligible, and consists almost entirely of price advertisements.

Dogfish are often a source of annoyance and loss to the fishermen but, at the same time, they are also made the source of some profit by utilizing them in manufacturing fish meal and oil. In 1930 the production of these commodities had a marketed value of over $67,000.

ASSISTING HERRING MEN IN ORGANIZATION

Dominion Fisheries Department Helps Grand Manan Fishermen in Joint Action Plan

Acting on requests made by fishermen, the Dominion Department of Fisheries is assisting the men engaged in the smoked herring industry of Grand Manan Island, New Brunswick, in working out a plan of organization whereby they hope to put their marketing effort on a more efficient basis.

In rendering this assistance the department is meeting the expenses of Rev. Dr. M. M. Coady, a Maritime Province authority upon work of this kind, whose advisory services the Grand Manan men desired to obtain. In company with the department's Supervisor of Fisheries for the district including Grand Manan, Dr. Coady went to the island some days ago to help the fishermen with their organization plan. A year or two ago Dr. Coady, a college professor who has made a close study of Maritime Province rural problems and of methods of organization among farmers and fishermen, was engaged by the department for some months to act as Promoter of Fishermen's Organization and at that time he successfully aided the fishermen on different parts of the Atlantic coast in carrying out steps which lead to the formation of the United Maritime Fishermen, an association of the commercial fishermen of the Maritimes and the Magdalen Islands.

Grand Manan is the biggest producer of smoked herring on the Atlantic coast. Its annual output—in 1930, for instance, the production was more than 27,700 hundredweights—is sold largely in the West Indies and the United States. Satisfactory marketing of the output is, of course, exceedingly important to the island. A few years ago a number of the producers set up a co-operative marketing organization, which, for a time, had very beneficial results. A combination of factors, however, subsequently created difficulties and the organization ultimately broke up. Latterly, with world economic conditions so unfavourable, the smoked herring men have had a good deal of trouble and a short time ago they took up again the question of organization. Requests were made to the Supervisor of Fisheries, on behalf of a large number of the fishermen, that Dr. Coady be called in to assist them.

NEW FISH COOK BOOK FOR CANADIAN WOMEN

Outlining various modes of preparing fish foods for the table, and giving a number of recipes, a new fish cook book is being issued by the Dominion Department of Fisheries. The booklet, which is entitled "Fish and How to Cook it," has been prepared under the direction of Mrs. Evelene Spencer, a woman with a continent-wide reputation as a specialist in fish cookery, who is now on the department's staff. Both English and French editions of the book have been made and copies are available at a price of ten cents each. Persons who wish the book should write the Department of Fisheries, Ottawa, giving name and address plainly, specifying whether the French or English edition is desired, and forwarding ten cents for each copy ordered.

LOW TEMPERATURE—*Con.*

cull when ultimately required for market. In cold storage the temperature of the fish must be maintained below -5 deg. C. (23 deg. F.), otherwise the bacteria will gradually play their part in causing deterioration of the flesh. . . . ."

Stand Much Change

Just by way of adding further interest to this summary of some of the results of Mr. Bedford's investigation it may be noted that some not only displayed most extraordinary vitality at low temperatures but they could grow over an extremely wide range of temperatures. Take, for example, the case of one fellow—a "rod bacterium" about 25,000th part of an inch in length. This sub-visible creature, by the way, "doesn't mind very much whether it has air to breathe or not and seems to thrive rather nicely when the air is replaced by either hydrogen or carbon dioxide gas." Normally it lives in the surface water of the North Pacific Ocean, but whatever the temperature of the North Pacific may be Mr. Bedford's experiment showed that "this particular bacterium can grow over a range of temperatures from -5 deg. C. to 37 deg. C. (23 deg. F. to 98.6 deg. F.). . . . . It grows most profusely at 20 deg. and 25 deg. C., and then gradually slows down as the range is extended on both sides of these two temperatures."

HONG KONG RELISHES B.C. FROZEN HERRING

Canada's Pacific Coast Fish Producers Find New Far Away Market

White residents of far away Hong Kong have recently been introduced to a new fish food from British Columbia in the shape of frozen herring and they are reported to have received it with relish. Enterprising fish people in British Columbia, alert to find and develop new markets, have discovered that their frozen herring are welcomed in the British settlement at Hong Kong.

In preparing the herring for this trade the producers select first quality fish, freeze them without salt, and put them up for market in 50-pound cases. Several shipments were made to Hong Kong during the herring fishing season just ended on the east and west coasts of Vancouver Island.

For many years past British Columbia fish producers have done a large business with China in drysalted herring but the export of frozen herring to Chinese ports is a new departure. The dry-salted herring shipped to China are used by the Chinese people themselves, while the sales of frozen herring in Hong Kong have been made to white consumers.

During 1931 about 575 barrels of squid were landed by fishermen of Canada's Atlantic coast for use as bait. Some 4,000 barrels of caplin were also used for bait purposes, as well, of course, as large quantities of herring, etc.

Canada is the world's biggest producer of smelts, and in the calendar year 1931 the total Canadian landings of these small but very tasty fish amounted nearly to 7,009,000 pounds. The chief producer among the provinces is New Brunswick.

Quebec's landings of salmon from sea fisheries operations in 1931 totalled something more than 1,397,000 pounds. Nearly all the Quebec salmon catch is marketed in the fresh form.

Cod, black cod, ling cod, and red cod are all caught in British Columbia waters. The ling cod and red cod are all marketed fresh. Part of the catch of the other varieties is sold in prepared form, although the greater part is disposed of fresh.

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SPECIAL COURSES ADD TO EQUIPMENT OF FISHERIES OFFICERS FOR WORK

Inspectors East and West Take Courses and Examinations at Biological Board Stations—Conferences of Officers on Pacific and Atlantic Bring Out Useful Discussions

Continued increase in the efficiency of the fisheries service is the purpose served by the Dominion Department of Fisheries in requiring its inspectors to pursue special courses of instruction from time to time, and keen interest in these courses is shown by the officers concerned, who are not only helped themselves, but by their study are equipped to assist the fishermen in applying the most approved methods of handling and processing their catch.

Within a comparatively short time past, three more of these courses have been given by trained instructors—one course in British Columbia and the others on the Atlantic coast. A fourth course, this one for Atlantic hatchery superintendents, was also given a short time ago, and in July hatchery officers in British Columbia below the rank of superintendent will meet at Shuswap Lake for a period of field study and instruction.

Annual conferences, such as one held recently at Nanaimo and one at Halifax, are among other aids to efficiency which officers find most helpful. At these assemblies the department brings its supervisors and inspectors together for discussion of different problems in connection with their work.

What Courses Covered

The recent instructional course for British Columbia officers was given at the Pacific Biological Station at Nanaimo, one of four fisheries research stations conducted by the Biological Board of Canada which operates under the authority of the Minister of Fisheries. This course was for Grade 2 inspectors and 22 officers were enrolled. The instructors included members of the staff of the station and the University of British Columbia. The subjects taken up included elementary physics and salmon canning, elementary chemistry and herring salting, elementary biology. There was also some work in bacteriology as well as several special lectures. At the close of the course examinations were set and the papers marked by the staff.

Both of the Atlantic courses were given at the Fisheries Experimental Station of the Biological Board at Halifax. One was for inspectors who had entered the fisheries service not long before and the other was a "refresher" course for eastern supervisors and inspectors, who had previously taken work of the same kind and now added to their earlier study. Fifty-nine officers were in attendance at the "refresher" and 18 inspectors at the course for recent appointees. In this latter course stress was laid upon the methods of pickling and drying fish and the men were required to process fish in these ways under expert direction. They were also instructed as to the application of the Fish Inspection Act and the details of inspection methods, and instruction in the principles of canning was given both by lecture and demonstration. Lectures were also given on the principles of fish smoking, refrigeration, bacteriology, biology, and elementary physics and chemistry. Examinations in the different subjects were held at the close of the course, which had extended over four weeks.

The "refresher" course for supervisors and inspectors, who had previously passed examinations, was naturally only a short one. It included lectures on such subjects as canning, smoking, dried fish the utilization of fish waste, the prevention of red discoloration in salt fish, and the migration of commercial fish. There was also instruction in methods of inspecting

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CALIFORNIANS GET N.B. SALMON EGGS

Exchange Shipment from Dominion Department Crosses Continent in Prime Condition despite Distance

Carried all the way across the continent, 28,000 Atlantic salmon eggs shipped from the Miramichi hatchery of the Dominion Department of Fisheries under an exchange arrangement with the State of California arrived at Big Creek hatchery, California, in A-1 condition, and before long the baby salmon will be seeing how they like Pacific coast waters for a home instead of the streams and sea of their ancestors.

It's a week's trip by rail from Miramichi, New Brunswick, to California,—some 4,000 miles—, and the prime condition of the eggs on their arrival testified to the efficiency of the packing case and methods used by the Fish Culture Branch of the Fisheries Department.

The eggs left the Miramichi hatchery at South Esk on February 29 and began their railway trip from Newcastle a few hours later. They reached Big Creek on the other side of the continent on March 8, making the trip in one of the special cases used by the Fish Culture Branch for shipments of this kind—a case insulated with dry Moss and having a filled ice box at the top to serve the double purpose of preventing the temperature from mounting unduly and helping to maintain sufficient moisture in the double tray holding the eggs. At Montreal and Edmonton, and again at Vancouver, the eggs were watered, and on their arrival at Big Creek the California fish culture officers reported them as being in "excellent condition."

In exchange for these Atlantic salmon eggs the State of California is supplying the Dominion Department with a corresponding number of steelhead eggs which will help to add further to the stocks of steelhead in British Columbia waters.

ADDED ASSURANCE OF QUALITY FISHERIES OUTPUT GIVEN BY RECENT REGULATIONS

System of Government Inspection of all British Columbia Canned Salmon Operative June 1st—Atlantic Oysters Culled Immediately on Being Taken from Water—Daily Inspection of Herring Drysalting Now Required

Further steps taken by the Dominion authorities within a short time past to ensure constant high standards in Canadian fisheries production have included the amendment of various regulations so as to provide for:

Inspection by a permanent federal Board of Inspection of all canned salmon put up in British Columbia, the centre of Canada's great salmon canning industry;

Culling of oysters taken in Atlantic waters as soon as they are brought up from the water, enforcement of a larger size limit than was previously in effect, and the establishment of standards of size and markings for barrels used in marketing oysters in the shell.

Daily inspection of herring drysalting by trained officers of the Dominion Department of Fisheries.

So far as oysters and drysalt herring are concerned, the amended regulations are already in effect, and the plan for the inspection of canned salmon becomes operative next June.

After June 1 no British Columbia canned salmon will be permitted to leave the producers' hands until it has been passed upon by the Board of Inspection consisting of three Vancouver men of long experience and established reputation as authorities upon the quality of salmon cannery products. Whether intended for domestic or export sale, the salmon must be inspected before the producer starts it on its way to market. Certificates will be issued by the Department of Fisheries for all canned salmon which the board approves as being above second quality, but no certificates will be given second grade fish. Fish of this latter grade may be marketed but only when it is packed in cans which bear the words "Second Quality" in clearly embossed letters of specified size and placing. If any canned salmon should be below "Second Quality" in standard it will be confiscated and either destroyed or used by the Department of Fisheries for some purpose other than human food. Inspection decisions made by the board under the amended regulations, which are regulations under the Meat and Canned Foods Act, will be final, whether unanimous or majority decisions.

Minimum Oyster Sizes

The amended oyster fishery regulations applicable in the fishery in Nova Scotia, New Brunswick, and Prince Edward Island, forbid the retention of "any oyster of a less size than three and one-half inches in diameter, or any long oyster of a less size than four inches in length, of the outer shell." Previously, the size limit was a half-inch less in each case. The change, of course, will assist in the conservation of the oyster stocks, since oysters under the specified size limits must be returned at once to the beds, and it will also be in the interests of the consumer.

The regulations provide, too, that not only must there be culling of oyster catches so that the small oysters may be picked out for return to the water but that the culling must take place immediately the catches are made. In this way there will be certainty that oysters under the size limits will be put back on the beds while still alive and vigorous. Each oyster fishing boat is required to be equipped with a culling board or deck, at least two feet wide, running across the full width of the boat, and all oysters taken from the water must be deposited on this board and culled immediately. Any oysters under the minimum sizes "shall then be returned to the bed from which they were taken by being scattered broadcast from the boat."

Under the sections of the regulations relating to oyster barrels it is provided that such containers used in marketing oysters in the shell must be of a specified minimum size "and shall be capable of containing two and one-half bushels of oysters in the shell." It is also required that each barrel must show plainly the full name and address of the packer, the minimum size of the oysters it contains, and the area from which the shellfish came.

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MAKE WATERS RICHER IN FOOD FOR FISH

Federal Scientists Study Fertilizing Plan Whereby Fish Stocks May be Increased

Interesting tests made by fisheries research scientists working under the Dominion authorities have indicated that water may be "fertilized" in such a way as greatly to increase the plant and animal life within it and thus to make it capable of sustaining a larger fish population than could otherwise be produced.

"For instance," says a progress report by M. W. Smith, who was in charge of an experiment conducted at the station of the Biological Board of Canada at St. Andrew's, New Brunswick, "a pond or lake which has not many fish may lack sufficient food for them, and by adding fertilizer the substances needed by the plants are put in and, as a result, the latter increase greatly in numbers until finally all the life, including the fish, which are most desirable, is increased."

In the St. Andrew's experiment the addition of only a single pound of herring meal to a thousand gallons of water was sufficient to make the pond so fertile that it produced nearly a hundred times as many plant growths as developed in a similar quantity of unfertilized water.

In making his tests Mr. Smith used two small concrete ponds on the station property. From the one source he fed a thousand gallons of water into each pond. To one lot of water he added a pound of dried and ground herring waste from a sardine cannery, but nothing was placed in the second pond except the water.

"The effect of the one pound of herring meal was remarkable," says Mr. Smith's report, "as could be seen by following through the summer the difference in the plant and animal life between the fertilized and unfertilized ponds. It showed well that those substances which the plants needed for their growth were present in such small amount in the natural water as to limit their growth as well as that of the animals which require the plants for food.... Nearly one hundred times as many plants were found in the fertilized pond as in the unfertilized.... In this way increased growth of fish

(Continued on page 3)

ADVERSE WORLD CONDITIONS REFLECTED IN MARCH FISHERIES, CATCH DROPS

Pacific Halibut Landings Show Gain with Some Increases in Atlantic Catches but Market Difficulties Continue as Brake upon Production Effort on both Coasts of Dominion

Canada's sea fisheries operations in March resulted, in brief, as follows:—

Total catch was slightly more than 18,770,000 pounds, with a landed value to the fishermen of $239,850, in round figures. Both in catch and landed value, and on each coast, there was a decrease from the figures for March, 1931—an inevitable consequence of the adverse economic conditions throughout the world. Pacific coast landings for the month totalled 12,986,500 pounds, with a landed value of $117,968. In the Atlantic provinces the month's catch was 5,783,700 pounds and landed value amounted to $121,885. All the figures are given by the Dominion Department of Fisheries as subject to revision but further checking will probably not change them very much.

No sea fisheries operations were in progress in Prince Edward Island or Quebec during the month—the usual condition for March. In New Brunswick the total landings were something more than 611,000 pounds, as compared with about 637,000 pounds in March, 1931, while landed value, $6,905, showed a decrease of a few hundred dollars. The clam and oyster fisheries in New Brunswick were both credited with larger catches than in the preceding March, and yielded larger landed value return as well. The scallop fishermen also did better than a year ago, but other fisheries, such as cod, lobster, and alewives, were not so successful as a year ago.

In Nova Scotia the decreases were general. Cod catch was about 1,711,000 pounds, as compared with 2,605,300 pounds in the previous March; haddock landings were approximately 2,450,000 pounds, as compared with 3,878,500 pounds; fewer hake and cusk, pollock, halibut, lobsters, scallops, and clams were taken than last year. Landings of herring and smelts showed gains, but the total landings of these fish were not large. All told, the month's catch by the fishermen of the province was 5,172,600 pounds, a decrease of 4,400,000 pounds, and the landed value was a trifle less than $115,000, as compared with $320,000. World-wide conditions, of course, explain the drops.

On the Pacific Coast

In British Columbia the catch of salmon for the month was almost the same as in March of last year, but March salmon fishing is never on an extensive scale and the landings for the month just past amounted only to some 337,000 pounds. Landed value, of course, decreased. Halibut landings, nearly 1,251,000 pounds, were 540,000 larger than a year ago but landed value, a little more than $49,000, showed a decrease of $18,700. The herring catch of 9,265,000 pounds, in round figures, was substantially less than in March, 1931, a condition due to market conditions as the fish were abundant.

Altogether, the month's landings from the fisheries of the province were approximately 12,986,000 pounds, as against more than 15,600,000 pounds in the 1931 month. Total landed value was $117,970 as compared with $178,210.

CANNED SHRIMP ADDED TO CANADA'S PRODUCTS

Canada's long list of fisheries products has recently been made still longer by the addition of canned shrimp meat from British Columbia.

Hitherto the shrimps taken in British Columbia waters, the only waters of the Dominion where these shellfish occur, have all been marketed in the fresh form but now canning is being tried by some operators in the Fraser river district. Operations have so far been on a small scale only—the total catch of shrimps is not very large—but reports are to the effect that very satisfactory results have been achieved.

Shrimps caught in English bay are carried by truck to the cannery where they are cleaned and shelled. The meat is next hand-packed in quarter-pound tins which are then put through the cooking process. When cooking has been finished, the lids are clamped on the cans which are then tested, labelled, and packaged for marketing.

SPECIAL COURSES ADD—*Conc.*

pickled fish and one or two other subjects.

Discuss Many Questions

The conference of British Columbia supervisors and inspectors, under the chairmanship of Major J. A. Motherwell, Chief Supervisor of the Western Division, was attended by the four district supervisors in the province and 30 inspectors. The main conference was preceded by meetings between the chief supervisor and the officers from each of the three fisheries districts. At all four gatherings some very interesting discussions took place, and a number of useful suggestions developed as to the best methods of carrying on the officers' work.

The Atlantic conference—the conference of officers of the Eastern Division—was presided over by Major D. H. Sutherland, divisional Chief Supervisor. All of the supervisors of the divisions were present and all of the inspectors, save three or four who were absent because of uncontrollable conditions. The conference was also attended by the Deputy Minister of Fisheries, W. A. Found, who was one of the speakers.

As at the Nanaimo meeting, there were many interesting discussions at the Atlantic conference but here the program also included a number of papers which had been prepared by various supervisors and inspectors, as well as addresses by different gentlemen outside the service. These latter speakers included the president and secretary of the United Maritime Fishermen, which is the union formed by fishermen of the Maritime Provinces and the Magdalen Islands; representatives of the Nova Scotia Fish and Game Association, the Canadian Fisheries Association, and the canned fish section of the Canadian Manufacturers' Association; the former departmental Promoter of Fishermen's Organization, and one or two others.

MAKE WATERS RICHER—*Conc.*

food either in hatchery ponds or natural ponds and lakes may be brought about....."

This particular experiment or study was only one of many which Dominion scientists were carrying on last year in connection with fisheries subjects. Research is in progress virtually continually at the four stations of the Biological Board, which operates under the authority of the Dominion Minister of Fisheries.

WOMEN PLEASED BY LECTURES ON FISH

Lecture-Demonstrations by Dominion Department Expert Proving Most Successful

Between four and five hundred women were present at each of the lecture-demonstrations given in Toronto in April by Mrs. Evelene Spencer, specialist in fish cookery, who has been put in the field by the Dominion Department of Fisheries to carry on a program of cookery demonstrations and addresses in the various parts of Canada with a view to widening popular knowledge as to the use of fish foods and thus helping to increase the consumption of the products of the Canadian fishing industry.

The success met with in Toronto, where Mrs. Spencer spent about three weeks, was a repetition of the experience in Montreal, where she had been greeted by large audiences throughout a stay of a little more than a month. So, too, in Ottawa, where the first demonstrations in the Dominion-wide campaign were given in February, the audiences were large and keenly interested. In all three cities radio addresses on fish cookery and the food and health values of fish were also important features of Mrs. Spencer's work.

Speaks at College

Circumstances made it necessary to divide the Toronto demonstrations into two series, and Mrs. Spencer is expected to return to the city in early June to complete her program there. She is at present in Hamilton where she began her program with radio talks on April 25. After leaving Hamilton she will probably go to several other Ontario centres. Before leaving the province she will also give a lecture-demonstration before the classes in home economics at the Ontario Agricultural College, at the request of the college authorities. Plans for Mrs. Spencer's itinerary, after the conclusion of her present Ontario work, have not yet been finally decided in detail, but it is the intention that her campaign shall take her to centres in all parts of the Dominion as quickly as possible.

The interest that the campaign is arousing is indicated by the requests that the Department of Fisheries has been receiving from many quarters for Mrs. Spencer's presence, and there is reason to believe that the campaign will be most useful in helping to further the progress of the fishing industry, which is an enterprise of great national importance. The purpose of the campaign, of course, is not simply to increase the use of any one variety of Canadian fish but the use of Canadian fish generally. In her demonstrations Mrs. Spencer employs different varieties of fish—Pacific, Inland, Atlantic—and employs both fresh and processed products.

Fish foods are especially valuable in the diet because of their content of Vitamin D., which is so effective in preventing such ills as rickets.

ADDED ASSURANCE—*Conc.*

Establishment of the canned salmon inspection system for British Columbia is of interest and importance from the standpoint of the domestic consumer, and it is expected that it will also aid the packers in meeting competition abroad, particularly in such countries as the United Kingdom. So, too, with the amendments to the oyster fishery regulations; they are of importance to both the Canadian and foreign buyer of Maritime Province oysters.

On the other hand, the new regulations as to the inspection of drysalt herring are not of direct importance to Canadians as consumers, for drysalt herring is intended for export to the Orient, not for sale in the domestic market. The regulations are indirectly of importance to all Canadians, however, because the British Columbia trade with China in drysalt herring runs to large figures in normal times and the new inspection system is likely to help in building up this business. No dry-salting of herring is done on the Dominion's Atlantic coast but in British Columbia it is an important branch of the fishing industry and in some recent years the shipments to China have been more than 100,000,000 pounds.

According to the regulations now applicable to drysalting, the operations in each herring saltery are inspected daily by one of the fisheries inspectors of the Department of Fisheries and daily salinometer tests in each salting tank are made so that it may be certain that a salinity of at least 90 degrees is being maintained. The regulations also specify the length of time the fish must remain in the tanks, how draining is to be done when the herring are removed, etc. Certificates are issued covering shipments which have been prepared according to the inspection requirements.

POOLED BUYING PLAN USED BY FISHERMEN

Organized Nova Scotia Men Report Useful Results from Joint Action

Co-operative purchasing of rope and other equipment has been of substantial advantage to fishermen in Port Maitland and neighbouring settlements in Nova Scotia who are members of Local 68 of the United Maritime Fishermen in that district. The United Maritime Fishermen is an association which fishermen of the Maritime Provinces and the Magdalen Islands established in 1930 with the assistance of the Dominion Department of Fisheries.

In purchasing rope recently, says a letter from the secretary of Local 68 to the department at Ottawa, the fishermen pooled their orders and buying 25,000 pounds in all they "made a big saving." Now, the secretary's letter continues, "we are buying about all of our equipment this way, and during this time of depression it has been a great help."

During 1931 several other locals of the United Maritime Fishermen entered into another activity—the operation of lobster canneries. This happened, for instance, at Alberton, Prince Edward Island, and at Mont Carmel and Egmont, two other Prince Edward Island communities, the locals joined hands to operate a plant at Mont Carmel. Like action was also taken by several other locals elsewhere on the Atlantic coast. Similar ventures had previously been undertaken by fishermen at one or two other Maritime Province places.

Nearly 200 land-locked salmon (*Salmo salar sebago*) were caught by anglers in Chamcook lake, New Brunswick, last year. Efforts by the Dominion Department of Fisheries to build up the stocks of these fish in Chamcook have evidently been productive of results.

Prince Edward Island's lobster catch in 1931 showed an increase of over $76,000 in marketed value as compared with 1930, or a total of nearly $880,000. The catch itself was 13,330 hundredweights larger than in the preceding year.

Canadian fish products are prepared for market in accordance with the most approved practice. That's one reason why they are such excellent food.

FISHERIES NEWS BULLETIN

Acting Minister: Hon. A. DURANLEAU, M.P.

Published Monthly by the Department of Fisheries, Ottawa, Canada

Deputy Minister: W. A. FOUND

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PRINCE EDWARD ISLAND EXPERIENCE SHOWS FISHERY CONSERVATION PAYS

Great Increase in Provincial Lobster Catch Last Year Believed Largely Due to Fishermen's Adherence in Other Seasons to Regulation Protecting Spawn Lobsters

Fisheries operations in Prince Edward Island in 1931 were featured by increased returns from the lobster fishery, which were all the more noteworthy since they were recorded in a year when fisheries returns generally were diminished everywhere.

Incidentally, but a point of importance, the improvement in the lobster fishery of the province is attributed, in part at least, to the fact that in recent preceding seasons most of the lobstermen had loyally respected the regulation requiring that any spawn lobsters found in the traps must be liberated immediately. The purpose of regulations of this kind, of course, is to conserve the fish stocks and Prince Edward Island's experience of 1931 indicates how successful they may be.

Despite the improved showing of the lobster fishery, Prince Edward Island's total fisheries production last year, as shown by information supplied the Dominion Department of Fisheries by its island officers, was smaller than in 1930, both in point of catch and amount of marketed value. No one will be surprised by that; the state of world affairs, economically, was so disturbed in 1931 that the market for fish products was unsatisfactory and, naturally, there was slackening of fisheries operations everywhere. Under all the circumstances, there might have been no surprise if Prince Edward Island's production figures for the year had shown a greater decrease than actually took place.

The island's total commercial catch of fish during the year was approximately 23,460,000 pounds, which had a landed value to the fishermen of a little more than $764,000. Final revision of the year's statistics, of course, may change some of these figures but it is not likely that any very substantial changes will be made. Using the unrevised figures for the year in making comparisons with 1930 results, 1931 saw a decrease of about 2,086,000 pounds in the total catch for the province for the twelve months and a drop of something more than $79,000 in landed value.

Ups and Downs

So far as catches were concerned, last year brought increased quantities of alewives, caplin, tomcods, oysters, and lobsters but there were decreases in the landings from the other island fisheries, such as the cod, hake, herring, mackerel, smelt and clam and quahaug fisheries. In most cases, and perhaps in all cases, where decreases occurred they were due chiefly to a lessening in the intensity of fishing effort because of unfavourable market conditions.

On the "gain" side of the account for the year, the lobster and oyster increases were the most noteworthy. Oyster catch, 5,326 barrels, was 438 barrels greater than it had been in 1930, notwithstanding that an amendment to the fisheries regulations which became operative last October raised the size limit for marketable oysters. Interest in this fishery in Prince Edward Island has been stimulated in the past two or three years by steps which the Department of Fisheries has taken to encourage oyster farming and further expansion of production in the next few years seems likely. As a result of successful experiments by the department in oyster culture in the province, applications for leases of suitable areas have been made by a number of citizens desirous of undertaking oyster farming in Prince Edward Island waters.

The increase in lobster catch during 1931 totalled more than 1,500,000 pounds!

(*Continued on page 8*)

COOK BOOK AVAILABLE IN ENGLISH, FRENCH

Copies of the new book, "Fish and How to Cook It," which has been issued by the Dominion Department of Fisheries, are now available either in French or English at a price of ten cents each. The booklet has been prepared under the direction of Mrs. Evelene Spencer, specialist in fish cookery, who is now on the department's staff. It gives authoritative information and is designed to meet the needs of the average Canadian household. Persons wishing to receive the booklet should write the Deputy Minister of Fisheries, Ottawa, enclosing ten cents for each copy required and stating whether the English edition or the French edition is desired.

SHORE WHITE MASS OF HERRING EGGS

Herring runs to various areas in Northern British Columbia are apparently on the increase, according to reports made to the Dominion Department of Fisheries from Pacific coast officers.

The run of herring to Pearl Harbour and adjacent territory, for instance, was exceptionally heavy this year and when spawning was at its height a few weeks ago the beaches along some parts of the coast showed almost white at low tide, so great was the mass of eggs adhering to the seaweed. The spawning was very heavy along the bar from Pearl Harbour to Digby Island, and this was true also at Stephens, Dundas, Prescott, and Porcher islands. Salmon trollers who have fished in these localities for years past are quoted as having stated that they had never before seen such a heavy spawning of herring over so wide an area.

APRIL LANDINGS FROM FISHERIES ON DOMINION'S COASTS 17,888,000 POUNDS

Catches of British Columbia Halibut and Nova Scotia Haddock Increased, Some Other Gains, but Effect of Adverse World Conditions Seen in Net Decrease

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As compared with the figures for April, 1931, the total landings of 17,888,200 pounds showed a decrease of some 5,900,000 pounds, and the landed value of the month's catch to the fishermen, $611,500 in round figures, was less by $214,000 than a year ago. Both decreases are attributable to the continued world-wide economic disturbance which lessens the fishermen's incentive to operate intensively and lessens the return from such fishing as is done.

In British Columbia Waters

On the Pacific coast during April the landings of halibut were much larger than the catch of any other variety of fish and, indeed, the total halibut fares for the month, between 1,809,000 and 1,810,000 pounds as shown by unrevised statistics prepared by the Dominion Department of Fisheries, were slightly larger than in April, 1931. Halibut prices, however, were lower than in the preceding April and the total landed value of the month's catch fell to $84,000 as compared with $136,250.

The month's salmon catch by British Columbia fishermen was a little more than 437,000 pounds, a decrease of 100,000 pounds. April, of course, is not one of the "big" months in the Pacific coast salmon fishery. There were also decreases in April in the landings from other Pacific fisheries—herring, clams, etc.

In the Maritime Provinces

Catches in most of the Atlantic coast fisheries were smaller than in April of last year, although there were some exceptions, as, for example, the haddock fishery in Nova Scotia waters. In April, 1931, Nova Scotia haddock fishermen landed 2,627,100 pounds, all told, and in the April just past their catch amounted to 2,771,400 pounds. Here again, however, lowered prices reduced the landed value total, notwithstanding the increase in catch. Nova Scotia scallop fishermen also did much better than a year ago, and in this case there was increase in landed value as well as in landings. Altogether 3,472 barrels of scallops were brought ashore, or an increase of some 1,400 barrels, and they had a landed value of $11,000 as compared with only $5,290 in April, 1931. There was some gain in Nova Scotia lobster catch, but a fall in landed value. Clam catch was practically the same as in April of last year, but landed value rose somewhat. Landings of cod, hake, pollock, and alewives decreased, and there was a sharp decrease in herring catch.

In New Brunswick the fish taken during the month included cod—the cod catch was slightly larger than a year ago—herring, sardines, alewives, clams and quahaugs, lobsters, oysters, and scallops. In most cases the landings were less than in April, 1931. Landed values decreased generally.

The Prince Edward Island catch for the month consisted for the most part of herring, although some clams were taken. The herring landings, approximately 180,000 pounds, were much smaller than in the April before.

In Bideford River, Prince Edward Island, where oyster culture has been carried on by the Dominion Department of Fisheries for two or three years past, there are now estimated to be sufficient oysters to fill several thousand barrels. A good many of them will be of proper size for sale this year.

British Columbia's output of canned salmon in the five-year period, 1927-1931, averaged 1,540,744 cases annually. Despite the fact that market conditions resulted in the 1931 output being much below normal, the average production in 1927-31 was only 92,000 cases below the average for the preceding five years.

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The attendance was the largest so far, the enrolment at the four previous courses having averaged twenty-two. Examinations were held at the close of the six weeks' period of instruction, and twenty-two of the men passed the tests, seven of them with honours.

In establishing these annual courses for fishermen the Dominion fisheries authorities had it in mind to open an opportunity for ambitious young men to add to their knowledge and efficiency so that they might not only carry on their own fishing operations more successfully but might also be enabled to impart authoritative information to their comrades as to the best methods to employ. A measure of assistance toward meeting the transportation and living expenses entailed by attendance at the courses is given, under prescribed conditions, to each fisherman who enrols.

The work done under trained and expert instructors at this year's course was largely similar to that taken up in previous years. It included practical instruction in processing pickled herring and pickled mackerel and dried and boneless fish, lectures and demonstrations as to brine-freezing bait and storing it properly, and practical work in navigation, etc. Some lectures on elementary science and economics were also given, taking up points which would fit into the experience of the men in the prosecution of their work.

Mullets taken in New Brunswick streams are used chiefly for feeding mink and foxes in fur farming ranches. The quantity caught is not large, amounting in 1931, for example, to 120 hundredweights only.

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Experimental use of a Nova Scotia power canal in the collection of salmon eggs for propagation purposes was so successful last year that the Fish Culture Branch of the Dominion Department of Fisheries is employing the same plan again this year, and expanding the plan, too, so that both the power pond and the canal will now be utilized and more parent fish taken for stripping than could be satisfactorily handled before.

Water-power developments are very useful to the country as sources of electric energy but this Nova Scotia case—the locale is a plant at Nictaux Falls, on the Nictaux River, which serves the town of Middleton—is the first instance, so far as known, where such works have rendered the additional service of aiding to maintain fisheries resources. Anglers, especially, will think the plant's new use a good use.

Last year 240 Atlantic salmon were stripped by the fish culture people in the Nictaux operations, and from 152 female fish an average of some 4,600 eggs were obtained, or a total of about 700,000. The eggs were than placed in the Fisheries Department's hatchery at Middleton and this spring the resulting fry are being distributed in waters of the Nictaux with a view to building up the salmon run in this area. It is by such collecting of eggs, and the distribution of eggs, fry, fingerlings, or, sometimes, larger fish, that the Dominion fish culturists help to maintain and increase the stocks of commercial and sport fish in different parts of Canada.

Although only 240 salmon were stripped at Nictaux Falls in 1931 a much larger number of fish were available and it is in order to enlarge the facilities for retaining fish for stripping purposes that it has been decided to use the power pond this year as well as power the canal. Plans were made last year not to retain more than 300 salmon, at the most, in the canal but now it will be possible to handle 800 fish in pond and canal combined. A barrier at the upper end will make the pond a suitable holding ground for 500 fish, and 300 more can be retained in the canal.

In these Nictaux operations the salmon desired for stripping are captured as they go up river via a fishway which leads from the foot of the power dam to the canal. At the fishway's outlet a trap has been constructed, with white-painted bottom, and as the fish make their way innocently into this trap on their upstream journey they show up so distinctly against the white that they may be readily examined without any handling. Only the best of fish, showing no signs of net marks or injury, are retained for stripping. Other salmon are allowed to go their way. Of course, the fish held for stripping are also liberated after the eggs and milt have been taken from them.

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Various other pieces of fish cultural work, in addition to the operations at Nictaux Falls, will be in progress this year in different parts of the Maritime Provinces, as in other seasons. Both east and west, the Dominion fish culture people are at work every year.

One of the Maritime Province activities will be a biological survey of Loch Lomond, near St. John, N.B., which will be carried out by scientists of the staff of the Biological Board of Canada, which operates under the control of the Minister of Fisheries. With a view to improving the angling in Loch Lomond the department has placed quite a large number of Brown and Loch Leven trout fry, advanced fry, and fingerlings in the lake within the past few years. Some larger fish of these species have also been put in the lake. Representations have recently been made, however, that the angling is not as satisfactory as hoped for and this summer's survey has been decided upon in order that the cause may be ascertained.

Possibly the lake is over-fished, possibly the supply of fish food within it is not capable of sustaining more than its present production of fish; there may be other "possiblys," but, in any case, the biological survey will seek to ascertain the condition of the lake as regards supply of fish food and the size of fish population, and to assay, as well, the development chances.

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Of course, it is not only in the livers of cod and halibut that vitamines occur in Canadian fisheries products. Research may show that the livers of other fish are also rich in these elements, which are essential to human health, but, in any case, science has already established that the body oils of various fish have valuable vitamine content, so that people may obtain needed vitamine supplies by eating fish regularly.

PRINCE EDWARD—Conc.

(Continued from page 1)

In 1930 the landings amounted, all told, to about 8,082,000 pounds and last year they rose to 9,677,000 pounds. The landed value of the 1931 catch also showed a gain, totalling nearly $572,000 as against $539,730 in 1930. The output of canned lobsters increased to 37,718 cases, as compared with 31,935 cases in the previous year, and the Department of Fisheries' supervisor for Prince Edward Island reports that the packers, who included several fishermen's associations operating canneries for their members, were successful in disposing of their entire production quite early.

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PRINCE EDWARD—Conc.

(Continued from page 1)

In 1930 the landings amounted, all told, to about 8,082,000 pounds and last year they rose to 9,677,000 pounds. The landed value of the 1931 catch also showed a gain, totalling nearly $572,000 as against $539,730 in 1930. The output of canned lobsters increased to 37,718 cases, as compared with 31,935 cases in the previous year, and the Department of Fisheries' supervisor for Prince Edward Island reports that the packers, who included several fishermen's associations operating canneries for their members, were successful in disposing of their entire production quite early.

BRITISH COLUMBIA SALMON PLENTIFUL IN 1931 THOUGH PACK FOR YEAR CUT

Spawning Grounds of Great Pacific Coast Fishery Generally Well Seeded during Past Year—Fishing and Canning Operations Curtailed because of World Economic Dislocation

British Columbia's output of canned salmon in 1931 was very much smaller than the 1930 back but that condition can be blamed upon world-wide economic upsets and was not attributable to any lessening in the available supplies of fish.

"Had market conditions warranted," says a statement in this connection from the Vancouver office of the Dominion Department of Fisheries, "there is no doubt that, with the splendid supplies of all varieties of salmon in practically all fishing areas, a pack could have been produced (in 1931) which would have compared very favourably with the output for the record season of 1930."

So far as pack is concerned, the fact is that the canners came into 1931 with a substantial carry-over on hand and with market conditions throughout the world exceedingly unsatisfactory it was inevitable that fishing and canning operations should have been greatly reduced.

Some comparative figures as to plant and equipment in use in 1930 and in 1931 will indicate the effect of adverse world conditions upon the scale of operations in the salmon industry last year. The number of licences issued in British Columbia for salmon purse seines in 1931 was less than 250, as compared with 350 or so in the year before. The issue of licences for salmon gill-net fishing was under the 5,000 mark, a decrease of more than a thousand. Only 35 canneries were in operation as against 59 in 1930.

Output in 1931

All told, the 1931 pack of canned salmon was a little more than 685,000 cases as compared with over 2,221,700 cases in the preceding year, but, of course, it is to be remembered that 1930 was a record-making year so far as production of canned salmon in British Columbia is concerned. The great decrease in 1931 pack was in the output of pinks and chums—two varieties of canned salmon which were affected even more than some others by the dislocation of the market situation. The year's output, by varieties, was as follows:—

	Cases
Sockeye	291,464
Springs	27,147
Cohoes (including bluebacks)	102,175
Pinks	206,995
Chums	55,997
Steelheads	1,326
Total	685,104

Curtailment of operations pulled down the canned salmon total but it also had the effect of giving greater opportunity for the fish to get to the spawning grounds in satisfactory numbers, and the reports from inspectors of the Department of Fisheries are to the effect that the grounds generally were well seeded during the year. The benefit from this condition should be harvested in future years when the fish born of 1931 spawning are available for capture as they, in their turn, make their way toward the spawning beds.

Here and there, of course, the runs to the spawning grounds were not quite as satisfactory as had been expected. On the other hand, there were other cases in which the beds seemed to be especially well seeded; for instance—choosing only one or two districts at random for purposes of illustration—the heaviest run of chums for many seasons occurred in practically all streams in the Alert Bay area and practically all of these fish passed safely to the spawning regions; the seeding of the beds in the Comox district with spring salmon eggs was the best since 1925; the Goldstream River, at the head of Saanich Inlet, showed one of the best runs of cohoes in recent years; conditions on the sockeye spawning areas in the Barclay Sound district were found to be most encouraging; in the Queen Charlottes a larger proportion of the pink runs than usual made their way to the beds.

Fur seal captures by British Columbia Indians in 1931 totalled 1,463, as compared with 2,297 in 1930. Prices were so low that there was much less inducement than usual for hunting fur seals, which, under the Pelagic Sealing Treaty, may be taken by Indians only, so far as British Columbia waters are concerned.

GUARD FISH STREAMS AGAINST POLLUTION

Dominion Fisheries Inspectors on Watch to Prevent Injury to Country's Fish Life

Sawdust has its place, but not in streams frequented by fish, and part of the work of fisheries inspectors under the Dominion Department of Fisheries is to see to it that such waters in their respective territories are not polluted with mill refuse or other substances injurious to fish life.

But how does sawdust, for instance, do harm to fish life? It has evil effect in two ways: By covering spawning beds it prevents the hatching of live fish from the eggs and, in the second place, it kills live fish by getting into their gills or breathing apparatus. Other kinds of waste—for instance, seepage from certain classes of industrial plants—are also injurious to fish life. It is because of these injurious consequences upon natural resources which it is so important to conserve that the Department of Fisheries requires that its officers in areas where the fisheries are under federal administration shall make careful inspection of mills, etc., along streams frequented by fish and check any operators who may thoughtlessly be allowing sawdust or other refuse to fall into the water. Steps of this kind are of importance from the standpoint of fisheries conservation, and conservation is essential in the interests of commercial fishermen and anglers alike.

In most cases where refuse from an industrial establishment is reaching a fish stream the condition is willingly and promptly remedied by the operator when the fisheries inspector draws it to his attention. If this does not happen, however, prosecutions may be instituted under the Fisheries Act which provides that "no person shall cause or knowingly permit to pass into, or put or knowingly permit to be put, lime, chemical substances or drugs, poisonous matter, dead or decaying fish, or remnants thereof, mill rubbish or sawdust or any other deleterious substance or thing, whether the same is of a like character to the substances named in this section or not, in any water frequented by fish."

Fish is tasty food but, better still, it's rich in health-making elements. Eat it often.

FISHERIES NEWS BULLETIN

Acting Minister: Hon. A. DURANLEAU, M.P.

Published Monthly by the Department of Fisheries, Ottawa, Canada

Deputy Minister: W. A. FOUND

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NO VISITING BETWEEN HADDOCK OF DIFFERENT AREAS OFF CANADA'S COAST

Tasty Food Fish, Adding Many Thousand Dollars Annually to Value of Dominion's Production, Has Ways and Markings All Its Own

On each side of every haddock there is found, near the shoulder, a blackish mark or patch, and thereby hangs an ancient tale:

Tradition has it, in the words of one writer, "that the black blotch on either shoulder of this fish is due to the action of St. Peter's finger and thumb when he drew out one of the haddock's ancestors from the Lake of Genneserat to obtain the piece of tribute money."

Whatever the explanation of their presence, the black patches are never lacking on the haddock, and this fish of distinctive markings brings in a good many dollars every year to the fishermen of Canada's Maritime Provinces. Haddock fishing operations also bring in a good many dollars to other Canadians beside the fishermen. The dollars received for the nets, the rubber boots, the oilskins; and other supplies the fishermen must have in large quantities. So far as production is concerned, the haddock catch in 1930, for instance, as shown by statistics collected by the Dominion Department of Fisheries, amounted to more than 48,600,000 pounds, and though the year was one when prices were tending downward the marketed value of the landings was over $1,850,000. By far the greater part of the annual catch is taken by Nova Scotia fishermen (more than 47,000,000 pounds in 1930), but there are substantial landings from New Brunswick waters and smaller catches are taken in the Prince Edward Island fishery. Haddock are not taken in Quebec operations, and they do not occur in Pacific waters.

One of the best of Atlantic food fishes, the haddock belongs to the same family as the cod, but it is distinguished from its brothers and sisters by the black shoulder patches, black lateral line, two separate anal fins, and three separate back or dorsal fins. In colour it is a dark purplish gray, above the lateral line, and, below the line, silvery gray, tinged with pink. The pink and purple shades soon fade after the fish is taken from the water. The average weight of the Canadian haddock is about three and a half or four pounds.

Much of the Canadian catch is marketed in the fresh form, selling in the domestic market and in the United States. A good deal is dried, a good deal smoked and sold in the form of finnan haddie. A relatively small quantity is canned. In all these various forms the fish is a nourishing and tasty food, which may be used in many different ways in preparing dishes for the family table. Haddock waste is utilized in the production of fish meal and, to some extent, in the manufacture of fish glue.

The Haddock's Ways

Haddock, of course, are not taken in Canadian waters only. As pointed out by Dr. Alfreda B. Needler, in a bulletin issued by the Biological Board of Canada, these fish occur only in the North Atlantic, "and even then only in somewhat circumscribed areas," but they are found on both sides of the ocean. On the European side they "are most abundant in the northern North Sea," and they are also quite plentiful off the coasts of Great Britain, off southwestern Norway, around the Faroe Islands, and off Iceland, as well as in some other waters. On the North American side, "haddock do not occur north of the Strait of Belle Isle or south of Cape Hatteras. The largest catches are made off Cape Cod. . . . Haddock are quite abundant all around the Gulf of Maine, around most of Nova Scotia and on the neighbouring banks, and off the coast of Cape Breton.

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LOBSTER GAINS MARK MAY SEA FISHERIES

World Difficulties Reflected in Smaller Production from Most Other Fisheries

Canada's sea fisheries operations in May were marked by large increase in the landings of lobsters, which amounted in all to approximately 22,739,000 pounds as compared with 20,030,400 pounds in May, 1931.

On the other hand, production was smaller than a year ago in most of the sea fisheries and May's total landings of all varieties of fish and shellfish were about 85,656,500 pounds, a decrease of something more than 14,000,000 pounds. The landed value of the catch to the fishermen was slightly over $1,956,300, a drop of about $337,000. The unsatisfactory state of world markets explains both decreases.

Of the month's total catch, the Atlantic waters yielded 80,206,000 pounds, in round figures, and 5,450,000 pounds were taken by British Columbia fishermen. May, of course, is always a month of relatively small production in the British Columbia fisheries. In May, 1931, for instance, Pacific coast operations accounted for only 8,030,000 pounds of the Dominion's sea fisheries landings of 100,135,500 pounds. It is in some other months of the year that such fisheries as the salmon, herring, and pilchard fisheries are at their height in Canada's Pacific waters and British Columbia production is lifted to big figures and exceeds Atlantic coast landings.

In Pacific Waters

Halibut catch accounted for about 1,897,000 pounds of British Columbia's total landings in May, but unfavourable market conditions lessened the intensiveness of fishing operations and the quantity of halibut taken was less by 1,390,000 pounds than was brought ashore in the previous May. Salmon catch for the month was 1,861,000 pounds, roundly stated, and was 335,000

(*Continued on page 4*)

AVERAGE FISHERIES VALUE FOR B.C. OVER $21,800,000 IN PAST 10 YEARS

Operations Curtailed and Returns Lessened in 1931 as Result of World Conditions but New Gains Reasonable to Expect when Situation again Becomes Normal

Return from the fisheries fell off very sharply in British Columbia last year, as everywhere else in the world, but notwithstanding this decrease the average annual value of the output from fishing operations in the province in the past ten years (1922-1931) has been more than $21,828,000.

And that's a tidy sum of money for one industry in one province to have added yearly to the value of the production from Canada's natural resources.

Doubtless the annual average may be pulled down a bit this year, since markets and prices are still unsatisfactory, but when the world has returned again to normal the figures may be expected to rise to new high levels, for the fisheries resources of the Pacific coast have not yet been exploited to the full.

Salmon, of course, account for the greater part of British Columbia's annual return from fishing operations, but the province is also possessed of other very valuable fisheries, such as the halibut, herring, and pilchard fisheries, as well as a number of lesser importance. As a matter of fact, about twenty-five different varieties of food fish and shellfish are taken commercially by British Columbia fishermen every year, and whales, seals, and grayfish or dogfish are also landed.

No Lessened Supply

Last year the marketed value of the fisheries production of the province was $11,110,000, in round figures. The 1931 value was the "low" for the ten-year period just passed, but it is to be kept in mind that the drop was due entirely to world economic conditions and not to any depletion of the fisheries resources. (Given a satisfactory market situation, the British Columbia fishermen would have landed a good many million pounds more fish than they brought ashore last year, for the fish were there to take.) The "high" level for 1922-1931 was reached in 1926, when world conditions were favourable and British Columbia output heavy.

The quantity of gear and equipment in use in British Columbia operations last year, and the number of persons employed, were both less, of course, than in the preceding year. A similar state of affairs existed in fishing countries the world over. Operations were curtailed because of economic conditions. Even at that, however, more than 13,000 people were working in Canada's Pacific coast fisheries and they used plant and equipment worth over $20,000,000. They operated nearly 5,000 gasoline boats and 228 sailing and gasoline vessels and over 1,900 sail and row boats, as well as between two and three hundred carrying smacks and scows. Their nets and lines and traps had a value of about $1,750,000, although that amount was naturally considerably less than the figure for years when operations were on a more intensive scale. With the salmon markets badly upset, the number of canneries in operation was reduced to 35 and the canners limited their pack.

NEW PRAIRIE HOME SUITS TROUT WELL

Add Antelope Lake to the Saskatchewan waters where trout reared in unfamiliar environment have thrived well.

Loch Leven trout fingerlings placed in Antelope Lake by the Fish Culture Branch of the Dominion Department of Fisheries in 1929 had reached a length of as much as sixteen inches in 1931, although these game fish are not indigenous to this particular body of water. The case is another example of success met with by the Dominion fish culturists in introducing different varieties of fish into areas where they were previously unknown. Most of the work of the Fish Culture Branch is concerned with maintaining and increasing the stocks of commercial fish but in a number of cases, in different provinces, the branch has also given attention to efforts to widen the angling resources of the country, and what has happened at Antelope Lake is an instance in point.

SUPERINTENDENT OF HATCHERIES RETIRING

After more than thirty-five years' work in the Dominion Fisheries service, Alexander C. Finlayson, Superintendent of Fish Hatcheries under the Department of Fisheries, is retiring from duty. He has applied for superannuation, which will become effective next January, and in the meantime he is on leave. Mr. Finlayson expects to continue to reside in Ottawa.

As an evidence of their regard for him, and as a memento of pleasant associations, members of the Department of Fisheries' staff at Ottawa presented Mr. Finlayson a few days ago with a gold watch and chain, with suitable inscription engraved upon the watch. The presentation was made, on behalf of the staff, by the Deputy Minister, Wm. A. Found, who spoke of the faithfulness and ability shown by Mr. Finlayson in the public service and of the valuable contribution he had made to fish culture progress in Canada. Mr. Found also expressed the hope that Mr. Finlayson would much enjoy the years of retirement so well earned.

Superintendent Finlayson, a Scot by birth, obtained his early training in fish culture work under the Biological Branch of the Fishery Board of Scotland. Coming to Canada he entered the federal fisheries service in April, 1897, when he was assigned to work at the hatchery operated at that time at Magog, Quebec, by the then Department of Marine and Fisheries. For several years he served at the hatchery as Officer in Charge. Later on, he was appointed Dominion Instructor in Fish Culture and in November, 1906, he was named as Inspector of Fish Hatcheries. A few years ago, when a reclassification of the service took place, Mr. Finlayson became superintendent of federal hatcheries throughout the Dominion. He has long been recognized as an expert in the fish cultural field and his ability and wide knowledge, coupled with his keen interest in his work, have made his services most efficient and valuable.

Fishermen at Prince Rupert, B.C., received 12 cents a pound last year for halibut livers which were sold to Canadian and United States laboratories producing medicinal oil.

Nova Scotia's catch of cod in 1931 totalled approximately 80,828,000 pounds.

MAKING OYSTERS NEW "FARM" PRODUCT FROM PRINCE EDWARD ISLAND WATERS

"Oyster Farming" Begun in Island Province Under Policy of Dominion Fisheries Department for Expanding Production—Preliminary Work Also Under Way in New Brunswick

Oyster "farming" under the policy adopted by the Dominion Department of Fisheries is getting actively under way in Prince Edward Island where already a dozen or more citizens have leased from the department Malpeque Bay areas which are suitable for oyster cultivation on a commercial scale.

More than seventy-five applications for leases of other areas in the Malpeque Bay region and elsewhere in the province are also before the department and are being dealt with as expeditiously as possible. Still others are expected from time to time. No leases are being granted, however, or will be granted, except for areas which departmental examination has shown to be suitable for oyster farming operations.

Extension of oyster farming to certain New Brunswick waters is also now in prospect under the department's policy. A short time ago an agreement was entered into between the Dominion and New Brunswick authorities whereby control of the oyster areas in the Westmorland County portion of Shediac Bay was vested in the department, which is undertaking investigational work there with a view to introducing a farming plan similar to that being followed in Prince Edward Island.

A season or two must elapse, of course, before it will be seen how great an increase will follow from the farming now being undertaken in Prince Edward Island, but there is keen popular interest in the possibilities and as the natural conditions are favourable, and the lessees will have the benefit of the advice of departmental experts, it is expected that a large measure of success will be achieved. Oyster farming, quite as feasible as agriculture, under proper conditions, is already an important industry in different countries, and as an indication that optimistic expectations are justifiable as to Prince Edward Island prospects it may be pointed out that a small area in the Malpeque Bay region which, in 1928, was planted with "spat," or young oysters, in the course of experiments conducted for the Department of Fisheries now has on it some 200,000 oysters which are expected to be ready for market this year.

Not Difficult or Costly

Adoption of the oyster farming policy as an aid to the further development of Prince Edward Island resources followed several years of investigation by the Fisheries Department, which was given complete administrative jurisdiction over the oyster beds under an agreement made with the Provincial Government in 1928. Some years previously the oyster stocks in the Malpeque Bay territory, which had been a famous producing ground, had been virtually exterminated by a disease which is believed to have been introduced by seed oysters brought in from elsewhere, and the department therefore set on foot investigation and experimentation to determine whether the Malpeque stocks could be built up again and whether there was ground for believing that commercial oyster farming could be successfully undertaken in the waters of the province. Both questions were answered in the affirmative by the study and experiments which were carried on, most of the work being done by Dr. A. W. H. Needler, a scientist on the staff of the Biological Board of Canada.

Dr. Needler found, too, that the farming methods which should be employed are neither difficult nor unduly costly. Expressed here in the most general terms, the farming operations include the cleaning of suitable hard bottom by the use of tongs or drags; the removal of starfish and other enemies of the oyster, and the removal of mussels and other competitors of the oyster; the collection of spat by the use of loose shells, shells in wire bags, brush, or cement-coated cardboard collectors; and planting the spat on the chosen ground. Although these operations are not difficult or expensive they must, of course, be properly performed, and for the assistance of persons who undertake them a bulletin of information and instructions has been prepared by Dr. Needler and will shortly be issued by the department.

Leasing Conditions

Following the investigation and the department's decision to adopt the

(*Continued on page 4*)

FISHERMEN HELPED TO GET QUALITY OUTPUT

Magdalen Islands Men Gainers from Educational Effort of Dominion Fisheries Department

There are good ways of curing fish, and better ways, too, and fishermen in the Magdalen Islands, Quebec, have been aided in applying these better ways by the action of the Dominion Department of Fisheries in sending an expert among them last year to demonstrate the most efficient method of curing cod for market.

This instructor was very successful in his work and a report to the department from its supervisor for the territory which includes the Magdalens is to the effect that a large part of the cod catch made in the islands is now processed according to the instructions given. Not only are the instructions being followed but they are evidently being applied efficiently for a large United States company which purchased a good deal of the Magdalens' 1931 output of pickled cod expressed itself as much pleased with the fine quality of the product.

The Magdalen Islands are the only part of Quebec province where the fisheries are administered by the federal authorities, but elsewhere in the country where the Dominion department is responsible for fisheries administration it has carried on other educational effort through special instructors and demonstrators, with very useful results. This has been the case, for example, in Prince Edward Island and in Northern New Brunswick. In addition to the work done by these special officers, there is, of course, the work done by the department's fisheries inspectors in different parts of the country in helping fishermen to follow the most approved methods of handling fish. In order to fit themselves fully to impart information of this kind, both orally and by demonstration, the inspectors are required by the department to take specified courses of study at stations of the Biological Board of Canada and to pass examinations in the subjects taken up.

Approximately 25,000 base boxes of tinplate are used each year by the Canadian lobster canning industry, practically all of them being purchased from Wales.

NO VISITING BETWEEN HADDOCK OF DIFFERENT (*Conc.*)

In the Gulf of St. Lawrence there are but few haddock, and these only in the summer."

Like other varieties of fish, haddock have their own particular ideas as to where and how to live. They don't like waters deeper than a hundred fathoms at all, and most of them apparently think fifty fathoms deep enough for true comfort. They like the bottom, but not all kinds of bottom; to suit the preference of these bottom dwellers the sea-bed must be sandy or peddly rather than rocky. They seem to like temperatures ranging between 32 degrees and 41 degrees Fahrenheit, and areas where the salinity is from 31·5 to 33 parts of salt to 1,000 parts of water. At meal-time they want bottom-living organisms such as crabs, clams, whelks, mussels, starfish, brittle stars, etc. Stomachs of haddock are sometimes found to contain other fish "and they have been accused of eating so much herring spawn that they develop a definite bloom on the skin," but North American investigators and fishermen, however, agree that in general the adult haddock eat very few fish.

Know their Place

There's another interesting fact about the North American haddock; indeed, there are many, but let this one suffice. The waters in which the fish range are divided by the deep-water Fundian and Laurentian channels into three definite areas which are comparatively shallow, and between these three areas—the "New England," "Nova Scotian," and "Newfoundland" regions, as they may be called—there is virtually no interchange of haddock. In other words, the haddock population off North America falls into three distinct divisions, as has been established by tagging operations and other steps taken in the course of an investigation carried on chiefly by Dr. A. W. H. Needler several years ago. Within their particular area the haddock may travel long distances but they do not cross the deep channels from one area to another.

"The only time at which there can be any mixing of the three populations," writes Dr. Alfreda Needler, "is before the young fish settle to the bottom. Haddock eggs and larvae float at or near the surface of the water; they are then at the mercy of ocean currents and may well pass from one shallow water area to another. The matter is rather as if three nations agreed to carry on a certain amount of exchange of babies but otherwise to maintain a cold political aloofness. . . . Further evidence of this distinctness of the populations is given by studying the rates of growth of the fishes in the different places. For instance, the fish on Georges Bank grow more quickly than those on Browns Bank"—Georges and Browns are both off the southwestern end of Nova Scotia—"although there is only a narrow neck of deep water separating the banks. Again it has been shown that the age composition of the catches of haddock tend to differ in the different areas, one year's brood doing well in one and another year's brood in another."

MAKING OYSTERS (Conc.)

leasing policy, a complete survey of the Malpeque Bay region was made and the bay was laid out in a series of blocks which, in turn, were divided into smaller parcels. A map showing these divisions was then prepared so that would-be lessees could readily ascertain what pieces of ground were available. All of the region was also subjected to expert examination so that the suitability of the different blocks for oyster culture could be determined.

At present the department is not granting more than five and a half acres on any single application for a lease, and, of course, each lessee is required to begin operations without undue delay and to carry them on in a proper way. "If at any time," says one clause in each lease, "the lessee should, in the opinion of the Minister (of Fisheries), neglect to properly establish and cultivate oysters, the minister may forthwith cancel the lease. The lessee, moreover, undertakes to improve the said area without undue delay, and if improvement to the satisfaction of the minister has not been effected within one year from the date of the issue of the lease, the minister may cancel the lease." Each lessee is also required to mark the corners and angles of his areas in a specified manner. The leases are for periods of twenty years each and are renewable for a like period. The rental, per acre or fraction of an acre, is $1 a year in the first three years and $3 in the subsequent years, but after the first five years the lessee must also pay a reasonable royalty on production.

LOBSTER GAINS MARK (Conc.)

pounds larger than a year ago. Salmon and halibut thus made up approximately 3,758,000 pounds of the total fisheries production of British Columbia in May.

Herring, ling cod, clams, and several other varieties of fish and shellfish accounted for the remainder.

Atlantic Returns

On the Atlantic coast, Prince Edward Island's total catch for the month, 10,298,000 pounds, was greater by nearly 3,236,000 pounds than in May of last year, but Nova Scotia, New Brunswick, and Quebec, all showed decreases. In all the provinces except Nova Scotia, as shown by unrevised statistics collected by the Dominion Department of Fisheries, lobster catch increased very substantially. In Prince Edward Island it was the larger landings of lobsters—6,176,600 pounds as compared with 4,311,700 pounds in May, 1931—which were chiefly responsible for the total gain in fisheries output for the month, although herring catch also showed a large gain and the cod catch likewise increased.

In Nova Scotia the lobster catch was 11,732,800 pounds, a drop of about 265,000 pounds. In New Brunswick the lobstermen took 3,522,500 pounds, a gain of nearly a million pounds, and the Quebec catch was 1,307,000 pounds as compared with 1,172,600 pounds in the May before. Lobster landed value increased in all the provinces except Nova Scotia.

Quebec's landings for the month were made up of lobsters, cod, and herring, and a few barrels of clams. Cod and herring catches were smaller than in May, 1931. In New Brunswick the cod landings, 681,300 pounds, were some 200,000 pounds greater than a year ago; landings of alewives showed a gain; but in most of the other fisheries, except the very important lobster fishery, there were decreased fares. Nova Scotia fishermen took more haddock, herring, mackerel, and halibut than in the 1931 month, but the other operations were generally less productive than a year ago.

Vessels, boats, and gear used by the fishermen of Prince Edward Island in 1931, in taking and landing their catches had a value of more than $756,000. The capital investment in the fish canning and curing plants of the province was slightly more than $183,000.

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PACIFIC LING COD, HALIBUT, SALMON GREY COD ALL SOURCES OF VITAMIN A

Valuable Work in Study of Vitamin Content of Fish Livers and Utilization of Their Oil Done at British Columbia Research Station Conducted by Federal Fisheries Authorities

Science continues energetically to seek out all the hiding places of the vitamins, those mysterious elements essential to health, and among the successful investigators are scientists on the staff of the Pacific Fisheries Experimental Station at Prince Rupert, B.C., whose laboratory work has brought out valuable facts as to the presence of Vitamin A in the livers of such Pacific fish as halibut, salmon, ling cod, and grey cod.

Samples of halibut liver oil prepared and examined at Prince Rupert have been found "to be very potent in Vitamin A," to quote from a progress report by H. N. Brocklesby, a member of the station's staff.

"The liver of the ling cod (also known as the Cultus and Buffalo cod) has been found . . . . to be rich in Vitamin A."

Tests of oil from the liver of red spring salmon "indicate that the oil is apparently a very good source of Vitamin A," although certain further research must be completed before a definite statement can be made as to the vitamin potency.

The grey cod, says another passage in the report, "yields a liver oil of fairly high Vitamin A potency." The oil, by the way, "resembles closely that of the cod of the Atlantic coast. The chemical and physical characteristics are much the same, but the oil from the Pacific grey cod is more deeply pigmented."

New Use for Dogfish?

More than this, the station's investigations have shown that the liver oil of the greyfish, or dogfish, a creature generally regarded by the fishermen as a pest or nuisance, has Vitamin A content and "since it can be obtained cheaply in large quantities it is suggested that it can be used for increasing the Vitamin A content of oils high in Vitamin D. Blended oils of this nature have been prepared in these (Prince Rupert) laboratories and are now being tested. For poultry purposes they would appear to be very satisfactory, and since they can be produced at very low cost it is hoped that a substantial market may be found for them."

Study and experiment in connection with the vitamin content of some of these liver oils—halibut oil, for example, which is now being used commercially in the production of a medicinal preparation similar to cod liver oil—has also been carried on, of course, by other scientists, but the research at the Prince Rupert station, which is one of four stations conducted by the Biological Board of Canada under the control of the Dominion Minister of Fisheries, is a valuable piece of work. Its benefits will probably be seen in the increasing utilization of fish livers which have heretofore been so much waste material in Pacific coast fisheries operations. Last year quite a tidy little business was done by some British Columbia fishermen in selling halibut livers to a company which had begun the marketing of halibut medicinal oil and business in other livers now found to contain vitamins will doubtless develop and add to the earning possibilities of the fishermen.

Facts brought out in the Prince Rupert investigations, which make up only part of the research work and experimentation carried on steadily by federal scientists on behalf of the fishermen and fishing industry, are of importance to the scientist and to men engaged in the fisheries by-products business, but some of them, at all

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CANADIAN FISH TALKS HEARD IN JAMAICA

Interesting Incident in Fisheries Department's Campaign to Increase Use of Canadian Fish

Visiting Jamaica a short time ago an Ontario woman turned on the radio and, to her surprise, there came to her a talk on Canada's fish, and fish cookery, which was being broadcast from a Canadian station by Mrs. Evelene Spencer, specialist in the food and health values of fish, who is now on the staff of the Dominion Department of Fisheries.

The listener was on holiday bent, not thinking of household duties at the moment, but the incident is interesting as indicating how wide a territory is being reached by the campaign which the department is having Mrs. Spencer carry on with a view to increasing the use of Canadian fish. The radio talks on fish foods and their preparation for the table have been reaching many parts of the Dominion, and have been followed with interest by large numbers of women, and as the campaign is continued other areas, too, in all sections of the country, will have opportunity of hearing these authoritative addresses which give so much information of value to the housewife.

To Quebec and West

At present Mrs. Spencer is doing work in the department at Ottawa, but at the outset of September she will begin a further series of addresses and cookery demonstrations. First she will go to some cities in Quebec and will then move westward. Several cities in the western part of Ontario will probably be visited and then work will begin in Manitoba. From Manitoba the campaign will be extended to Saskatchewan, Alberta, and British Columbia, although the exact itinerary has not yet been determined.

Prior to the coming of the summer season, which is not a very suitable time for cookery demonstrations and

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FISH INSPECTION SYSTEM WIDENED BY CHANGED LAW, NEW CONSERVATION STEPS

Additional Safeguards for Fish Runs in Canadian Streams Provided for by Amendments to Fisheries Act and Application of Fish Inspection Law Extended under Changes Made by Parliament

Legislation to conserve raw material of the Canadian fishing industry and other legislation designed to give further assurance of high quality in certain of the industry's finished products were passed by Parliament at its session of this year.

The first legislation consisted in amendments made to the Fisheries Act, enlarging and strengthening the provisions relating to the construction and maintenance of fishways in streams where power or mill dams or similar obstructions make it necessary to have fish-passes to protect fish stocks and thus serve the public interest.

The other enactments were amendments to the Fish Inspection Act and provide, chiefly, that after January 1, 1933, such fish as pickled herring, pickled alewives or gaspereau, pickled mackerel, and pickled salmon (other than mild cured salmon), shall not be sold, bought, or shipped unless they and their containers have been inspected by a duly-authorized officer and found to comply with regulations made under the act. Sale, purchase, or shipment of containers for fish coming under the Act is also forbidden unless they have been approved by an inspecting officer as complying with the regulations as to manufacture and marking.

The amended Fish Inspection Act also authorizes regulations "to provide for the grading and inspection of oysters" and regulations as to the size and marking of containers used in shipping oysters to market. A further provision, which like the others becomes effective next January, makes it necessary for all fish imported into Canada to show "the name and address of the packer, or the licence number of the packer." At present it is not necessary that these particulars be shown, although the country of origin, the kind and grade of fish, etc., must be indicated and the containers must be similar in character and equal in quality to those required under the act.

Giving Fish Fair Chance

The amendments to the general Fisheries Act make a number of changes, including the deletion of former sections relating to the licensing of fish canneries, reduction plants, etc. Apart from this deletion, which was consequent upon a Privy Council decision that the sections were ultra vires, the most interesting and most important changes are probably those in regard to dams and other obstructions in streams frequented by fish.

Power and mill dams are, of course, very useful to the country but so are fish, and unless suitable precautions are taken the obstructions may very easily destroy the runs by interfering with the ascent of mature fish to the spawning grounds or by jeopardizing young fish making their way downstream. It is in order to conserve the runs for the benefit both of commercial fishermen and anglers that the fisheries authorities lay emphasis upon the necessity of giving the fish another route of passage where streams are dammed, for it is to be remembered that once the stock is seriously depleted it may require years to build it up again, if, indeed, that can be accomplished at all.

Perhaps the most important of the new provisions is one which requires that in cases where it is not feasible to construct efficient facilities to enable fish to make their way past obstructions the owners or occupiers of the dams may be called upon by the Minister of Fisheries to meet the cost of constructing, operating, and maintaining such complete fish hatchery establishment as will keep up the annual run of migratory fish. The particular purpose of this requirement is to take care of cases where dams are built of such height as to make efficient fishways impracticable. It may be put into effect in any case where it is determined by the Minister that the construction of "an efficient fishway or canal around the slide, dam, or other obstruction is not feasible, or the spawning areas above such slide, dam, or other obstruction are destroyed."

Provisions of the former act requiring the owners or occupiers of dams or

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DESCRIBES BRITISH COLUMBIA GAME FISH

Bearing the title "The Trout and Other Game Fishes of British Columbia," a book written by Dr. J. R. Dymond, on the sport fish of Canada's Pacific coast has been published by the Dominion Department of Fisheries and is obtainable from the King's Printer, Ottawa. It is bound in green cloth and is illustrated by colour plates, showing various fish in their natural colourings, and by several black and white drawings. The illustrations were made from paintings and drawings by E. B. S. Logier, of the Royal Ontario Museum of Zoology, Toronto.

The writer of the book is a member of the faculty of the University of Toronto and also holds the position of Assistant Director and Secretary of the Royal Ontario Museum of Zoology. In a foreword Dr. Dymond points out that the text is based on studies carried out under the auspices of the Biological Board of Canada, a research body which operates under the control of the Dominion Minister of Fisheries. "Two summers were spent by the author in British Columbia," the foreword continues, "partly at the Pacific Biological Station, Nanaimo, and partly in visiting some of the principal game fish waters. From the inception of the studies in 1926, fishery officers, both federal and provincial, and numerous anglers, have co-operated by supplying specimens and information. The work has been carried out under the direction of Dr. W. A. Clemens, Director of the Pacific Biological Station, and for much of the time with the assistance of Mr. C. McC. Mottley."

This book is a valuable addition to Canadian fisheries publications, and it has the added merit of attractive appearance. The price at which it is obtainable from the King's Printer is $1 a copy. The book is not distributed by the Department of Fisheries.

There are no better fish foods in the world than those produced by Canada's fishing industry. Buy the Canadian product.

Something like sixty tons of parchment paper is used every year by the lobster canners of Canada's Atlantic coast in lining the tins of lobster which they place on the world's markets.

MORE LOBSTERS TAKEN IN EAST, MORE SALMON IN PACIFIC IN JUNE FISHING

Sea Fisheries Operations Generally of Lessened Intensiveness, However, as Result of Continued Effect of Adverse World Conditions and Consequent Marketing Difficulties

Continued unsettlement of world economic conditions again acted as a brake upon fishing effort in Canada in June, and the total landings from the country's sea fisheries during the month were less by about 1,550,000 pounds than they had been in June, 1931, or 66,884,000 pounds, in all, as compared with 68,439,000 pounds. More fish would have been taken had the world market situation warranted endeavour to swell production.

Nova Scotia's catch of sea fish and shellfish was larger than in June of last year but landings fell off in each of the other provinces which carry on sea fisheries operations—British Columbia, Quebec, Prince Edward Island, and New Brunswick.

The landed value of the fares to the fishermen decreased in all five provinces except Prince Edward Island, where a gain in lobster value, consequent upon an increase of some 300,000 pounds in catch, was more than sufficient to offset decreases in the returns from other sea fisheries.

The lobster fishery, indeed, was a bright spot in the June fisheries. Only in New Brunswick among the four lobster-producing provinces, which are the three Maritime Provinces and Quebec, was there a decrease in catch and value, although the gain in value in the latter province was small.

The Quebec lobstermen landed 1,153,000 pounds, or 81,000 pounds more than a year ago. In Nova Scotia the catch was 6,242,000 pounds, a gain of over 1,222,000 pounds, and on the landed value side there was a betterment of nearly $63,000. Prince Edward Island men caught approximately 3,475,000 pounds, as compared with 3,174,100 pounds a year ago and landed value showed a gain of about $9,000. New Brunswick's catch, slightly more than 1,743,000 pounds, was some 600,000 pounds under the figures for June, 1931, and the landed value decreased by about $37,000.

Atlantic Ups and Downs

Out of the month's total landings from the sea fisheries approximately 33,420,000 pounds were taken by Nova Scotia fishermen, according to unrevised returns prepared by the Dominion Department of Fisheries. Increased catches of cod, haddock, pollock, alewives, salmon, and lobsters, among the more important fish, brought the provincial total above the figures for the preceding June. Landings of hake and cusk, halibut, herring, mackerel, and clams and quahaugs were smaller than a year ago, but total gains exceeded total decreases and the net result of the month's operations was that Nova Scotia's catch was greater by 2,688,000 pounds than it was in June, 1931.

New Brunswick's catch totalled 9,071,000 pounds, a drop of 2,680,000 pounds or so. Smaller landings of cod, lobsters, and salmon, and a sharp decrease in herring catch, explain the provincial reduction, although there were large increases, relatively, in pollock and shad catches and more mackerel, haddock, sardines, and alewives were taken than a year ago.

Quebec cod fishermen did not do as well as in the preceding June. Herring catch also decreased, and the commercial salmon landings dropped. Mackerel landings increased by some 377,000 pounds. Lobster catch was higher than last year, as already noted.

In Prince Edward Island the lobster catch made up the greater part of the month's total. Cod catch rose slightly, and the landings of alewives and clams also increased. Fewer mackerel, herring, and hake were taken than in the June before.

In Pacific Waters

Salmon and halibut fishing are the major fisheries operations in progress in British Columbia in June, and this year the month saw an increase in salmon catch and a drop in the landings of halibut. In the case of halibut the catch totalled 1,913,000 pounds, or 915,000 pounds less than in June, 1931. Landed value, of course, was also less than last year. The salmon fishery, however, yielded over 4,421,000 pounds, a gain of approximately 1,150,000 pounds and the landed value total, $192,290,

(Continued on page 4)

NEW SHIP SERVICES MAY AID FISH EXPORT

Arrangements recently made by the Canadian National Steamships with steamer lines operating in certain southernwaters now make it possible for Canadian exporters of fish-stuffs and other goods to make direct shipments to countries on the west coast of South America and Central America. Heretofore there has been no transportation service whereby Canadian cargo for such countries as Chile, Colombia, Costa Rica, Ecuador, Guatemala, Nicaragua, Panama, Peru, and Salvador could be handled direct from Canadian ports. This condition has been a handicap to the development of trade but the new arrangement brings it to an end and offers opportunity of increasing business. Under this arrangement the steamship lines entering into it will work with Canadian National Steamships for the direct transportation of goods, with transhipment taking place at Cristobal, on the Atlantic side of the Panama Canal. The west coast of Mexico, as far north as the United States boundary, is also covered by the new plan.

In the past, Canada has done some export business in fisheries products with different countries in the territories affected by the arrangement now made, but the trade has not been on a very large scale. The improved shipping service may make it possible to expand the sales.

CANADIAN FISH TALKS—*Conc.*

public meetings, Mrs. Spencer gave demonstrations in Ottawa, Montreal, Toronto, Hamilton, and London, as well as one at the Household Science Institute of the Ontario Agricultural College at Guelph. The Toronto meetings were divided into two series in order to meet certain exigencies as to accommodations. The visit to Guelph was at the invitation of the college authorities and the demonstration there was attended by some 200 household science students. Everywhere except in Guelph, Mrs. Spencer also gave radio addresses through the courtesy of the respective managers of several stations.

The demonstrations in the different cities were largely attended and keen interest was evinced by the audiences as Mrs. Spencer showed various methods of preparing fish for the table. Atlantic, Pacific, and freshwater fish were used in the different dishes.

SMOKED HERRING MEN PLAN JOINT MARKETING

With a view to more satisfactory handling of their output on the market, the producers of smoked herring in the Grand Manan area of New Brunswick, which is normally the point of largest Canadian production of these smoked fish, have joined forces in a marketing association which they expect to be of much advantage to them.

Substantial saving in transportation expense is one of the important gains which the fishermen expect to derive from the system of joint marketing which they are establishing. More effective selling effort may also be brought about by the appointment of sales agents to represent the association in the West Indies, which is ordinarily the largest market for smoked herring from the Dominion's Atlantic coast provinces.

The association has already elected its board of directors, which is representative of the different parts of Grand Manan Island, and details of the organization's business will be handled by a manager appointed by the directors. In forming the association the fishermen had the assistance of Dr. M. M. Coady, formerly employed by the Dominion Department of Fisheries as Promoter of Fishermen's Organization. Following requests from the Grand Manan men for his presence, the department arranged for Dr. Coady to go to the island to advise with them as to their plan of action.

FISH INSPECTION SYSTEM—*Conc.*

other obstructions to construct and maintain fishways or canals where the Minister of Fisheries decides that they are necessary, and to construct them according to plans approved by the Minister, are retained in the amended legislation, though some changes have been made in their form, but one or two additional requirements have been incorporated in the statute, touching especially the question of ensuring adequate flow over dams. Some of these additions are perhaps of secondary importance but, like the more important provisions, they are counted on to help in giving surer guarantee that there is proper conservation of Canadian fish stocks without putting unreasonable requirements upon persons using the streams for industrial purposes.

SEES OPENINGS IN WEST INDIAN MARKET

Reviewing what he observed while on the trip, a Canadian associated with the fishing industry, who went to the West Indies on the trade exhibition cruise on the ss. *New Northland* a short time ago, has reported that he found there was opportunity for increased business in pickled salmon. Gutted and with the heads left on, the fish should be put up, he says, in a very strong pickle and packed in barrels of 200 pounds or casks of 600 pounds. The same observer also noted a demand for split herring, gutted and with heads on, put up in 200-pound barrels, and there were other inquiries for smoked fillets, smoked herring, and alewives.

PACIFIC LING COD—*Conc.*

events, have their interest for the layman too. For instance, oil obtained from the livers of ling cod caught in the autumn showed a lower Vitamin A potency than oil from spawning fish caught in the spring. "Whether the variation in vitamin potency is due to the seasonal variation or to sexual condition is a question that is being further investigated."

Similarly, the liver oil from grey cod caught in the autumn had lower vitamin potency than oil from fish taken in the spring, although the actual oil content of the autumn livers exceeded forty per cent as compared with an average of less than ten per cent in the livers from the spring-caught fish. In the case of halibut the yield of oil per fish is not large. The liver makes up about two per cent of the weight of the fish and contains from fifteen to twenty per cent of oil, although "there is considerable seasonal variation in size of liver and oil content and apparently also with the condition and sex of the fish."

MORE LOBSTERS TAKEN—*Conc.*

was $19,000 above the figures for a year ago.

Herring, ling cod, clams, crabs, and several other varieties of fish and shellfish were also landed by British Columbia fishermen in June, and the total catch from the sea fisheries of the province during the month was something over 7,351,000 pounds. In June, 1931, the total catch was 8,578,400 pounds.

HUNT SEA LIONS TO PROTECT SALMON RUNS

Leave the sea lions alone, free to carry on their depredations unchecked, and the British Columbia salmon fishery would suffer seriously, and that's why the Dominion Department of Fisheries sends one of its vessels to the Pearl and Virgin rookeries, west of Rivers Inlet, to carry on a lion hunt for a few days every year.

This year over 1,100 lions and pups were destroyed on these two rookeries when the hunt was carried on by C.G.S. *Givenchy* in June. Bad weather interfered with operations, especially at the Pearl Rocks, and the lions were very wild and difficult to reach, but, nevertheless, the result of the hunt will be that the sea lion family won't work as much damage to the salmon fishery in the future as they would otherwise have accomplished.

The purpose of these annual hunts is not the extermination of the sea lions; the hunts have been undertaken for some years but the lions are still numerous—too numerous to suit the salmon men. The purpose sought is not to exterminate the herds but to keep them within something like reasonable limits in numbers and thus to protect the salmon resources, which mean so much to British Columbia and, indeed, to the Dominion. Just how much these resources do mean is indicated by the fact that, in normal times, the value of the production from the British Columbia salmon fishery may be as much as $16,000,000, and even more. The salmon runs are worth too much to allow them to be jeopardized by marauding sea lions.

Investigations made by Canadian fisheries research workers last year showed that a very satisfactory fish meal can be made with naphtha extraction from oily fish.

"Fish and How to Cook It," an authoritative booklet on fish cookery, may be obtained, in either English or French, from the Deputy Minister of Fisheries, Ottawa, at a price of ten cents a copy.

One good reason why Canadian fish foods should be served regularly in the family where there are growing children is because of their Vitamin D content. Vitamin D is essential to proper development of young bodies.

FISHERIES NEWS BULLETIN

Acting Minister: Hon. E. N. RHODES, M.P.

Published Monthly by the Department of Fisheries, Ottawa, Canada

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INSPECTING FISH PRODUCTS IMPORTANT PART OF WORK OF FISHERY OFFICERS

Nearly 230,000 Parcels Inspected in Past Year under Fish Inspection Act by Officers Specially Trained—Inspection Done also under Meat and Canned Foods Act

Part of the training which the permanent Fishery Officers in the service of the Dominion Department of Fisheries are required to take consists of instruction to qualify them as inspectors of fish products, and in putting this training to use last year they inspected nearly 230,000 parcels of smoked, pickled, and drysalted fish.

This work was done under the Fish Inspection Act, and regulations made under the act, and in addition to passing upon the processed fish the officers inspected the curing plants and the containers used for marketing the output.

They also carried out inspection work under those sections of the Meat and Canned Foods Act and regulations which provide for the inspection of fish canneries of all kinds, their raw materials and methods, and the products themselves.

All of these inspections, which are part of the regular work of the Fishery officers stationed in the areas where the fisheries are administered by the Dominion authorities, have it as their purpose, of course, to make it sure that the products put upon the market will be of sound quality.

During last year, moreover, some of the regulations relating to inspection were altered with a view to making them still more effective, and amendments made to the Fish Inspection Act at the recent session of Parliament and the creation, this spring, of a permanent board of experts to inspect all canned salmon put up in the great British Columbia salmon industry will also be important factors helping to make the standard of Canadian fish production even higher than it has been hitherto.

Inspection Act Field

The products which come within the provisions of the Fish Inspection Act are pickled herring, smoked round herring, drysalted herring, pickled alewives or gaspereau, pickled mackerel, and pickled salmon exclusive of mild-cured salmon. Drysalted herring, which are processed in British Columbia only, make up the greater part of the fish inspected by the officers in the course of each year. Virtually all of these herring are exported to the Orient and during the past drysalting season, which began in October and continued until several weeks after the end of 1931, the officers inspected more than 185,700 boxes, each box containing 400 pounds of fish.

On the Atlantic coast the 1931 inspections under the act covered 16,700 packages of smoked herring, 12,200 packages of pickled mackerel, 8,200 packages of pickled alewives, and 5,900 packages of pickled herring. (In addition, there was the inspection of 44,000 barrels or other containers and the inspection of the fish curing establishments.) A large part of the fish inspected had been put up for shipment to export markets such as the West Indies and the United States.

Courses Given Officers

Until a few years ago fish inspection was done by special officers appointed for the purpose from time to time, but it was then decided to place the work in the hands of the department's permanent Fishery Officers and to require them to take courses of study which would equip them fully for duty of this kind. On the Atlantic coast the officers were given courses at the Atlantic Fisheries Experimental Station, Halifax, and it was necessary for them to pass examinations which were set at the close of the classes. The courses covered both theory and practical fish curing.

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COOKERY LECTURES IN QUEBEC AND WEST

Plans Made for More Lecture-Demonstrations by Fisheries Department Expert

Continuing the programme of fish cookery demonstrations and lectures which the Department of Fisheries is having her conduct in different parts of the Dominion, Mrs. Evelene Spencer will spend most of September in Quebec and then go to Manitoba where she will probably be at work for some six weeks or so.

Since December is not a very suitable time for a series of women's meetings Mrs. Spencer will do no field work immediately after the close of her stay in Manitoba, which will probably end at the latter part of November, but at the outset of next January she will begin her British Columbia programme. When her Pacific coast work is concluded, it is expected that she will start east-ward again, giving lecture-demonstrations first in Alberta and Saskatchewan.

In Quebec Mrs. Spencer will go to Quebec city and probably also to several other centres. At these cities she will have with her a bilingual assistant provided by the provincial authorities of Quebec, who assigned such an assistant to work with her when she conducted an extended series of lecture-demonstrations in Montreal early in the present campaign.

Mrs. Spencer's itinerary for Manitoba and British Columbia has not yet been definitely mapped out but it is now being arranged. In Manitoba it is proposed to have her go first to Winnipeg and then to various other places, while in British Columbia she will work in Vancouver, Victoria, and a number of the provincial towns.

In carrying on the campaign, which is designed to widen popular knowledge of the value of Canadian fish foods and the best methods of preparing them for the table, Mrs. Spencer, in addition to

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SEEK TO TRANSFORM BEAUTIFUL BARREN LAKE INTO PRODUCTIVE ANGLING WATER

Remarkable Success in Stocking Medicine-Maligne Lakes System with Game Fish Leads to Introduction of Kamloops Trout Elsewhere in Jasper National Park through Dominion Fisheries Department

Action taken by Dominion fish culturists has made big trout grow in Medicine and Maligne Lakes, in Jasper National Park, where no fish grew before, and now history may repeat itself in Amethyst Lake.

Amethyst is one of the most beautiful lakes in the park but it has been utterly devoid of fish life.

This year Kamloops trout have been placed in it and if the attempt to establish game fish there is as successful as the like efforts undertaken in the Medicine and Maligne Lakes system the hitherto barren Amethyst will become one of the famous angling waters of the country.

The plantings in Medicine and Maligne followed careful investigation as to the suitability of the lakes for sustaining trout. Speckled trout were finally decided upon as the fish most likely to thrive in these waters and plantings were made several years ago by the Fish Culture Branch of the Dominion Department of Fisheries. The fish have done remarkably well in their unfamiliar home and big fellows—plenty of them—have been giving the anglers great sport this year.

Amethyst Lake, which lies in the Tonquine Valley, differs considerably from Maligne and other lakes in the neighborhood of Jasper but there were reasons for believing it to be suitable for trout. The question as to what particular variety of trout it would be best to place in the lake was gone into and the conclusion reached by the Fish Culture Branch was that the Kamloops trout should be used. Accordingly, some few weeks ago, 50,000 Kamloops trout eggs were shipped to the park from the hatchery establishment operated by the branch at Lloyds Creek, British Columbia, and were hatched out at the sub-hatchery at Jasper, and the fry were liberated in the lake in due course. It will be a year or two, of course, before it will be possible to judge the success of the experiment but Amethyst apparently contains an abundance of fish food and investigation over many years has indicated that there are no fish native to it so there is no danger that there will be predatory fish to prey upon the trout.

Fine Gamey Fish

As for the Kamloops trout itself, it is a sturdy, gamey fish which reaches its greatest size in lakes but runs into tributary streams in the spring to spawn. It has thrived greatly in various barren lakes in British Columbia into which it has been introduced by the fish culture people. In one such lake a fish weighing more than thirteen pounds was taken a little over two years after the introduction of the species was made, and in another lake, a few years after the first introduction there, specimens were landed weighing as much as forty pounds. It is not suggested by the Fish Culture Branch that anglers may expect to land 40-pound trout in Amethyst Lake as a regular thing before very long but it is hoped that the steps taken this year will gradually have the result of transforming the lake into excellent angling ground.

Stocking of angling waters, of course, is only a part, and not the main part, of the work carried on by the Fish Culture Branch of the Fisheries Department. The major work of the branch consists in helping to maintain and increase the stocks of fish sought by the Dominion's commercial fishermen. Effort to increase the angling resources of the country, however, serves very useful purposes in that it enlarges the recreational opportunities of Canadian citizens in their own land, and at the same time, adds to the country's attractions for the visitor and thus aids in building up the profitable tourist business.

COOKERY LECTURES—*Conc.*

giving cookery demonstrations, speaks before clubs and other organizations and also gives radio broadcasts as occasion offers. So far as possible she meets all requests which may be made to have her address women's societies, women's institutes, etc.

PACIFIC COAST PACK OF SALMON HIGHER

Some Gains over '31 So Far though Market Conditions Prevent Intensive Operations

With conditions still unsatisfactory in the export markets, where most of British Columbia's pack of canned salmon is sold, the canners of the province are naturally not seeking record production this year but, nevertheless, the output up to early August was larger than the quantity which had been processed at a corresponding date in the 1931 season.

Expressed in terms of the 48-pound case, the production from the canneries totalled 422,500 cases, in round figures, as compared with 382,600 cases on August 8th, 1931. The output for each period could have been made much larger, of course, had world market conditions warranted more intensive operations for there is no depletion apparent in the stocks of salmon on the fishing grounds.

The gain in this year's pack, as of August 6th, was chiefly in the production of canned Springs, Chums, and Cohoes, although slightly more Bluebacks were handled than a year ago. Fewer Sockeye and Pinks were packed than in the corresponding 1931 period. That is true, too, as regards Steelheads, but the Steelhead output is never large.

The pack of Sockeye, which is the most valuable variety of Pacific salmon, totalled 203,670 cases, or some 27,000 cases less than a year ago. The drop was due to lowered output in some parts of Fisheries District No. 2, the northern section of the province, a condition partly due to some difficulties which caused fishermen to discontinue fishing for a time.

More than 48,600 cases of Springs were canned, as compared with about 17,200 cases at August 8th, '31; nearly 42,000 cases of Chums were put up, a gain of some 28,000 cases; Cohoe pack was more than 33,600 cases, an increase of more than ninety per cent; a pack of 20,130 cases of Bluebacks meant a gain of a couple of hundred cases. On the other hand, the Pink output was only 74,025 cases, a decrease of between eight and nine thousand. The Steelhead pack was 507 cases, as compared with 592.

Capital investment in the Dominion's fishing industry in 1931 was something more than $45,300,000.

SHORT COOKING TIME AMPLE FOR FISH SAYS SPECIALIST IN COOKERY METHODS

Trained Woman on Staff of Dominion Department of Fisheries Talks Interestingly of Ways of Preparing Fish Foods for Family Table and Mistakes to Avoid

"What is the most common mistake in fish cookery?"

The question was put to Mrs. Evelene Spencer, cookery specialist on the staff of the Dominion Department of Fisheries.

"There are two of them," she answered at once.

"Over-cooking, and failure to salt the fish before putting it on the stove or in the oven.

"When fish is over-cooked", Mrs. Spencer went on, "its juices are dried out, so that flavor is impaired and one kind of fish tastes much like any other. Distinctive flavor is lost.

"As for salting, too many think it is sufficient to add some salt after the cooking. That is quite wrong. The salt must be put on the fish before the cooking, and plenty of salt, too."

Mrs. Spencer was speaking out of years of experience. Her business is to know fish foods thoroughly and how they should be cooked. A recognized expert in this field, she has covered many parts of the continent, demonstrating methods of cookery and giving addresses on the food and health values of fish foods. In carrying on this work she has served under governmental auspices both in Canada and the United States, as well as under private auspices. She joined the staff of the Department of Fisheries some months ago and has been engaged in giving lecture-demonstrations in different parts of the country.

Fish are Tender

Another question was put to her: "Why doesn't fish require much cooking?"

"You see," she replied, "the connective tissues of fish are very tender, more gelatinous than those in many meats, and they soften quickly under the application of heat.

"When the white of an egg is 'set', it is done. It is just the same with fish. Everybody knows that you can boil or poach an egg so that its white will be just soft and creamy, and easily digested, while if you cook it too much the white will be hard and tough.

"Soft and creamy when the albumenous substance is properly cooked, tough when it is over-cooked—whether it be egg or fish, the principle is the same."

Choosing the Fish

Mrs. Spencer went on to say that in buying fish it is well for the housewife to know whether the particular kind she is purchasing is 'oily-meated' (salmon, whitefish, herring, mackerel, and lake trout, for instance, come in this class) or 'dry-meated' like the cod, haddock, pike, etc.

"If she is looking for a fish to boil or steam or make into a curried dish," Mrs. Spencer said, "the housewife will find it more satisfactory to buy some of the 'dry-meated' varieties. They will keep their shape well in the cooking process.

"On the other hand, for baking in general, the 'oily-meated' are preferable since their abundant oil makes them liable to fall to pieces from very richness if they are cooked by a method necessitating much handling.

Cooking Time

"The time actually needed for cooking fish?" Mrs. Spencer continued. "That depends entirely upon the thickness of the fish, or fillet or portion of fish, which is being used.

"A piece of fish an inch or less in thickness will cook in ten minutes in a hot oven—an oven with a temperature from 500 to 600 degrees Fahrenheit. This time is quite sufficient, no matter whether the quantity of fish is one pound or five pounds, so long as the thickness is not more than an inch.

"If the fish is being steamed or boiled, or poached in the oven, and is not more than an inch thick, it should be cooked from ten to twelve minutes, according to the degree of heat and the mode of cooking.

"If several pounds of fish are purchased in one piece, it is better to cut it into serving portions of about three to the pound and to cook the pieces as if they were fillets. If it is cooked in one large piece, the outside is likely to be overcooked before the tissues are cooked at the bone.

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FRY BY MILLIONS PLANTED IN STREAMS

Season's Distributions So Far from Dominion Hatcheries in Maritime Reach Big Figures

There are a good many more fry and fingerlings in Maritime Province streams just now than there were a short time ago.

Twenty-six millions or so more.

They came from Atlantic hatcheries operated by the Dominion Department of Fisheries, which every year distributes in suitable streams great numbers of eggs, fry, and fingerlings, as well as some older fish, in order to help to maintain and enlarge Canada's stocks of commercial and game fish. Hatcheries are operated by the department, through its Fish Culture Branch, in the Maritime Provinces and British Columbia, territories where the fisheries are administered by the Dominion; and on the Pacific coast, as in the Atlantic area, very large distributions are made every year.

Up to the end of the first week of August the distributions from the Dominion hatcheries in the Maritimes had totalled approximately 26,610,000 fry and fingerlings. Distributions made since then, and others still to be made, will increase the figures very substantially. Some of the eggs and fry and fingerlings put out will, of course, not survive; toll will be taken of them by Nature and by enemies of fish life against which they cannot be wholly protected; but the others will thrive and add to the stocks available for capture by the commercial fisherman and the angler in subsequent seasons. Experience has shown that fish cultural effort is an effective means of maintaining fish stocks and building them up.

Try Kamloops Trout

Much the greater part of the total distribution made in the Maritimes up to a month ago had consisted of Atlantic salmon, or 19,970,000 fry and fingerlings out of the total of 26,610,000. Speckled trout came second in numbers —5,790,000. The other species distributed were Brown trout, Landlocked salmon, Rainbow trout, Lake trout, Hybrid Brown trout, Loch Leven trout, and Kamloops trout. Kamloops trout, by the way, have never previously been planted in the Maritime Provinces and the distribution this year was made for

(Continued on page 4)

JULY SEA FISH CATCH 94,300,000 POUNDS

Landings on Atlantic Coast above July, 1931, but Pacific Catch Off

Approximately 94,300,000 pounds of fish and shellfish were landed from the sea fisheries by Canada's commercial fishermen during July.

The figures, collected and compiled by the Dominion Department of Fisheries, are unrevised, but revision is not likely to change them very much.

Nova Scotia's catch was substantially larger than in July, 1931, and the Quebec landings also showed an increase but there was a sharp drop in British Columbia catch and New Brunswick and Prince Edward Island fares were smaller than a year ago.

The decrease in the British Columbia figures—something over 30,000,000 pounds—was chiefly due to slackened operations in the pilchard fishery. The salmon catch for the month on the Pacific coast was also smaller than in the previous July—roundly stated, 23,895,000 pounds as compared with 25,310,000 pounds. Halibut catch totalled 2,207,000 pounds as against 2,683,000. The landings from the herring fishery, another of the major fisheries of British Columbia, was substantially larger than a year ago, but July is not one of the chief herring fishing months in that province.

On Two Coasts

All told, the Pacific coast landings in July amounted to 39,655,000 pounds. The landed value of the catch to the fishermen was a little less than $1,100,000. A decrease of $356,000 on this side of the account is explained by smaller landings and lowered prices.

Atlantic coast landed value—$642,500—also showed a drop of about $117,000, although the total catch was greater by more than 3,900,000 pounds than it had been a year ago when 50,727,600 pounds were taken. The comparative figures for the Atlantic provinces for July, '31, and July, '32, are as follows:

	July, 1931	July, 1932
Catch, Lbs.		
Nova Scotia	24,166,000	31,624,000
New Brunswick	7,434,000	10,898,000
Prince Edward Island	1,741,000	2,599,000
Quebec	13,065,000	13,842,000
Landed Value		
Nova Scotia	$337,735	$327,060
New Brunswick	162,495	101,405
Prince Edward Island	26,230	18,160
Quebec	233,355	195,875

MORE BOATS, VESSELS IN QUEBEC FISHERIES

Increase Made in Fishermen's Fleet in 1931 despite Year's Difficulties

Adverse world conditions made 1931 a time of difficulty for fishermen everywhere but, in spite of that, the men engaged in Quebec's fishing operations added to the number of their vessels and boats during the year.

Their fleet of sailing and gasoline vessels and gasoline boats rose from 3,136 in 1930 to 3,396 and the number of sailboats and rowboats from 3,387 to 3,684.

Most of these crafts were used in Sea Fisheries operations but slightly more than 1,400 of the boats were employed in the Inland Fisheries.

There is the further interesting fact that the value of the equipment in use in the primary operations of the Inland Fisheries—"primary operations" covering the catching and landing of fish—was slightly greater in 1931 than it had been in the year before, or about $284,200 as compared with $279,456. On the other hand, the value of the vessels, boats, nets, etc., used in the primary operations of the Sea Fisheries was somewhat less than in the year before—$2,051,000, in round figures, as against $2,096,000.

So far as the year's production by the Quebec fishermen is concerned, a drop in value was to be expected, in view of the market situation. The actual value figures were $1,952,894 as compared with about $2,503,000 in the year before. Both Sea and Inland production fell off, the former amounting to $1,469,677 and the latter to $483,217.

Cod Come First

Cod ranked first in total marketed value among the fish taken, then herring, lobsters, salmon, and eels in order. Eels led the fish from the Inland Fisheries in the marketed value column.

Cod, herring, and eel catches were each larger than they had been in the previous year.

More lobster canneries were in operation in the province than in the year before (fifty as compared with forty-four). All told, they put up 9,190 cases of canned lobster and twenty-two cases of tomalley. The number of salmon canneries increased from seven to twelve and they packed 1,153 cases; it is only in British Columbia, of course, that salmon canning is done on a large scale in Canada. There were thirty-one fish curing plants operated in Quebec areas during the year, a decrease of three, and one reduction plant.

SHORT COOKING TIME—*Conc.*

Add no Water Here

"Let me point out, too," Mrs. Spencer concluded, "that fish which is to be cooked quickly in a hot oven should never have *any* water put into the pan with it. If water is added, the fish will steam and the juices run out. When this happens you get a highly flavored gravy in the pan—but a tasteless, insipid fish. When no water is added, the hot oven quickly seals up the natural juices within the fish itself so that the full flavor is retained."

FRY BY MILLIONS—*Conc.*

experimental purposes. The Kamloops is indigenous to British Columbia and the fry planted in the Maritimes were hatched at the hatchery at Yarmouth, N.S., from eggs brought from one of the department's Pacific coast plants.

The distributions from the Nova Scotia hatcheries were made up of Atlantic salmon and Speckled trout from the Antigonish establishment. Atlantic salmon, Landlocked salmon, Lake trout, and Speckled trout from Bedford, Atlantic salmon from Lindloff, Atlantic salmon and Speckled trout from Margaree and from Middleton, and Atlantic salmon, Kamloops trout, Rainbow trout, and Speckled trout from Yarmouth.

From the Kelly's Pond hatchery in Prince Edward Island there were distributions of Atlantic salmon, Rainbow trout, and Speckled trout.

Atlantic salmon were distributed from all the New Brunswick plants. There were also distributions of Brown trout, Hybrid Brown trout, Landlocked salmon, Loch Leven trout, Rainbow trout, and Speckled trout from the hatchery at Saint John.

INSPECTING FISH PRODUCTS—*Conc.*

In British Columbia, before the beginning of the last herring drysalting season, certain officers who had been selected to act as herring inspectors were given special instruction at the Pacific Biological Station, Nanaimo. Further instruction was given them at the close of the season, and a course of the same kind will be repeated again this year. Early in 1932 all of the Fishery Officers in British Columbia were given a special course at the Nanaimo station covering, chiefly, salmon canning, herring salting, bacteriology, and fish biology.

FISHERIES NEWS BULLETIN

Acting Minister: Hon. E. N. RHODES, M.P.

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COULD PUT 500 OYSTER EGGS IN SPACE WITH DIAMETER OF ONLY SINGLE INCH

Tiny Creature Invisible to Naked Eye when Spawned—Grown Oyster Rich in Valuable Health Elements—Fisheries of Both Canadian Coasts Producers

Oysters in the shell belie their looks.

The shell is inert and, at a casual glance, not very interesting looking, but as a matter of fact there are many interesting points in the oysters' life story.

For instance, one reason why oysters are valuable in the diet is because, in addition to containing vitamines, they are rich in iron in an assimilable form, and have copper, too, so that they are useful in preventing anaemia.

That's on the dietary side, and it is a bit of information worth keeping in mind.

It's worth keeping in mind, too, that oysters of excellent quality are produced both in British Columbia waters and on Canada's Atlantic coast.

But there are many interesting facts in the natural history side of the oysters' story.

For instance, in the course of investigations made in Prince Edward Island waters for the Dominion Department of Fisheries in the past two or three years it has been found that when the oysters are two years old about three out of four of them are males but "as they grow older the proportion of females increases until, among old oysters, three-quarters or more may produce eggs." The eggs, by the way, are only about 1/500th of an inch in diameter when they are spawned.

In a few hours after it is fertilized the egg develops into a small larva, which swims about by using tiny vibrating hairs upon its surface. Before long a shell grows over the larva, which can still swim slowly. After about three weeks the free-swimming period is ended and the oyster, now about 1/75th of an inch long, is ready to "settle" or, in other words, to cement itself by the more curved half of its shell to some suitable surface, such as a rock or a shell or a piece of brush.

Travelling Days Over

After that, the oyster can do no more moving. It cannot go about after the minute plants or animals upon which it fed when at the larval stage of life.

"For the rest of its life," to quote Dr. A. W. H. Needler, the Biological Board scientist who has carried on the Prince Edward Island investigations arranged by the department, "it obtains its food from the water which is made to flow through its shell by minute hairs beating rhythmically. It has an elaborate mechanism by which the solid particles are taken from the water; some are selected and taken into the mouth and the rest are rejected."

But the oysters do not fed all the year 'round, neither the young nor the mature. Canada's Atlantic coast osysters stop feeding when the temperature of the water is lower than about 41 degrees Fahrenheit. As the water is usually colder than this from November to April the oysters' growth is in the other six months of the year. They usually take from three to five growing seasons after their first winter to reach "marketable size," which is a size of three and a half inches for those of round shape and four inches in the case of the "long" fellows.

Shaped by Environment

Nor is it by chance that one oyster is of rounded shape and another is not. The shape of an oyster, as Dr. Needler explains, is influenced by the conditions under which it grows. "If growing on soft bottom where it sinks slowly, or if growing in a place where silt is settling, the oyster, being unable to move, must grow long to keep the lips of its shell above the mud. On soft bottom an oyster tends to be long and narrow and its shape is roundest on hard, clean bottom.

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HERRING CHIEF FOOD IN FUR SEALS' DIET

Dominion Investigators Find What Fish are Eaten as Migrating Herds Pass B.C.

Investigation carried on for the Dominion Department of Fisheries has indicated that herring are the most important food eaten by fur seals as they make their way along the British Columbia coast to their breeding grounds in the north.

Salmon, too, say the investigators, constitute an appreciable portion of the food, but not the main part.

The fur seals, protected under the Pelagic Sealing Treaty, are valuable, of course, but there has been a feeling among British Columbia fishermen that some of the fisheries, especially the salmon fishery, suffer from the seals' appetite, and the investigation recently conducted for the Fisheries Department was undertaken with a view to obtaining some definite information bearing on this point. The investigators were Dr. W. A. Clemens, Director of the Pacific Biological Station, a federal fisheries research station at Nanaimo, B.C., and G. V. Willby, of the station's staff.

In the course of the investigation twenty-five seal stomachs were examined by Dr. Clemens and Mr. Willby. These stomachs were obtained from Indians—under the treaty none but Indians are permitted to kill fur seals off British Columbia—who had been sealing off Clayoquot Sound, Vancouver Island, and care was taken to obtain full stomachs.

17 Liked Herring

In most instances the food in the stomachs had been reduced to small particles in the process of digestion but it was established that herring had been eaten in seventeen of the twenty-five cases, salmon in nine, squid in eight, and pilchards in six. Some other kinds of food were also found in three or four of the stomachs examined.

The amount of food in each stomach, on the average, was about one quart of well-packed material, and in fourteen

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FEMALE HERRING OF THE SPECIES IS FOUND FASTER GROWER THAN THE MALE

Many Interesting Points Brought Out in Investigation of British Columbia Fishery Undertaken to Determine Whether Herring Stocks Withstanding Fishing Strain Satisfactorily

Herring are all herring, but investigations carried on in British Columbia waters show that the herring found in one area there may be a population quite distinct from those in other areas.

Or to put it in another way: The British Columbia herring fishery—a very important fishery whose product enters into large export trade—is centred off the east coast of Vancouver Island, off the island's west coast, and off the Prince Rupert district in the north, and evidence gathered by scientific investigators "proves conclusively" that herring of the Prince Rupert area (Jap Inlet and Pearl Harbour) are a population distinct from those of Vancouver Island.

Other evidence "indicates," too, that the fish on the east coast of the island are distinct from those of the other coast, while some of the information "suggests" that herring in each district are more or less isolated from each other and tend to form local populations.

Study State of Stocks

These are interesting points but the investigations have a much more important purpose, of course, than simply to discover things which are interesting to know. The prime object of the work, which has been in progress for several years under joint federal and provincial auspices and has been conducted by research workers of the Biological Board of Canada, is to determine whether or not the British Columbia stock of herring is satisfactorily withstanding the strain of intensive fishing. In accomplishing this purpose there must necessarily be a study of the age and length compositions of the stock "in order to detect any evidences of depletion" and a statistical analysis of "certain so-called 'racial' characters of the herring of each of the various fishing areas to determine the degree of intermingling and migration which takes place between them."

During the 1931-32 herring season almost 4,000 herring from the three main fishing areas were examined, and other samples had been studied in previous seasons. Here are some of the facts which were brought out, as given in a report by Albert L. Tester, one of the scientists concerned:

The average length of female herring was greater than the average length of the males, and, as found by previous investigators, female herring grow at a faster rate than the male fish.

Herring from the Prince Rupert area were characterized by their slow rate of growth as compared with that of herring in the more southern part of the province, herring from the west coast of Vancouver Island had a rate of growth more rapid than that of herring on the east coast, herring from some areas on each coast of the island grew somewhat more rapidly than fish from certain other areas on the same coast.

Herring from Sydney Inlet, on the west coast of the island, had a greater average length than those of any other district considered.

West Coast Fish Bigger

On the average, the fish from the west coast were slightly larger than those on the other side of the island, which were of approximately the same length as the herring from Prince Rupert.

Comparison of length composition and age composition of catches of herring which were made in several Vancouver Island areas in former years with those of the 1931-32 season "indicates" some diminution of the fishery in these districts since 1916.

The relatively new fishery of Sydney Inlet is characterized by the large average length of the fish in the catch, and by the large percentage of fish in their fourth and fifth years.

"Intensive fishing in a particular district," says the Tester report, "appears to cause a decrease in size range, a decrease in average length, and a decrease in the numbers of older fish in the catch. Whether the fishery, having suffered this decline, again stabilizes itself at a lower level, *i.e.*, younger fish, and consequently smaller size, or whether it continues to decline to the point of depletion, remains to be determined."

Every can of salmon packed in British Columbia must now be submitted for inspection to a board of experts appointed by the Dominion Government. Unless it passes the inspection none of the salmon may be placed upon the market except with a conspicuous label showing that it is "Second Quality" fish.

KEEP WAY CLEAR FOR THE FISH TRAFFIC

Fisheries Engineers Do Important Work in Aiding Movement of Fish in Streams

If it weren't for the Engineering Branch of the Dominion Department of fisheries many of Canada's river-spawning fish could not make their way to and from the spawning grounds.

And that, of course, would mean depletion of fish stocks.

The staff of the branch is not large, but every year the engineers are at work having obstructions removed from different streams, improving channels, building or improving fishways—all with a view to ensuring free passage of the fish up and down river and maintaining fish life in areas where the fisheries are administered by the Dominion authorities.

In addition, the engineering staff deals with construction and repair work in connection with the department's fish cultural establishments and the research stations of the Biological Board of Canada. It also makes required maps and plans and performs various other services. The staff is under the direction of the Fisheries Engineer at Ottawa, and there is also a British Columbia divisional office in Vancouver which is in charge of a Resident Engineer.

Glances here and there in reports made by the Fisheries Engineer as to operations in 1931 will show something of the work which is done by the branch from year to year. The glances, taken at random, may or may not chance to fall upon the more important pieces of work performed in '31:

Portions of old driving dams were removed from streams tributary to the Jordan River, N.S., to increase the spawning areas.

A fishway in the Hunter River, P.E.I., was reconditioned.

Designs were made for fishways in several New Brunswick streams.

A fishway 345 feet long was built on the Cowichan River, B.C., making it possible for fish to reach the extensive spawning grounds above Skutz Falls.

By removing a large section of a disused power dam, the ascent of salmon up the Tangier River, N.S., was made possible.

A fishway on the Salmon River, Victoria county, N.B., was extended to give the fish a better chance.

Numerous streams were inspected with a view to determining the best method of clearing out obstructions.

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BIG INCREASE IN PACIFIC COAST SALMON CATCH FEATURES AUGUST SEA FISHERIES

Substantial Gain, Too, in Nova Scotia Cod Landings but Production from Most of Dominion's Sea Fishery Operations Kept Down by Unsatisfactory State of World Markets

British Columbia's commercial fishermen landed a much larger quantity of salmon in August than they had brought ashore in the same month of last year, and there was a tidy gain in the total amount of money which they received for the fish.

The rise in Pacific coast salmon figures, and a gain of more than 1,900,000 pounds in Nova Scotia cod catch, were the features of August operations in the Dominion's sea fisheries, but, taking the Atlantic and Pacific coasts together, the aggregate landings of all varieties of sea fish and shellfish was smaller than it had been a year ago and the landed value of the catches to the fishermen also decreased.

World market conditions explain these net decreases. Prices generally continued to be below normal level during the month and the situation did not encourage such greater intensiveness of fishing as would have enlarged the catch and value figures.

Thanks to the larger catch of salmon, the total landed value of Pacific coast production for the month was larger by $196,000 than in August, 1931, and reached $1,134,000 in round numbers. On the Atlantic coast, however, the landed value, $527,000 showed a drop of some $330,000. For the Dominion's sea fisheries as a whole there was, therefore, a decrease of about $134,000 in the value of the catch as landed.

So far as the total catch itself is concerned, there was a decrease of some 31,000,000 pounds. The Pacific coast landings were less in the aggregate than a year ago, in spite of the salmon gain, and there was also a decrease in the catch made by the fishermen of the four Atlantic coast provinces. All told, the fares for the month amounted to 116,276,000 pounds as compared with 147,802,000 pounds in August, 1931.

Following are the catch and landed value figures for August by provinces, as shown by unrevised returns made up by the Dominion Department of Fisheries:—

	Catch lbs.	Landed Value $
British Columbia	72,904,000	1,134,000
Nova Scotia	22,730,000	242,500
New Brunswick	10,066,000	144,500
Quebec	8,656,000	99,380
Prince Edward Island	1,921,000	40,550

In Pacific Areas

Major operations in British Columbia waters in August are in the salmon, halibut, and pilchard fisheries. As already indicated, there was a gain this year in the production from the salmon fishery. In the case of the halibut fishery there was a gain in catch but in the case of the pilchard fishery catch and landed value alike fell off. There were decreases also in the returns from most of the other sea fisheries of the Pacific coast province.

Salmon landings by the British Columbia fishermen during the month amounted to 47,373,000 pounds, roundly stated, or 20,600,000 pounds more than in the previous August. The catch had a landed value of $990,320, a gain of more than $278,000. In the halibut fishery the landings totalled 2,821,000 pounds and their value to the fishermen was $102,600, as against 2,488,000 pounds and $120,750 last year. The pilchard catch was 22,073,000 pounds, as compared with 62,986,000 pounds; more fish could have been taken, of course, if market conditions had encouraged fishing operations on a larger scale. The landed value of the pilchard takings was $18,600.

Other fish taken in British Columbia fishing during the month included ling cod, black cod, herring, clams, oysters, etc.

Atlantic Coast Results

In Nova Scotia the catches of most of the principal varieties of fish were smaller than a year ago, with cod landings the most notable exception. The cod catch of the province was some 12,252,000 pounds while in August, 1931, it amounted only to 10,320,000 pounds. In Quebec, too, more cod were taken than in the previous August—7,126,000 pounds, a gain of 141,000—but the New Brunswick catch was only 1,809,000 pounds as against the earlier 3,298,000 pounds, and the Prince Edward Island fishermen landed 720,200 pounds, a decrease of 196,400 pounds. In each of the four provinces there was a drop in the cod value figures.

Nova Scotia landings of pollock, halibut, salmon, tuna, shad, and scallops were larger than in the '31 month. On

(Continued on page 4)

FISH CULTURE MAKES TROUT STOCKS BIGGER

Stocking of P.E.I. Water with Rainbow Followed by Excellent Results

Rainbow trout are not indigenous to Prince Edward Island but they're thriving now in Jimmy Jim's Pond, Glenfinnan—and in one or two other waters, for that matter—as a result of fish cultural efforts undertaken by the Dominion Department of Fisheries.

Several years ago Rainbow fingerlings were introduced into Jimmy-Jim's Pond by the Fish Culture Branch of the department. Now, to quote from a report made this summer by a Maritime Province officer in the fisheries service, the pond is "carrying a large quantity of heavy Rainbow of excellent quality."

Observation showed the officer that there were plenty of trout in the pond, and experience showed him that they are of good size for he tried his luck with rod and fly and in a short time he had landed "three excellent specimens . . . . from one and a half to two and a half pounds in weight." He was trying the fishing for departmental reasons, but numbers of Prince Edward Island anglers who have tried it simply in search of sport have also found that the fish are plentiful and gamey. As a matter of fact, there is some indication that the Rainbow in Jimmy-Jim's take the fly more readily than other trout of the same variety in other localities.

The first distribution of Rainbow fingerlings which the Fish Culture Branch made in this lake was in 1929. Another was made in 1930 and a third, the largest or 23,920 fingerlings, in 1931.

In distributing fish eggs, fry, fingerlings, etc., in different parts of Canada where the fisheries are under its administration the Dominion department concerns itself with both game fish and commercial fish. Chief attention is given to the commercial varieties, since they are the raw material of one of Canada's most important industries, but everything which can properly be done toward building up the angling resources of the country is also done, and what has been undertaken in connection with the introduction of Rainbow trout into suitable Maritime Province waters is a case in point.

Hair seals to the number of 10,129 were taken in the Dominion's commercial fisheries in 1931 as well as 103 porpoises.

BARREN LAKE MADE PRODUCER OF TROUT

What's happened in the case of White Swan Lake, British Columbia, is another indication of what fish culture work can accomplish in the way of widening fisheries resources.

White Swan, which lies in the Kootenay district, was barren of sport fish until last year. Then, in June the Fish Culture Branch of the Dominion Department of Fisheries planted 20,000 Kamloops trout eggs within the lake, and reports have shown that when the autumn had come round there was a very satisfactory showing of fingerlings darting about in the water. This year, of course, will give more definite evidence as to how well the trout will thrive in this lake where they were formerly unknown, but the signs, so far, have been favourable.

The Dominion fish culturists give much attention to efforts to maintain and increase the stocks of fish sought by commercial fishermen, but they seek also to enlarge the angling resources of the country by means of such plantings as the one made in White Swan. In numbers of instances, in different provinces, they have met with distinct success in this regard.

BIG INCREASE IN PACIFIC COAST—*Conc.*

the other hand, fewer haddock, hake and cusk, herring, mackerel, swordfish, lobsters, and clams and quahaugs were taken than last year.

In New Brunswick, sardine landings were somewhat larger than a year ago, lobster catch increased by some 320,000 pounds, and there were gains in the salmon, clam, shad and pollock catches but the landings from the other fisheries showed drops.

Quebec fishermen were more successful than a year ago in the cod, herring, and mackerel fisheries, so far as size of total catch is concerned. Their halibut landings also increased although the Quebec catch of these fish is not large. Landings of salmon, clams, and one or two other fish were smaller than in August of last year. The catch of all varieties of sea fish and shellfish showed a gain of about 225,000 pounds.

In Prince Edward Island the month's mackerel catch increased. So did the salmon and haddock catches, but these two fisheries are not large producers in Prince Edward Island waters. The island's landings of cod, hake, herring, and clams and quahaugs decreased.

COULD PUT 500 OYSTER EGGS—*Conc.*

"Under conditions which favour rapid growth it appears that the oyster grows flatter and has the edges of its shell less curved, the most 'cupped' oysters being found where the growth is slow. . . . Oysters of the most valuable shape—*i.e.*, most nearly round, with strong, cupped shells and plenty of space filled with meat between the two shells—are produced where they grow singly on hard, clean bottoms where the water is relatively cool and salt."

Year's Output

The oyster found on the Dominion's Atlantic coast is the species known scientifically as *Ostrea virginica*. In British Columbia there are three species —the Native, and two varieties introduced originally by means of seed oysters, the Japanese, and the Eastern. All told, more than 24,300 barrels of these tasty shellfish were marketed from the Dominion's fisheries last year. New Brunswick produced some 13,400 barrels of the total, Prince Edward Island over 5,300 barrels, British Columbia 3,555 barrels, and Nova Scotia slightly more than 2,000 barrels.

Up to the present the annual Canadian production has not been equal to the demand but with increasing attention to the possibilities offered by the oyster industry, and the employment in suitable areas of "oyster farming" methods, such as those now being put into effect in some areas in Prince Edward Island, the output may be expected to increase. In the meantime, those people who buy Canadian oysters get a delicious, healthful sea food.

HERRING CHIEF FOOD—*Conc.*

cases herring made up much the larger part of the food content or from seventy-five to one hundred per cent. In five cases from eighty to one hundred per cent of the food found consisted of pilchard particles and in four cases salmon accounted for the greater part.

"It is evident", the investigators report, "that the schooling species (of fish) form the bulk of the food of these seals, no doubt because of abundance and ease of capture. . . . It can reasonably be concluded that herring undoubtedly form the most important food material and that salmon constitute a very appreciable portion of the food, although not forming the sole or even the main item."

BULLETIN IS GUIDE TO OYSTER FARMING

"Oyster Farming on the Atlantic Coast of Canada" is the title of a new bulletin which has been issued by the Dominion Department of Fisheries for the use of persons engaging in the commercial culture of oysters. The bulletin, which has been written by Doctor A. W. H. Needler, of the staff of the Biological Board of Canada, is based upon investigations and experiments which the Department has had carried on in Prince Edward Island for several years past. The early pages deal concisely with the life history of the oyster, and then follows a section which discusses the need for oyster farming. A third section has to do with "the first step in oyster farming," which is the proper preparation of the ground for planting oysters or for collecting the "spat" or newly-settled oyster larvae. This part of the bulletin is followed by another dealing with spat collection and some final pages which have to do with planting spat. The information and instructions contained in the booklet are given in some detail, and there are also several useful illustrations. The booklet is not intended for the general reader but anyone who has taken up oyster farming or proposes to do so may obtain a copy by applying to the Deputy Minister of Fisheries, Ottawa.

KEEP WAY CLEAR—*Conc.*

Rearing pond systems at several hatcheries were extended.

A new salmon retaining pond was established on the Nictaux River, N.S., and another at the Miramichi hatchery, N.B., where the construction included a dam 70 feet long and a flume 120 feet long.

A small open hatchery to accommodate 1,000,000 pink salmon eggs for experimental purposes was built at McClinton Creek, B.C.

Advice was given the Fishermen's Federation, Marie Joseph, N.S., as to some desirable modifications in a bait cold storage plant which the association had constructed under an agreement made with the department under the Bait Freezer Regulations, and assistance was given the federation at Cheticamp, N.S., where a bait storage plant, with brine freezing unit, was also built.

Last year's production of whitefish from Canada's inland fisheries totalled nearly 15,786,000 pounds. The catch had a marketed value of about $1,445,000.

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MAKE MUD BOTTOMS FIT FOR OYSTER FARMING BY SIMPLE SAND-HARDENING

Experiments Conducted by Dominion Fisheries Department in Prince Edward Island Indicate Satisfactory Way of Enlarging Commercial Culture Areas in Oyster Districts

Investigations and experiments carried out by the Dominion Department of Fisheries have shown that under proper conditions oyster "farming" may be successfully undertaken, but there are several essentials of success and one of them is that the sea bottoms used are clean and hard.

The investigations have gone further, however, and have shown how bottoms of soft mud can be hardened sufficiently by a simple method and the oyster culture areas thus enlarged. It has also been established that this hardening, which is accomplished by spreading over the mud the tough "muddy sand" found in the zone of transition from sand to mud, can be done at a cost which is not great, having regard to the fact that "an acre (of ground) can be made to yield 100 barrels of oysters a year, and in some cases as much as 200 barrels."

These particular investigations have been conducted in Prince Edward Island but the knowledge gained from them would doubtless be of value in other parts of the country which were found suitable for commercial oyster culture.

In discussing the importance of selecting only the right kind of ground for "farming" oysters Dr. A. W. H. Needler, the zoologist who has been in charge of the department's oyster investigations in Prince Edward Island for the past two or three years, points out that "the bottoms must be firm enough to prevent the sinking of 'cultch' or oysters, with consequent complete loss." (Cultch, it may be explained for the information of the layman, is the clean material put down on the bottoms to collect the spat or baby oysters.) More than this, the bottoms should be sufficiently firm to prevent "even that partial sinking which leads to the production of an elongated shape in the oysters or to the loss of small spat on the cultch by smothering."

Tried Different Plans

Knowing the necessity of firm bottoms and knowing also that in numbers of areas otherwise suitable for oyster culture the bottoms were soft and muddy, the investigators undertook experiments to determine the possibility of bringing about satisfactory hardening. The addition of shells to soft ground was tried but it was found that this did not meet the case. "It was evident in the trials that where the mud is really soft it is necessary to add some material which would form a continuous layer over the surface with no breaks." Then it was noticed that in many places on shores there was a bottom composed of a mixture of fine sand and mud, which "becomes so tough that when one steps where it overlies soft mud it cracks at some distance from one's foot." This suggested that the addition of a layer of sand to soft mud bottoms might give the necessary hard surface.

And this is just what it did. In 1930 a patch of ground in the Malpeque Bay area, where the bottom was very soft, was treated in this way. A layer of sand about six inches thick was spread over it. The bottom grew gradually harder. When a four-inch layer of shells was added this summer "the bottom felt definitely hard, comparing favourably with many oyster beds" and the shells were so well supported that it was possible "to obtain a good 'set' of spat on most of them." Further experimentation is being carried on now in other areas with a view to getting additional information as to what thickness of sand layer is most effective.

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WINNIPEG PLEASED BY COOKERY LECTURES

British Columbia Next Province on Itinerary of Fisheries Department Specialist

Very large audiences attended the fish cookery demonstrations conducted in Winnipeg in October by Mrs. Evelene Spencer, of the staff of the Dominion Department of Fisheries, in continuing the department's program for bringing to the attention of Canadian women the best and easiest methods of preparing fish foods for the table.

Previous series of lecture-demonstrations held by Mrs. Spencer in Ottawa, Montreal, Toronto, Hamilton, London, Quebec, and Sherbrooke had been most successful but in none of these cities was greater interest than was shown in Winnipeg. At the opening demonstration there the audience numbered more than 400 but the attendance grew steadily and passed well beyond the 500 mark. Persons associated with the fishing industry in Manitoba expressed the opinion that the work being done by the department through Mrs. Spencer is most valuable.

In addition to carrying on the lecture-demonstrations, Mrs. Spencer gave a number of radio talks in Winnipeg on the food and health values of fish foods. By invitation she also spoke before the Manitoba convention of the Daughters of the Empire and before several Winnipeg clubs. She is now giving demonstrations and addresses in a number of Manitoba towns, and in these centres, as was the case in Winnipeg, she has the active co-operation of the Fisheries Branch of the provincial Department of Mines and Natural Resources.

Used Lake and Sea Fish

In her demonstrations at Winnipeg, Mrs. Spencer used several varieties of lake fish, fresh salmon from the Pacific coast, and haddock fillets from the Atlantic. Everywhere she endeavours to use products from the fisheries of the

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DOMINION SCIENTISTS FIND WHY EEL GRASS SCARCE NOW ON ATLANTIC COAST

Plant Disease Probably Spread Northward from Virginia by Water Circulation Cause of Scarcity of Marine Grass Fishermen Harvest for Use in Manufacture of Insulating Material and Other Purposes

In the past two summers Canada's Atlantic coast has been "invaded" by tropic fishes and plankton but, alas, the unusual water circulation which accounted for these visitors may also have been responsible for bringing northward a mysterious plant disease which caused lack of normal eel grass growth in various Maritime Province districts this year, entailing loss to numbers of fishermen and preventing manufacturers of certain kinds of insulating material from obtaining required supplies.

Investigations made by scientists working under the Biological Board of Canada have indicated that this disease spread gradually northward from Virginia waters, and it is possible that it was borne along by the exceptional water circulation which was apparent on the Atlantic coast in 1931 and again this year. The exact nature of the disease has not been ascertained—though it has been found that it develops in late summer and is most marked in the salter water—nor is there knowledge as to where it may have occurred in the past.

Happily, however, the Canadian investigators have uncovered some facts which encourage a belief that the disease will shortly disappear from the areas of the Dominion where this year it has had its damaging effect.

Good News for Birds, Too

Word of this likelihood will not only be pleasant news to fishermen who harvest eel grass for sale to manufacturers or for use as fertilizer but it would also be welcome to brant and wild geese along the coast, if someone could whisper it to them, for these birds find the roots of eel grass their principal food during the winter season. There is some reason for believing that last winter the scarcity of eel roots was responsible for the death of brant and geese in at least one Nova Scotia area.

Eel grass—unfamiliar to some Canadians, perhaps, although it occurs on both coasts of the Dominion—is a marine plant with roots and rootlets embedded in the sea bottom and with long, narrow, green leaves thrusting upwards. Unlike the seaweeds, which reproduce by means of spores, it breeds by means of flowers and seeds, and "it is the only seed plant," says Dr. A. G. Huntsman, of the Biological Board staff, "living in the fully salt water of our coast." Formerly it was not much used except for fertilizing land and for banking houses in the winter but more recently it has been utilized successfully in the manufacture of insulating blankets and for upholstering purposes. A good many tons of it have been harvested by Atlantic coast fishermen for commercial purposes in the past few years.

Last winter there were signs in different parts of the Maritime Provinces that something was wrong with the eel grass. The first sign, by the way, was the fact that its scarcity was bringing the geese and brant to shore. When summer succeeded winter, and it was seen that in some districts where it is normally abundant the eel grass was not growing, action was taken to have investigations made by the Biological Board, a federal body which operates under the control of the Minister of Fisheries and is continually concerned with research in connection with matters of moment to the fishing industry.

Pacific Situation Normal

The investigations revealed extensive death of the matted eel grass roots and sparse, restricted growth of leaves. This condition seemed to be general from Northumberland Strait southward but it was not as marked in the less salt waters of estuaries and brackish pools as it was elsewhere. Nothing was learned of any scarcity in more northern waters of the Gulf of St. Lawrence. Reports obtained from Newfoundland and British Columbia were to the effect that there was no apparent scarcity in either of these regions.

Information from United States sources indicated that normal eel grass growth had been lacking on the Massachusetts coast this year and in Chesapeake Bay there had been only about one-third the usual quantity. Advices from Virginia were that "eel grass has been very scarce and possibly none in these waters during the past two years."

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SALMON CLIMB FORTY FEET BY N.B. FISHWAY

Make their Way in Numbers to Spawning Grounds of Magaguadavic River

Numbers of Atlantic salmon have this year successfully made their ascent up the fishway on the Magaguadavic River, New Brunswick, which overcomes an obstruction forty feet high and opens a relatively easy passage to the spawning grounds on the upper waters of the stream.

In other words, the fishway is effectively helping to maintain the salmon stocks.

Fishways, of course, are built to enable fish to get past obstructions but the point of particular interest in the Magaguadavic case is the exceptional height that is conquered. There is only one other place in Canada where a fishway successfully helps fish to climb a greater height, fifty-nine feet, and that is at a point on the Mersey River, Nova Scotia.

The Magaguadavic fishway was built by the Dominion Department of Fisheries about four years ago. It had to be constructed at a spot which presented marked natural difficulties, and there were sceptics who shook their heads when they discussed the likelihood that it could be made to operate efficiently. Truth to tell, there were times when it seemed as if doubts had been warranted, but this year came satisfactory and gratifying evidence that the salmon were making the ascent in numbers.

The plans for the Mersey fishway were also prepared by the Fisheries Department. Elsewhere in the Maritime Provinces and in British Columbia—areas where the fisheries are administered by the Dominion authorities—are numbers of other fishways which are operating with efficiency and enabling spawning grounds to be reached by many fish which otherwise could never get to them. Construction of works of this kind is one of the ways by which the department is continually helping to conserve and build up the fish stocks of the country for the benefit of both commercial fishermen and anglers.

Canada's output of canned sardines in 1931 was 202,520 with a marketed value of more than $810,000. All of the Canadian production of these canned fish is packed in southwestern New Brunswick.

PERFECT SIMPLE METHOD OF UTILIZING FISH WASTE LIQUORS IN GLUE MAKING

Successful Investigation at Dominion Fisheries Experimental Station in British Columbia—Useful Work Also Done on Refrigeration and Other Subjects —Similar Activity at Halifax Station

Research may not always be concerned with practical problems of immediate importance but it is work with definitely practical objects which goes on at the Fisheries Experimental Stations conducted by the Dominion authorities, and the development of a simple method of making glue from fish waste liquors is a case in proof.

This particular job was done by a research worker on the staff of the Pacific Experimental Station at Prince Rupert, B.C., but it is only one of many pieces of work of present or potential value to the fishing industry which have been done at Prince Rupert and Halifax, the second of the two experimental stations conducted under the authority of the Dominion Minister of Fisheries being located in the Nova Scotia capital. At each of these research centres trained scientists are continually carrying on investigations and experiments in connection with practical problems related to the fisheries and the results of their work are placed freely at the disposal of the fishing industry. At two other stations, one on each coast, questions touching fish life are studied.

Prince Rupert Undertakings

The glue investigation at Prince Rupert was completed last year and it was established that by means of the method developed the waste liquors obtained in reduction plant operations on the Pacific coast can be utilized to produce a glue as strong as the best commercial liquid glues. Reference to one or two other investigations in progress at Prince Rupert during last year may also be of interest as indicating some of the ways in which science is being employed on behalf of Canada's fishing industry but it should be kept in mind, of course, that work of similar importance was also carried on at the Atlantic Experimental Station. Here is some of the research that went on at Prince Rupert:—

Continued study was made of ways of improving cold storage rooms, which showed that "by increasing the cooling coil area the total efficiency of the refrigeration plant is increased whilst the dehydrating effect decreases."

Experiments were undertaken which indicated that a horizontal oil-sealed hatch is a great improvement over the standard refrigerator door.

Investigations were made which showed that several British deposits of diatomites and bentonites can be economically used to decolourize fish oils, a discovery of value in connection with the possible establishments of refineries since decolourization is an important process in refining.

Valuable data were accumulated bearing on the use of pilchard oil in the protective coating industry.

Experiments in regard to the nutritive value of canned salmon, including Vitamin A and D potency.

Investigations as to the use of waste liquors from pilchard reduction plants as fertilizer were begun.

Further investigation was conducted regarding the characteristics of marine bacteria and their relation to the spoilage of fish, and study of the effect on the growth of marine bacteria at low temperature of the sodium chloride treatment, which had been found so efficient in the treatment of fresh fish. In this study it was found that halibut treated with a twenty per cent brine solution and kept in cold storage for eighteen months was in good condition at the end of that time.

EEL GRASS—*Conc.*

Eventually the investigators were led to the conclusion that "a disease, which was probably in Virginian waters in 1930 and responsible for scarcity of eel grass there in the following year, spread northward and in the latter part of 1931 affected the eel grass as far as Cape Breton Island and Northumberland Strait." This year the disease reached the north shore of Prince Edward Island and the east coast of New Brunswick, but apparently did not spread as far as Chaleur Bay. Where it was present this year for the first time it seemed to affect entire beds but where it had occurred a year ago the proportion of plants attacked this summer was relatively small, and it is this fact which encourages the opinion that it does not continue very long.

FISHERMEN HELPED BY EXPERT METHOD

Excellent results are following from action taken by the Dominion Department of Fisheries in sending an experienced and expert instructor to the Magdalen Islands in the past two or three seasons to demonstrate to the fishermen the method of preparing cod in the Gaspe cure. The fishermen have shown the greatest interest in the work and have applied the instruction very successfully. In a recent report to the department one of the fisheries inspectors in the islands records a marked improvement in the dried cod put up. As proof of the improvement he cites the fact that this summer "very little cullage" was necessary, "only three quintals, for instance, in one lot of 117 quintals."

Instructional work in other districts beside the Magdalens, such as Gloucester County in New Brunswick, parts of Prince Edward Island, and some places in Nova Scotia, has also been carried on in recent seasons by expert demonstrators in the department's service. Some of this instruction has covered "Gaspe" curing, some the curing of cod in pickle and the processing of boneless fish. The fishermen in all these places have been alert to add to the knowledge gained from their own experience and from the experience of other fishermen, and the results everywhere have been satisfactory.

In addition to the work done by these special instructors in different places the department also sees to it that its regular fisheries inspectors are fully qualified to give information, not only orally but also by means of demonstration, as to the most approved methods of handling and processing fish. To make certain that the inspectors are soundly equipped for work of this kind they are required to take special courses of study and to pass examinations in the subjects taken up. Courses of this kind have been given the inspectors at the Atlantic Fisheries Experimental Station, Halifax, and the Pacific Biological Station, Nanaimo, which are two of the centres of fisheries research maintained by the Dominion authorities.

Canada's fisheries production in 1931 had a marketed value of approximately $30,685,000, or some $17,000,000 less than in 1930. The adverse marketing situation induced by worldwide economic disturbance explains the decrease.

WORLD DIFFICULTIES CHECK FISH OUTPUT

Unsettlement of Markets Lessens Fishing Effort and Catch is Curtailed

Production from Canada's sea fisheries in the 9-month period ending with September was less than it had been in the corresponding period of 1931, but this condition was due to the continued unsettled state of world markets, not to any depletion of the Dominion's fisheries resources.

With markets much unsettled and prices lowered, fishing effort this year has been less intensive than it would otherwise have been and the total catch for the January-September period was only 582,000,000 pounds, in round figures, as against some 685,000,000 pounds a year ago. Landings fell off in all of the five sea fisheries provinces except Quebec, where the catch of 65,005,000 pounds represented a gain of 6,151,000 pounds. In British Columbia the landings amounted to 244,958,000 pounds, while Nova Scotia, the second largest producer, accounted for 167,033,000 pounds. The New Brunswick catch was 83,750,000 pounds and in Prince Edward Island it was 21,104,000 pounds.

There was general decrease in the landed value of the fish and shellfish taken, and the total value for the Dominion was $9,501,000, a drop of $2,475,000.

Results in September

Further figures compiled by the Dominion Department of Fisheries show that in September the New Brunswick fishermen increased their total catch as compared with the catch in September, 1931 (the gain was in herring, hake, mackerel and lobsters), but in the other sea fisheries provinces—British Columbia, Quebec, Prince Edward Island, and Nova Scotia—the landings decreased, although the Quebec decrease was very small. Taking the sea fisheries as a whole, the month's catch was approximately 99,890,000 pounds and total landed value was $1,032,300. In the previous September the catch was 110,278,000 pounds and landed value $1,480,800.

Landings for the month fell off in most of the Atlantic coast fisheries except in the case of herring, hake, lobsters, and mackerel in New Brunswick, mackerel in Prince Edward Island, and cod in Quebec. In British Columbia there was gain in halibut catch—2,565,000 pounds as against 2,327,000 pounds—and in pilchard catch, which was 37,060,000 pounds as against 36,549,000 pounds. Landings from the salmon fishery, the third of the principal fisheries carried on in Pacific coast waters in September, was 15,961,000 pounds, a drop of 6,977,000 pounds.

WINNIPEG LECTURES—*Conc.*

different parts of the Dominion, for the purpose of the campaign is to direct attention to the tastiness and diet value of Canadian fish foods generally, not the particular merits of any one variety of fish or shellfish.

The present Manitoba program of meetings will be finished some time in November and the next series of demonstrations will be held in British Columbia, beginning at the first of the coming year. No program is being arranged for December since that month is not a very suitable time for holding meetings of women. Mrs. Spencer's British Columbia itinerary will take her to Vancouver, Victoria, and a number of other places in the province, but it has not yet been mapped out definitely.

At all of the cities which Mrs. Spencer has so far visited there has been brisk demand for copies of the cook book, "Fish and How to Cook It," which was prepared under her direction and issued by the Department of Fisheries several months ago. This booklet may be obtained, for ten cents a copy, from the Deputy Minister of Fisheries, Ottawa. Persons ordering it should be careful to indicate whether they desire copies in the English or French edition.

Thanks to the construction of a fishway by the Dominion Department of Fisheries, certain varieties of salmon which in other years had been held up at Skutz Falls, on the Cowichan River, British Columbia, were last year enabled to get to spawning grounds at least twenty miles above the falls. Better seeding of the Cowichan spawning beds from year to year, and consequent upbuilding of the runs, will be the dividend from the money invested in the fishway.

During 1931 the seaplanes employed in the fisheries patrol service in British Columbia, under the Dominion Department of Fisheries, were on flying duty about 320 hours. Planes have been used in this service for several years past, with very satisfactory results.

B.C. SALMON PACK MUCH AHEAD OF 1931

Chief Gains so Far in Production of Canned Chums, Cohoes, Springs

British Columbia's output of canned salmon this year is already more than 315,000 cases greater than the total pack put up in the province in 1931.

Last year's production amounted in all to slightly more than 685,000 cases while early in October this season's pack had reached 1,000,208 cases. Total figures for 1932, of course, will be somewhat larger than this.

Although total 1932 pack will show a large gain over last year it will still be considerably below the average annual production for several years prior to 1931. Unsatisfactory conditions in world markets have led to curtailment of salmon cannery operations since 1930. There has been no depletion of British Columbia salmon runs but, with markets dislocated, there has naturally been lessened intensity in fishing and canning effort.

Production of canned sockeye up to October 8 of this year was 275,200 cases, in round figures, or slightly less than the pack processed up to approximately the same date in 1931. Steelhead output also fell off a little, but annual steelhead pack is never more than a couple of thousand cases or so. On the other hand, the pack of chums, 260,800 cases, was about 205,900 cases greater than a year ago, the output of cohoes (including bluebacks) showed a gain of more than 79,600 cases, and there was an increase of 46,400 cases in the production of springs. The pack of pinks was nearly 13,900 larger than at the same date in 1931.

OYSTER FARMING—*Conc.*

Much of the cost entailed in carrying out hardening operations is labour and since, at certain seasons, the oyster farmer has considerable free time, the method followed in the experiments would be a profitable means of enlarging the area capable of cultivation. It would also be of use in hardening soft spots in existing hard areas, thus making it possible to work them more satisfactorily.

Close to 55,000 pounds of herring scales, for use in manufacturing artificial pearls, were marketed by New Brunswick fishermen last year and brought a return of $1,550.