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**REPORT OF COMMISSION OF INQUIRY
INTO
FRESHWATER FISH MARKETING**

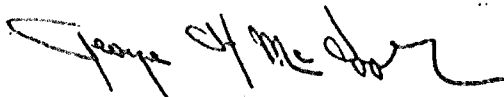
COMMISSIONER, GEORGE, H. McIVOR C.M.G.

**TO HIS EXCELLENCY THE GOVERNOR GENERAL IN COUNCIL
MAY IT PLEASE YOUR EXCELLENCY,**

As the Commissioner appointed by Order in Council dated the ninth day of July, 1965, P.C. 1965-1269 to enquire into and report upon the marketing problems of the freshwater fish industry in the Provinces of Ontario, Manitoba, Saskatchewan and Alberta and the Northwest Territories and, in particular, without limiting the generality of the foregoing, to consider and report upon:

- 1 - the nature of the factors which give rise to the weakness of prices for freshwater fish, particularly in the export market;
- 2 - the possibility of better coordination of production and supply in relation to demand to achieve more orderly marketing;
- 3 - the possibility and desirability of establishing an export monopoly to achieve more efficient marketing and thus provide better returns to primary producers, taking into consideration the proposals which have been before the Federal Provincial Prairie Fisheries Committee;
- 4 - relevant matters which may in the course of the enquiry arise or develop and which, in the opinion of the Commissioner, should be included within the scope of the enquiry and report.

I BEG TO SUBMIT FOR YOUR EXCELLENCY'S CONSIDERATION THIS REPORT



COMMISSIONER

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PREFACE

The present backwardness of the Canadian inland fishery and fish trade, and their uncertain position in future economic developments of this nation, has been recognized by the Federal Government and provincial governments concerned. The Federal-Provincial Conference on Fisheries Development in Ottawa, January 23 and 24, 1964, also included deliberations on the Canadian freshwater fish industry. At this conference it was agreed that marketing was one of the problem areas and that the usefulness of marketing board techniques warranted further specialized study. This led to the establishment of the Inter-Governmental Committee on Marketing Organization for the Freshwater Fisheries. This committee became subsequently the Sub-Committee of the Federal-Provincial Prairie Fisheries Committee on Marketing Organization. The recommendations put before the Federal-Provincial Prairie Fisheries Committee by its Sub-Committee gave rise to the establishment of my Commission of Inquiry to consider and report upon the marketing problems of the freshwater fish industry in the Provinces of Ontario, Manitoba, Saskatchewan, Alberta and Northwest Territories.

Marketing constitutes the process of moving freshwater fish from the primary producer to the consumer. Therefore, I concerned myself not only with exporting but also with domestic handling and processing of freshwater fish. Production problems in the primary fishing industry, to the extent that such problems do not affect the process of marketing, were not considered part of my terms of reference and were only touched upon briefly.

Weakness of prices of freshwater fish does not refer to a price level, but to the strength or weakness in bargaining of the buyer and seller in arriving at a specific price. When the market position of the exporter of freshwater fish or the fisherman is ineffective, i.e. when his influence in price determination is minimal, then his price is characterized by weakness. I was concerned, therefore, with the weakness of the bargaining

position of the Canadian exporter and of the fisherman in selling freshwater fish, and particularly with the underlying factors which contribute to this weakness.

The terms of reference recognize that the lack of co-ordination of supply and demand is a factor which affects adversely the export marketing of freshwater fish. The Commission is hence instructed to inquire into and report upon the possibility of better co-ordination which will achieve more orderly marketing, and will thus remove, in some degree, the weakness in export prices.

I am also commissioned to inquire into and report upon whether the current marketing situation warrants an export monopoly, whether persons and organizations involved in the marketing process want organized marketing, and whether an export monopoly or marketing board technique of selling can work for marketing freshwater fish. The Commission is instructed to consider the proposals which have been placed before the Federal-Provincial Prairie Fisheries Committee by its Sub-Committee on Marketing Organization. The recommendations of this Sub-Committee were as follows:

- (1) That a Freshwater Fish Export Authority be established by federal legislation.
- (2) That this Authority be the sole exporter of designated fish products of freshwater fish from Ontario, Manitoba, Saskatchewan, Alberta and the Northwest Territories.
- (3) That the Authority purchase, by contract, such products offered to it under contract by licensed fish dealers in the designated area.
- (4) That the Authority publish the price payable by it for such products at specified centres by quality.
- (5) That any surplus earned in trading operations be distributed by the Authority on a pro rata basis.

- (6) That each provincial government concerned and the government of the Northwest Territories provide for the appropriate reorganization of the primary and secondary fishing industries in their jurisdiction to ensure:

- (a) The channelling of supplies to the Authority, and
- (b) The maximization of returns to fishermen.

In carrying out my inquiry, having given due advance notice, public hearings were held at thirteen Canadian centres; in Manitoba at Winnipeg, Gimli and Winnipegosis, in Saskatchewan at Prince Albert and Meadow Lake, in Alberta at Edmonton, in the Northwest Territories at Hay River, and in Ontario at Belleville, London, Sudbury, Sault Ste. Marie, Port Arthur and Kenora. A transcript of the evidence placed before me at these public hearings has been compiled. The Commission received, as well, written submissions from various organizations and individuals. In order to obtain the views of all parties concerned with marketing Canadian freshwater fish, I also visited United States wholesalers, processors, and retailers in New York, Detroit and Chicago.

The evidence placed before me, supported with research carried out by the Commission is incorporated in my report. The report commences with a summary of the Commission's findings and recommendations, Section I. Next the Commission submits its findings in greater detail and elaborates on its recommendations. The background material which supports the findings are found in Section III, History of the Canadian Freshwater Fish Industry; in Section IV, Marketing Canadian Freshwater Fish; and in the Statistical Appendix.

The Commissioner wishes to thank his advisors, Dr. W.A. Kennedy and Mr. W.L. Posthumus, who were made available by the Fisheries Research Board of Canada, and the Department of Trade and Commerce respectively, for their

perseverance and diligence during the deliberations of the Commission and in the preparation of the report, and to Mr. R.W. Bedard of the Department of Trade and Commerce, who also facilitated the work of the Commission as Secretary.

The Commissioner is grateful to the Deputy Minister of Trade and Commerce, Mr. J.H. Warren who made available the facilities of his Department. Special thanks are due to Mr. Lorne Grant, Director, Central Area, Department of Fisheries; Mr. T.R. Kinsella, Assistant Director (Fisheries), Agriculture and Fisheries Branch, Department of Trade and Commerce, and Mr. H.V. Dempsey, Director, Inspection Service, Department of Fisheries, who provided valuable advice and assistance.

I wish to express appreciation as well to the numerous other persons, in particular, Mr. J.O. Grieve, Toronto, and Mr. H.B. Monk, Winnipeg, who helped the Commission in carrying out the inquiry.

The Commissioner and his staff also appreciate the cooperation which they received in New York, Chicago, Detroit and Washington from members of the Trade Commissioner Service of the Department of Trade and Commerce. A special thanks is due to the United States Importers and to the officials of the United States Government for the friendliness and hospitality which marked our reception and discussions.

FISH NAMES

Many species of Canadian freshwater fish are known by different names in different localities. To avoid confusion, common synonyms of the names used in this report are tabulated below. The scientific name is also given, since there is one scientific name and only one for each species of fish, a name which is the same in every language. "Spp." in a scientific name indicates a collective noun which includes several species of the same genus (i.e. several species which are much alike).

Name Used Here	Synonyms	Scientific Name
Sea Lamprey	lamprey.....	<i>Petromyzon marinus</i>
Sturgeon	lake sturgeon, rock sturgeon.....	<i>Acipenser fulvescens</i>
Alewife	sawbelly, gaspereau.....	<i>Alosa pseudoharengus</i>
Spring salmon	Chinook salmon.....	<i>Onchorhynchus tshawytscha</i>

Name Used Here	Synonyms	Scientific Name
Chum salmon	dog salmon.....	<i>Onchorhynchus keta</i>
Atlantic salmon	salmon	<i>Salmo solar</i>
Lake trout	trout, siscowet, togue, salmon trout, grey trout, macinaw trout	<i>Cristivomer namaycush</i>
Actic char	<i>Salvelinus alpinus</i>
Inconnu	cony	<i>Stenodus leucichthys</i>
Whitefish	lake whitefish	<i>Coregonus clupeaformis</i>
Cisco	lake herring, herring, shallow-water cisco.....	<i>Leucichthys artedi</i>
Cisco	chub, (¹) tubilee (¹)	<i>Leucichthys spp.</i>
Smelt	American smelt.....	<i>Osmerus mordax</i>
Pike	jackfish, jack, northern pike, pickerel (in U.S.A.)	<i>Esox lucius</i>
Muskellunge	musky, lunge.....	<i>Esox masquinongy</i>
Goldeye	<i>Hiodon alosoides</i>
Sucker	mullet (²)	<i>Catostomus spp.</i>
Redhorse	mullet (¹)	<i>Moxostoma spp.</i>
Buffalofish	Buffalo	<i>Ictiobus spp.</i>
Carp	<i>Cyprinus carpio</i>
Catfish	bullhead (applicable to some but not all catfish).....	<i>Ictalurus spp.</i>
Eel	American eel	<i>Anguilla rostrata</i>
Burbot	ling, lawyer, eelpout, maria, methy, loche	<i>Lota lota</i>
White perch	<i>Roccus americanus</i>
White bass	silver bass.....	<i>Roccus chrysops</i>
Black bass	smallmouth bass	<i>Micropterus dolomieu</i>
Perch	yellow perch	<i>Perca flavescens</i>
Pickerel	yellow pickerel, yellow walleye, yellow. pike-perch, walleye, doré, pike (in U.S.A.)	<i>Stizostedion vitreum</i>
Blue pickerel	blue walleye, blue pike, blue	<i>Stizostedion vitreum glaucum</i>
Sauger	sauger pickerel, sand pickerel	<i>Stizostedion canadense</i>
Sheepshead	freshwater drum, drum, silver bass, sunfish.....	<i>Aplodinotus grunniens</i>

(¹) Collective nouns, each of which include several species of cisco. The species included may vary from lake to lake.

(²) In recent years redhorse have frequently, and suckers have sometimes, been sold as "mulletts". This could be regarded as misrepresentation, since there is an entirely different group of marine species which have for centuries been called "mulletts" and sold under that name.

Freshwater Fish Product Forms

- Whole, round** — as the fish comes from the water
- Whole, dressed** — with "blood", i.e. viscera, gills, kidney, etc. removed
- Whole, headless** — "dressed" with head removed
- Fillets** — "headless" with major bone structure removed

I-SUMMARY OF FINDINGS AND RECOMMENDATIONS

FINDINGS:

We find that:

- 1 - prices for round or dressed fish in export markets are weak because there are too many exporters to counter the control exercised by a few importers;
- 2 - in marketing round or dressed fish Canadian exporters receive too small a share of the price paid by the consumer, because, due to their relative weakness as sellers, they bear the cost of uncertainties and risks encountered in exporting;
- 3 - the uncertainties and risks are especially extensive in exporting round or dressed freshwater fish due to (1) the perishable nature of the product (2) the absence of effective quality control and of product standardization and (3) the lack of coordination between the demand and supply coming to the market;
- 4 - pickerel, pike, sauger, whitefish and lake trout, are the major species which are, in total, marketed mostly round or dressed; and that ninety percent of the total catch of these species are produced in the inland fishery of Manitoba, Saskatchewan, Alberta, the Northwest Territories and Northern Ontario;
- 5 - prices to the fisherman in Manitoba, Saskatchewan, Alberta, the Northwest Territories and Northern Ontario are weak, and the share received by the fisherman of the price paid by the consumer is far too low;
- 6 - the fisherman receives an unduly small share of the retail price because (1) the exporter passes on the reduction in export return to him which result from his ineffectiveness in bargaining with the importer and (2) because domestic handling and processing of freshwater fish is inefficient and costly.

- 7 - we agree in many respects with the proposals which have been before the Federal-Provincial Prairie Fisheries Committee concerning the desirability of an export monopoly. However, we disagree strongly with their proposals, that fish be bought from licensed fish dealers and not directly from fishermen, and as well that they make no provision for a direct transfer to the fisherman of any increased export earnings.

RECOMMENDATIONS:

We recommend that:

- 1 - a Freshwater Fish Marketing Board be established under federal legislation;
- 2 - the Board consist of not less than five and not more than seven members, one of whom shall be chairman and general manager, all to be appointed by the Federal Government;
- 3 - the Board be the sole seller of the freshwater fish and fish products produced in the designated area consisting of Northwestern Ontario, Manitoba, Saskatchewan, Alberta and the Northwest Territories;
- 4 - the Board accept delivery of freshwater fish only from the fisherman;
- 5 - the Board prior to the opening of each fishing season establish initial prices for the duration of the season for each species of fish, by grade, "in store" Winnipeg, and at such other exporting points as the Board may decide;
- 6 - the Board pool the returns from the sale of its fish and fish products and pool the costs incurred in marketing these products;
- 7 - the Board determine and make a final payment to the fisherman for the fish delivered to the Board, after all fish delivered has been sold;

- 8 - the Board undertake the handling, packing, processing, and storing of the fish;
- 9 - the board sell and dispose of the fish for such prices as it may consider satisfactory, keeping in mind the overall purpose of promoting the sale of Canadian freshwater fish in world markets;
- 10 - the Board have the authority to finance the fisherman with working capital;
- 11 - standards and grades for fish and fish products be established to promote orderly marketing, to guarantee a supply of prime quality fish, and to enhance consumer confidence in Canadian freshwater fish;
- 12 - financial assistance be given to the secondary fishing industry to modernize cold storage facilities and processing facilities;
- 13 - the Canadian Government make a formal

approach to the Government of the United States to agree on a method of inspection of whitefish, which is mutually more satisfactory;

- 14 - a cooperative educational effort by all governments concerned to acquaint the fisherman with the operations of the Board;
- 15 - that present legislation governing water pollution be strictly enforced and that governments take all further steps required to prevent pollution of Canadian inland waters;
- 16 - research pertaining to freshwater fish and freshwater fish products be continued and expanded where desirable;
- 17 - that the opening and closing of fishing seasons on lakes be determined collectively by the governments concerned in order to facilitate the coordination of supply and demand.

II-FINDINGS AND RECOMMENDATIONS

A. FINDINGS

The Commission finds that the majority of the nine thousand fishermen engaged in the commercial inland fishery have failed to obtain an income from fishing which supports an adequate standard of living. Many fishermen supplement their low income from fishing with other, part-time employment. However, many freshwater fishermen are incapable of having or have no alternative employment opportunities, and consequently are living at subsistence levels. Such subnormal, and totally unacceptable living conditions occur especially in the northern segment of the inland fishery consisting of Northern Ontario, the northern halves of the prairie provinces and the Northwest Territories. In this area, the failure of the freshwater fishery to support normal living conditions is associated more and more with the Indian and Metis, as their participation in the commercial fishery has expanded in recent years.

(1) Production

The Canadian supply of freshwater fish has normally been between 105 and 120 million pounds. In 1964, inland fishermen landed a total of 105 million pounds. Its value to the nine thousand inland fishermen is estimated at about 13 million dollars. The more important species in terms of income to the fisherman are whitefish, pickerel, sauger, lake trout, pike, perch, smelt and cisco. Minor commercial species include goldeye, sturgeon, inconnu and a group of species normally designated as "rough fish," comprised of carp, sucker, catfish, etc.

The Commission finds that of the major commercial species the output of lake trout, pickerel and sauger has declined and that the landings of whitefish, pike, perch, smelt and cisco (chub

and tullibee) have increased. There has been an increasing regional concentration in the production of the species. The landings of pickerel, lake trout and whitefish from the Great Lakes⁽¹⁾ have fallen off sharply so that Northern Ontario, the prairie provinces and the Northwest Territories at present account for more than 90 percent of the total production of these species. The latter region also accounts for almost the entire commercial catch of pike and sauger. Cisco (lake herring, chub and tullibee) is produced throughout the entire inland fishery.

It is evident that the marketing of pike, pickerel, sauger, whitefish and lake trout is the concern almost exclusively of the fishermen, dealers and exporters in the western inland fishery and in Northern Ontario, where there are some six to seven thousand fishermen, three hundred dealers, and thirty-five exporters. The marketing of perch and smelt affects primarily the fishermen on Lake Erie and Lake Ontario and the dozen processor-exporters in the area.

The Commission finds that within the commercial catch the incidence of whitefish infected with *Trikenocephalus crassus* is increasing. Whitefish which are infected with this parasite are found in most of the producing areas in Saskatchewan, Manitoba and Northern Ontario. Whitefish landed in parts of Alberta and from the Great Lakes are generally free of infection. Landings of whitefish from the latter have fallen off substantially while those from the former have increased.

The presence of this parasite in the whitefish is a problem to the freshwater fish industry because the United States Food and Drug Administration prohibits the entry of infected whitefish, under the Food, Drug and Cosmetics Act

⁽¹⁾ In this report two subdivisions of Ontario fisheries statistics are used for convenience: (1) "Great Lakes", meaning the Canadian waters of Lake Superior, Huron (Incl. North Channel and Georgian Bay), St. Clair, Erie, and Ontario, with their connecting waters, plus "Southern Inland Waters" of the published statistics; and (2) Northern Ontario which is equivalent to "Northern Inland Waters" in the published statistics. Great Lakes production plus Northern Ontario production equals total Ontario production.

of 1906. All whitefish entering the United States are therefore subject to inspection by F.D.A. officials. Rejected shipments, having suffered considerable deterioration in quality, are returned to Canada and are subsequently marketed for a greatly reduced return in the domestic market.

In order to minimize the effect on Canadian industry and to determine the infection as close to the source as possible, the "Whitefish Export Inspection Regulations" were established on March 8, 1951 under the Canadian Fish Inspection Act. Under these regulations inspection is carried out by Canadian inspectors. Inspection involves basically the cutting up of a number of whitefish from each shipment to determine the incidence of the parasite. However, the fish used as samples cease to have any commercial value, and represent a loss to the industry, both to the exporter and to the fisherman.

Even with prior inspection by Canadian authorities a good deal of whitefish continues to be rejected by United States inspectors because the samples used in both countries to determine infection are too small to give consistent results. Canadian inspectors examined 18.6 million pounds of whitefish in 1965, and rejected 950 thousand pounds or 5 percent. Of the 17.7 million pounds passed, the United States inspectors examined approximately 2.8 million pounds and rejected 410 thousand pounds or 15 percent.

It is obvious that there is little ground for confidence on the part of United States authorities in the methods employed by Canadian authorities to determine the rate of infection in whitefish. The presence of *Tricinenophorus crassus* and the present system of inspection and reinspection have a far-reaching effect on the marketing of whitefish. The Commission recognizes this as the most important problem affecting any single species.

The Commission finds that greater production of freshwater fish is possible, especially if there were a reversal in the course of a number of developments which have led to the underutilization of the present water resources and the stocks of fish available in them. We find that pollution has had a disastrous effect on some Canadian inland fisheries. Canada's greatest asset is pure unadulterated water. Yet year by year we Canadians are deliberately destroying this priceless

heritage. Further pollution must be stopped and waters presently polluted must be cleaned. We find that the opening of lakes for sport fishing and the consequent closing of such lakes to commercial fishing leaves the stocks of a number of non-sport species almost entirely unutilized. The encroachment of sport fishing on the commercial fishery is not only wasteful of fish resources, but it also forces the commercial fishery into more remote areas, where prices to the fisherman are lower.

We find also that the stocks of "rough fish" in Canadian inland waters are under-utilized. Under present market conditions the optimum exploitation of the stocks of these species is not warranted because of generally uneconomic returns, but present efforts should be greatly expanded to develop acceptable products from these species and to extend present markets.

(2) Markets

The freshwater fish industry markets approximately eighty percent of its production outside Canada. In 1965, it exported sixty million pounds of fish products, which earned Canada over twenty-two million dollars. While the freshwater fish industry is comparatively small in total output it is an important participant in Canada's export trade.

The United States is essentially the only customer for Canadian freshwater fish. Over ninety-five percent of all freshwater fish exports, or three-quarters of the total Canadian production is exported to the United States. The development of alternative markets for most species has generally not been successful because our exporters could not obtain comparable prices. In recent years, the only worthwhile effort to create alternative outlets involved pike, which is a less desirable species in North America, but which is well-known and appreciated in Europe.

Domestic consumption of commercially produced freshwater fish is not significant for the freshwater fish industry, partly because many Canadians who prefer freshwater fish catch their requirements themselves, having relatively easy access to lakes and rivers, and partly because of the availability of lower priced sea fish. Also the quality of fish offered on the domestic market is

sometimes inferior. This is always true of whitefish which have been rejected by United States inspectors and have subsequently been returned to be sold on the domestic market. There is a need to develop the domestic and export markets for quality freshwater fish and fish products particularly those which utilize species such as rough fish, which are presently not fully exploited.

Although the United States is the major outlet for Canadian freshwater fish, the Canadian industry is virtually the only foreign supplier in that market. Imports of freshwater fish from Canada make up around forty percent of the total United States supply. Moreover, United States importers depend on Canadian production for nearly their entire requirements of pickerel, pike, sauger, whitefish and lake trout.

Pickerel, sauger, whitefish and lake trout are the high-priced species: the average export value per pound in 1965 was 52 cents, 44 cents, 39 cents and 40 cents respectively. Of the major commercial species, pike, perch and smelt are relatively low-priced, with average export unit values of 20 cents, 18 cents and 13 cents.

Export prices of pickerel, sauger, pike, whitefish and lake trout have seldom been higher than during the last one or two years. Prices rose most substantially for pickerel, pike and sauger. The average price of whitefish, the most important species, has only increased slightly during the past decade. The average export return on perch and on smelt, with wide variations from year to year, show no consistent upward or downward direction.

(3) Demand

In the past, pickerel, pike, sauger, whitefish and lake trout were marketed almost exclusively whole, either round or dressed. Today, the consumer is demanding these species increasingly in the fully-processed, conveniently-packaged fillet form. Accordingly, today sixty percent of the combined production of pickerel, pike and sauger is filleted. The Commission also estimates that thirty percent of all whitefish landings is

filleted, as are small amounts of lake trout. The Commission is of the opinion that this change in the pattern of utilization will continue provided production of these five species is maintained.

The Commission recognizes that there are two distinct markets for pickerel, pike, sauger, whitefish and lake trout. In general, the consumer of unfileted fish is willing to pay a higher price than the consumer of fillets. The Canadian exporter on average during the year realizes more for these species when they are exported "in the round" or "dressed", than when he filelets them.⁽¹⁾

The difference in return, again on a landed weight basis, between whole, dressed fish and fillets is particularly large for whitefish.⁽²⁾ There are several reasons for the low return on fillets of whitefish. They utilize largely fish which are unsuitable for the whole, dressed fish trade because of infection with *Trisophorus crassus*. There is no market for such whitefish unless they are filleted. Frequently, infected whitefish are filleted only after rejection by the United States inspectors, by which time quality has deteriorated. This deterioration reduces consumer acceptance. In addition, because of the texture of the flesh of whitefish and trout the present freezing techniques are inadequate to produce a consistently frozen fillet which can be stored for a considerable period of time without the loss of quality.

The western inland fishery produces primarily pickerel, pike, sauger, whitefish and lake trout. Plant processing, that is filleting, accounts for about forty-percent of the catch, and the remainder is dressed, iced and packed largely for export by fishermen and/or packers. The Great Lakes fishery produces primarily perch, smelt and bass which are almost exclusively plant-processed.

(4) Weakness in Export Prices

The Commission finds that although the market situation is currently favourable and ex-

(1) A pound of fillets requires more than a pound of whole, round fish; but not twice as much which is necessary since about two lbs. of the whole round fish are required to make one pound of fillets.

(2) In 1964, a whitefish weighting two pounds realized on average 61 cents sold whole dressed, and 40 cents when filleted.

port prices are comparatively high, the average return to the Canadian freshwater fish industry in export markets is not as high as it could be because the spread between the exporter and and retailer is too large.

We find that export prices are weak. When marketing Canadian freshwater fish, the Canadian exporter bargains from weakness, and the United States importer from strength. Therefore, the United States importer, as a middleman between the Canadian exporter and the United States retailer, passes on the costs of risks and inefficiencies encountered by him in marketing to the retailer and the Canadian exporter. And we find that the Canadian exporter has in general scarcely resisted because of both inability and unwillingness.

The ineffectiveness in bargaining and the uncertainties and risks in marketing are relevant especially to freshwater fish marketed round or dressed.⁽¹⁾ This involves mostly pickerel, pike, sauger, whitefish and lake trout, particularly the portion produced by the freshwater fish industry in the western inland fishery and in Northern Ontario.

In this region some 35 exporters handle the export movement of freshwater fish. Exports move largely through Edmonton, Prince Albert and Winnipeg, the last handling the largest volume. The portion marketed round or dressed is transported mostly to Chicago and Detroit. Two importers, of the nine in these cities, handle most of the Canadian shipments. These two importers are the dominant factor in the pricing of round or dressed freshwater fish.

As a consequence of the ineffectiveness of the Canadian exporter in pricing, most of the costs which arise from the risks and inefficiencies in marketing round or dressed fish are borne by the Canadian freshwater fish industry. The uncertainties encountered in marketing whole, fresh fish also offer the United States importer opportunities for taking advantage of the Canadian exporter. These aspects combined result in an unsatisfactory share of the consumer's price for the Canadian industry.

In the summer of 1905, in spite of the high price level at that time, the Canadian freshwater fish industry received only about half of the price paid by the United States consumer. The Canadian industry catches, dresses, ices, packs and transports the product, yet it receives only fifty percent of the retail price. We regard this as an unacceptable situation and one which can be substantially improved upon. The Canadian industry as sole supplier of these species to the United States market is wasting the marketing strength inherent in such an important supply position by sharing the selling function among too many individual exporters. Control over the marketing of these species rests by default with the United States importers.

(a) Factors Underlying the Weakness in Export Prices

Several factors are responsible for the uncertainties and risks encountered in the marketing of round or dressed pickerel, pike, whitefish, sauger and lake trout.

(1) The perishability of whole fresh fish not only adds to the cost of marketing but also adds risk and uncertainty. Fresh fish spoils rapidly. In fact fresh fish should reach the consumer no longer than a week after it has been caught by the fisherman. Moreover, during this week, it must be handled, iced, packed and stored properly. Fresh fish from the more northerly producing areas requires four or five days to reach the importing centres of Chicago and Detroit. It is readily apparent that export shipments from these remote areas will be of undesirable quality on delivery if there is any breakdown in forwarding.

The Canadian exporter is frequently uncertain whether his shipment is or is not of acceptable quality on arrival. There is no doubt that some shipments are not, and that the consequent spoilage losses are the shipper's fault. However, we note that the United States importers in Chicago and Detroit, with one exception, lack the equipment and storage facilities necessary to maintain quality. The Commission is of the opinion that these importers, in their influential position, are under no pressure

(1) Dressed fish is largely a product of the fisherman. The fisherman normally "dresses" the fish. There is little plant processing in the production of fresh, dressed fish. The fisherman frequently ices and packs the fish himself as well, though these functions are often left to the local dealer-packer.

to make an investment in satisfactory facilities, because the additional marketing costs for the importer evolving from the perishable character of the product are passed on to the United States retailer and the Canadian exporter.

We find that Canadian exporters are frequently faced with claims of poor quality with no assurance that such deterioration has in fact taken place, and even if it did, whether it occurred prior to arrival or resulted from mismanagement at the hands of the importer. On occasion invoice prices previously agreed upon with the Canadian exporter have been reduced arbitrarily on payment by the importer as much as two months after shipment.

(ii) The Commission finds that the absence of effective quality control and of product standardization in the Canadian freshwater fish industry aggravates the weakness of the Canadian exporter and enhances the strength of the importer. The lack of control and of standardization applies to all species that are marketed fresh, round or dressed.

The present regulations of the Canadian Government Fish Inspection Act states that fish shall be disposed of when found to be "tainted, decomposed, or unwholesome". Many shipments of fresh fish which are not tainted, decomposed, or unwholesome are still not a quality product from the viewpoint of freshness, cleanliness, firmness and general appearance. We find that Canadian exporters have shown little or no initiative in cooperating with government officials to improve quality control procedures. Canadian exporters are loath to adopt rigid quality control which would make their own positions as buyers more inflexible, unless importers accept these procedures as well. The Canadian industry is not in a position, in its present structure, to impose such quality standards on the importers.

Canadian exporters have tried a selling policy of limited product standardization with respect to size of fish and area of production. Importers in Chicago, Detroit and New York accept this standardization from time to time, but have not incorporated these standards on a formal basis in a price schedule. It is apparent that the introduction of any regularity in quality control and product standardization is resisted

by the United States importer because it will undermine his bargaining position. However, without a quality control system and product standardization recognized and accepted by both the exporter and the importer, the Canadian freshwater fish industry has no recourse when claims for poor quality are made by the importer.

(iii) The Commission finds that a good deal of uncertainty pervades the marketing of fresh fish because of fluctuations in demand. The incidence of this irregular demand pattern is compounded in some instances by the lack of effective knowledge of market conditions in the United States on the part of the Canadian exporter. This deficiency weakens the exporter's market position and in turn enhances the control over marketing round or dressed fish by the importer.

The Commission finds that the lack of coordination between supply and demand, in other words that disorderly marketing by the exporters, increases further the uncertainty arising from the irregular pattern of demand. Canadian exporters frequently engage in "distress" selling. The exporter, then, decides to dispose of part of his supplies not because market conditions warrant such disposal, but because he may be short of working capital. Such uncontrolled selling is of advantage to the importer and weakens the market.

Each provincial government in its policy for opening and closing lakes during the fishing seasons wishes to promote fishing effort when market conditions are most favourable. While this individual action is laudable the combined result for the entire freshwater fishing industry, at times, leaves much to be desired, in that, supply exceeds demand and returns are depressed. Therefore, we suggest that provincial governments make every effort to determine collectively a more effective policy of closing and opening lakes which will coordinate supply and demand and thus benefit the entire freshwater fishing industry.

The Commission recognizes that each individual exporter controls to some extent the volume reaching the market, in whole round or dressed form by filleting a portion of the fish purchased from the fisherman. However, in view

of the existence of two distinct demands for freshwater fish, one for whole round or dressed fish which on average yields a higher return on the fish as landed, and one for fillets, each individual exporter must have accurate knowledge of day-to-day market conditions in order to fillet the appropriate amount and to maximize his total returns. If the exporter fillets too much or too little in relation to current market conditions, he and the fisherman lose money. The Commission is of the opinion that this degree of coordination and control over the supply of whole fresh fish coming on the market is at present inconceivable when it is recognized that this must be achieved by some thirty-five exporters, who individually and collectively appear to have little or no dependable knowledge of consumer demand.

It is to be realized, however, that Canadian exporters encounter fewer problems and have a stronger bargaining position when marketing fillets than when selling dressed fish. Exporters sell fillets not to an importer-distributor, but directly to a retailer. There are a large number of importers of fillets, and hence foreign control over the export movement of fillets is not nearly as concentrated as for round or dressed fish. Also freshwater fish fillets, if frozen, can be stored. And because the fillets can be stored, coordination of supply and demand can be achieved more readily. Fish fillets are produced with greater quality control, and standardization of packing.

However, despite the advantages encountered in marketing fillets, we do not find it desirable to fillet the entire catch of pickerel, pike, sauger, whitefish and lake trout. To do so would reduce export earnings and income to the fisherman. As long as there exist a demand for premium whole round or dressed fish, the freshwater fish industry should be willing and able to supply this product. In order to achieve this and to realize a better return for the Canadian freshwater fish industry, an attack should be made on the weakness in export prices of whole fish by redressing the imbalance of power in the market, by establishing appropriate procedures for controlling quality and standards and by bringing about orderliness in putting the available supply on the market.

(iv) In exporting whitefish a great deal of uncertainty arises from the present inspection system to determine the rate of infection with *Tricinenophorus crassus*. The Canadian exporter has no assurance that whitefish found acceptable by Canadian inspectors will pass inspection regulations of the United States Food and Drug Administration. If the shipment of whitefish is not found acceptable by United States inspectors, then the fish must be returned to Canada at the expense of the Canadian exporter. It is the opinion of this Commission that the return on whitefish to the Canadian freshwater fish industry can be improved substantially if this uncertainty can be removed.

(5) Weakness in Domestic Prices

The Commission finds a weakness in the price generally received by the fisherman. The fisherman in selling his product has little or no influence on the price he receives. The price to the fisherman reflects the weakness in export prices as well as the cost of inefficiencies in handling and processing in Canada.

We find that there is weakness in the price of perch, smelt and bass to fishermen of Lake Erie and Lake Ontario. They have little influence on pricing because the processing plant is basically the only outlet for perch, smelt and bass. The fisherman must sell to the processor or otherwise his fish spoils. On the other side, the processor must have fish otherwise his plant is idle. Therefore, the weakness in the price to the fisherman on Lake Erie and Lake Ontario is most evident during years of abundance. At such time, there is overproduction in relation to processing and storage facilities, and prices drop drastically. This situation occurred again for perch in the spring of 1966.

The Commission finds, however, that the weakness in the domestic price for perch, smelt and bass is not caused by a weakness in export prices. In other words, it does not appear that there are problems encountered in exporting the solution of which would result in increased returns to the Canadian industry. The wide fluctuations in prices to the fisherman which occur from year to year are a reflection of inadequacies in domestic handling, processing and storing, particularly the latter. We note that an

approach towards solving the problems of this large local fishery can be made under present federal and provincial legislation.

The Commission finds that overall the weakness of the fisherman in the western inland fishery and in Northern Ontario is particularly appalling. Many fishermen in Manitoba, Saskatchewan, Alberta, Northern Ontario and the Northwest Territories, mostly Indian or Metis, lack the training for and have no alternative employment. During the fishing season, they must fish or remain idle. Many are located on small lakes in remote areas and have usually only one buyer for their fish. Because the fisherman lacks the capital and in order to assure a supply of fish, the buyer equips many fishermen with a boat, motor, nets, fuel, food etc. At the end of the fishing season, the buyer indicates whether the value of the catch was sufficient to pay for the rental of the equipment and the cost of the supplies. Often it is not, and the fisherman remains in debt until the coming season.

We find that under these circumstances, the fisherman is essentially an undentured labourer for the fish companies. It is self-evident that fishermen in this situation do not negotiate a price. There is no bargaining. The fisherman's prime concern is existing.

Although conditions have improved, we find that even today as much as twenty-five percent of the fishermen in the inland fishery in Northern Ontario and western Canada are still completely dependent on some fish company. The other fishermen equip themselves, and are therefore more independent, or are members of cooperatives through which they are equipped. Unfortunately, there is no accurate information on the number of fishermen in cooperatives and the number of independent fishermen.

Even when the fisherman is "independent", the price he receives has little relation to the export price. The grading according to size, which the exporter recognizes when he purchases whitefish from the dealer and on which ba-

sis payment is made by the United States importer, is not a factor at the fisherman's level. In the summer of 1965, for instance, fishermen on lakes in Northern Manitoba did not benefit from a six cent per pound increase in export returns for pickerel. We find that frequently the fisherman does not even know the price he will receive when he delivers his fish. Nothing indicates the bargaining weakness of the fisherman more than relinquishing his fish without knowing what he will receive.

The fish company, often in the person of its agent, does not commit itself to a price until the fish has been marketed, because of its own weakness in marketing. In this manner, the lower return caused by the strength of the United States importer and by the risks and uncertainties encountered in exporting is passed on to the fisherman. Therefore, the exporter need have little concern over the control which the Chicago and Detroit importers exercise over the export movement of round or dressed fish.

There is a large spread⁽¹⁾ between the price received by the exporter-processor and the price paid to the fisherman. During the summer of 1965, the fisherman in northern Manitoba received 16-28 cents at the lake for dressed pickerel for which the dealer received 34-47 cents f.a.s. the exporter's plant. The exporter received 50-56 cents f.o.b. plant if sold "dressed" and 56-64 cents if filleted. In this specific instance, the fisherman received less than half. Considering variations among the provinces and among species, the difference between the landed value to the fisherman and the market value realized by the exporter for the entire freshwater fish catch of the western inland fishery is between 40 and 55 per cent.

The Commission finds that on average the spread is excessive because handling, processing and storing are inefficient. There are too many dealer-pickers, who pack and forward fish from the fisherman to the exporter. This appears to be the case especially in Manitoba where on average there is one dealer for every seventeen

(1) The spread comprises mainly (transportation costs, the cost of icing and packing whole, dressed, round fish, the cost of filleting, the cost of storage, and a return for the labour and capital invested by the dealer-packer and exporter-processor.

fishermen. There are more exporters than is required to handle efficiently the present volume of fish in the western fishery. Also filleting plants are in general too numerous and too small and consequently filleting is relatively costly. In addition none of the cold storage facilities can maintain a temperature of -15°F, which is a prerequisite for producing top-quality frozen fish products. Dealers and exporters have shown little concern for the need to reorganize and rationalize the industry in this segment of the inland fishery, because the cost of the present inefficiencies are passed on to the fisherman.

We find that the formation of cooperatives has been instrumental in improving the bargaining position of many fishermen. Many fishermen members now obtain their equipment from their cooperatives, and are no longer dependent on the fish company. The cooperative ices and packs the fish, thus replacing the dealer-packer. Cooperatives sell directly to the exporter. Many sell their entire catch by tender even before it is caught. Obviously, these cooperatives have an influence in pricing. We find that the formation of cooperatives should be encouraged, not only achieve an improvement in the fisherman's market position, but also to develop more knowledgeable participation in marketing at the primary producer's level.

Even cooperatives bargain from weakness in their dealings with the exporter. In order to overcome this entirely, the cooperative movement in Saskatchewan has proceeded a step further. In that province, eighteen local cooperatives have their own sales agency, Cooperative Fisheries Limited, which handles their entire output. In this manner, the weakness in the price to the fishermen arising from his ineffective bargaining position has been overcome. The weakness of Cooperative Fisheries Limited as an exporter however remains.

We note that any increase in the influence of the fisherman in pricing, for instance, through the establishment of more cooperatives, occurs under the present industry structure, at the expense of the exporter-processor. More equitable bargaining between the fisherman and the exporter-processor does not result in itself in an improvement of the latter's position versus the United States importer. Greater organization of

fisherman in the western inland fishery has alleviated the pressure on the fisherman but has shifted it on the exporter. The share of the price paid by the United States consumer which the exporter receives remains the same, but he finds that he must give Canadian fishermen more. This development increased the industry's awareness of the need for rationalization and reorganization.

Rationalization, or increased efficiency in handling and processing can proceed only if the weakness in export prices has been reduced. A consolidation of export selling strength is the only way to retain the benefits of modernization and rationalization for the Canadian industry. But if only the exporter's position were improved, much of the improvement in the fisherman's position achieved by the establishment of cooperatives would be offset, and the position of the independent fisherman would in fact deteriorate. The Commission finds therefore, that an unified plan is required which will affect simultaneously an improvement in the price to the exporter and in the price to the fisherman.

In conclusion, this Commission is not aware of a worse pocket of poverty in Canada than the northern segments of the inland fishery. Current conditions are reducing the savings of those who in the past did well in the industry. An atmosphere of pessimism and doom has taken hold on the inland fishery, which will lead eventually to its downfall, unless remedial action is taken.

Improvements in marketing can add substantially to the fisherman's gross income; over and above what he would receive if current marketing conditions were to continue. It must be realized however that as much or more can be accomplished by a substantial reduction in the number of fishermen and by a rationalization of fishing. Federal and provincial governments should take action, where conceivable, which will provide for the education and training of fishermen and which will create alternative employment opportunities, and which will promote the use of more productive and remunerative fishing equipment.

We agree with the Sub-Committee on Marketing Organization for Freshwater Fisheries of the Federal-Provincial Prairie Fisheries Committee concerning its finding of weakness in

export prices and the consequent desirability of an export monopoly. However, the Sub-Committee did not limit its recommendations only to freshwater fish marketed round dressed, and to those produced largely in Northern Ontario, Manitoba, Saskatchewan, Alberta and the Northwest Territories. We agree with the Sub-Committee that tight control by a small group of importers and fragmentation of the Canadian export trade governs the marketing of pickerel, pike, sauger, whitefish and lake trout produced in the western inland fishery, but we disagree that such tight control exists for the marketing of the five to ten percent of the total landings of these species and of the perch, smelt, bass and chub from the Great Lakes fishery.

The conclusions and recommendations of the Sub-Committee are wanting especially with regard to the benefits which would accrue to the fisherman as a result of the establishment of an export monopoly. The proposed Freshwater Fish Export Authority was to purchase its fish products from licensed fish dealers⁽¹⁾ and not from the fisherman. In other words, the dealer was to be the initial recipient of any increased export earnings.

The Sub-Committee recommends that any trade surplus earned in trading operations be distributed by the Authority on a pro rata basis.⁽²⁾ The Sub-Committee's draft act specifies that this trade surplus be distributed "amongst the participating provinces", after having notified the appropriate Minister in each province and after having received direction for the payments.⁽³⁾ In proportions established by deliveries by each licensed fish dealer.⁽⁴⁾ Since no records are to be kept of deliveries made by each fisherman, it would appear that the Minister would have great difficulty in directing the trade surplus on a pro rata basis to the fisherman.

The fisherman's share of the higher export earnings, implicitly would continue to be determined by his effectiveness in bargaining with the dealer. Therefore, the fisherman would

benefit little from the higher export earnings of the proposed Freshwater Fish Export Authority unless a reorganization at the primary level took place. Consequently, the Sub-Committee recommended finally, "that each provincial government concerned and the government of the Northwest Territories provide for the appropriate reorganization of the primary and secondary industries in their jurisdiction to ensure: the 'maximization of returns' to the fishermen". There is a strong hint in the Sub-Committee's report that the "maximization of returns" would involve a rationalization of fishing effort to increase the fisherman's productivity rather than an improvement in the fisherman's selling position leading to maximization of prices. In any event, the fisherman would benefit little, if at all from the establishment of the export monopoly as recommended by the Sub-Committee, until such time, according to the Sub-Committee, as his bargaining position had been improved by reorganization under provincial legislation. We find this an uncertain, an indirect and a second-best way in which to pass on to the fisherman the increased returns from an export monopoly.

The Commission finds that the provincial governments of Manitoba, Saskatchewan, and Alberta and the government of the Northwest Territories recognize the desirability of an export monopoly. The province of Ontario did not officially commit itself on organized marketing,⁽⁵⁾ but a spokesman for the government implied that if an export monopoly were to be established for the inland fishery in the Northwest Territories and the three prairie provinces, that northwestern Ontario might be included in the designated area.⁽⁶⁾

From testimony put before us at the public hearings, it is clear that the trade, i.e. the private dealers, exporters and processors, are opposed to an export monopoly. We find, however, an awareness among the members of the Manitoba trade of a need for some form of reorganization and rationalization.

(1) Page 3, Recommendation 3.

(2) Page 33, Draft Act Section 12, Subsection (b).

(3) Page 34, Draft Act Section 13, Subsection (1).

(4) Page 33, Draft Act Section 12, Subsection (c).

(5) Transcript of Public Hearings, Page 980.

(6) Transcript of Public Hearings, Page 983.

The inland fisherman in Western Canada and in northwestern Ontario generally indicated that there was an urgent need for change in the present system of marketing. Several times we found a deep concern over fluctuations in prices and hence an expression of a need for some measure to provide price stability. A number of representatives of local fisherman cooperatives, one a cooperative of Indians and Metis, supported the establishment of a marketing board. The Cooperative Fisheries Limited, the central sales agency for 18 local cooperatives comprising half the fishermen in Saskatchewan, also indicated support in principle for an export monopoly.

RECOMMENDATIONS

1. We recommend that a Freshwater Fish Marketing Board be established under federal legislation. The Board should handle all export and interprovincial sales. The interprovincial and export movement of fish and fish products and the sale of the same for export or interprovincially should be prohibited except by the Board or under license issued by the Board. The Board should also have the authority to control imports.

2. We recommend that the Board consist of not less than five and not more than seven members, one of whom shall be chairman and general manager, all to be appointed by the Federal Government.

The membership of the Board can provide adequate representation of regional interests. The Commission stresses the need however, for concentrating the control of everyday operations of the Board in one full-time general manager and chairman.

3. We recommend that the Board be the sole seller of the freshwater fish and fish products produced in the designated area consisting of Northwestern Ontario, Manitoba, Saskatchewan, Alberta and the Northwest Territories.

The Board should handle all export and interprovincial sales or movements of all products of all species of freshwater fish produced in the designated area. The Board should have however, the authority to exclude any category of fish or fish product from its operations. In reference to Northwestern Ontario, the Com-

mission is concerned with those producing areas west of Lake Nipigon which are not in the Great Lakes watershed.

While the Commission has recognized that the Great Lakes fishery, comprising mostly perch, smelt, bass and cisco (chub and lake herring), involves a marketing structure basically different from that in the western inland fishery, and while the direct benefits from an export monopoly for the Great Lakes fishery are consequently much less extensive, nevertheless, we deem it desirable that this fishery be included in the operations of the Board, when the fishermen involved, and the provincial government so decide. In this instance, it may however be necessary to set up a separate designated area.

4. We recommend that the Board accept delivery of freshwater fish only from the fisherman.

By accepting delivery from the fisherman, the Board can commence grading and quality control at this early stage. We recommend delivery and purchase at this stage also because the utilization of the raw material between alternative products such as dressed fish or fish fillets can be coordinated and centrally controlled. The Board would be required to designate "delivery points" and "agents" who are authorized by the Board to act on its behalf when taking delivery. These agents might be selected from among the present dealer-packers. The present competition and hence duplication of effort in assembling and forwarding would be eliminated.

5. We recommend that the Board prior to the opening of each fishing season establish initial prices for the duration of the season for each species of fish, by grade, "in store" Winnipeg, and such other exporting points as the Board may decide.

The Commission is of the opinion that the Board should determine the initial price for each species by grade (including quality) in accordance with the anticipated market return for each species by grade allowing for expected marketing costs and "safety margin". The Commission feels that the initial price of each species, by grade, should be determined on its own merit. The Commission feels that the initial

price system should not be used to promote one fishery at the expense of another by means of cross-subsidization.

The Commission realizes that the adoption of similar initial prices at the various export points means that the higher cost of transportation of (i.e. the lower return to) the more distant producer would be absorbed by the producer closer to the market. While this might prove objectionable to some, the Commission feels that the alternatives while more equitable with the present export movement, would also be administratively more cumbersome and reduce the flexibility of the Board in its marketing operations.

A fisherman might deliver fish to the Board's agent at a given delivery point either (1) in the round, or (2) dressed, or (3) headless and each of these forms could be either (1) packed or (2) not packed. Where appropriate, separate initial prices should be quoted for each of the six ways ("dress-packs") in which it is possible to deliver each grade of fish. These initial prices should provide for an equitable return for labour and production costs to those fishermen who pack and/or dress their own fish. Because local conditions determine local practice, in most cases all the fishermen in a community prefer to prepare their fish for delivery in the same way, or with one alternative at most. The Board should be empowered to specify which "dress-pack" or "dress-packs" are acceptable at each delivery point. The Board does not deem it essential that there be a distinction between fish produced from the summer fishery and the winter fishery.

6. We recommend that the Board pool the returns from the sale of its fish and fish products and pool the costs incurred in marketing these products.

The Commission recommends that this pooling be carried out for each species handled by the Board. There should also be a pool for whitefish not acceptable for export. We consider it a desirable simplification to incorporate the premiums for size, quality, etc. in the initial price only. It is the opinion of the Commission that separate pools on the basis of size, quality, etc. are not essential, and their exclusion would

reduce the number of pools substantially. On the other hand, it is recognized that for the sake of equity the number of pools could be increased to take into account other grades.

The pooling of returns from marketing for each species, by grade, must be accompanied by a corresponding pooling of costs incurred in marketing. The Commission recognizes that some marketing costs would accrue to the entire turnover of the Board, and that other costs must be charged to individual species pools.

Selling, operation, and administration expenses obviously accrue to all sales made by the Board. The costs incurred by the Board for filleting and storing, in the opinion of the Commission, are chargeable to the particular pool of the species concerned and are to be carried by the fisherman whose fish is sold round or dressed as well as by the fisherman whose fish is filleted. Filleting and storing are instruments of market stabilization which benefit the return on the sales of that species, both the return on the round or dressed product as well as the filleted product. Moreover, it is reasonable and equitable that if the benefit of stabilizing the market is for all fishermen producing the species in question, then the filleting costs should be carried by all producers as well, and not only by the fisherman whose fish happens to be filleted or stored.

7. We recommend that the Board determine and make a final payment to the fisherman for the fish delivered to the Board, after all fish delivered has been sold.

The final payment for each pool is to be determined by subtracting from the gross returns the initial payments made, and the costs charged to the pool. Since the final payment is to be made on deliveries into the pool, which may be on a round or dressed weight basis, therefore, the final payment must take this variation in consideration, or deliveries should be entered into pools on a common weight basis. The latter problem would not arise if deliveries were all made "in the round" or all "dressed".

8. We recommend that the Board undertake the handling, packing, processing, and storing of the fish delivered by the fishermen.

We recommend that the handling, packing,

processing, and storing be performed preferably by the present packers and processors under contract with the Board. In other words, the Board would have the authority to negotiate agreements stipulating the functions and the margins at which they are to be performed.

If, in the opinion of the Board, facilities are not adequate or are not available to the Board, then the Board should have the authority to establish and operate its own processing and/or storage facilities.

In as much as the Board would have the authority to negotiate agreements for handling, processing, forwarding and storing fish accepted at a particular delivery point, the Board in fact would determine the "spread" between "in store" exporting point and f.o.b. "In dock" prices at delivery points. The spread would consist of costs which are not pooled, and therefore, exclude filleting and storage costs. The spread, so determined, is to be taken from the "initial price", on delivery and would be different for each delivery point. For each species and grade, the individual fisherman would receive on delivery an initial payment which would be equal to the initial price minus the spread.

In actual practice, the fisherman on delivery would receive a certificate entitling him to participate in any future payments. This certificate would serve as a receipt indicating the volume of each species, grade and quality delivered, the respective initial prices, the respective spreads, and initial payments. A duplicate would be forwarded to the Board, which would credit the fishermen's account, and which would issue a cheque payable to the fisherman.

9. We recommend that the Board sell and dispose of the fish for such prices as it may consider satisfactory, keeping in mind the overall purpose of promoting the sale of Canadian freshwater fish in world markets.

The Commission considers it desirable that the Board use the present exporters as its agents under license for exporting the Board's fish and fish products. In other words, while the Board should determine the utilization of the fish produced within the designated area, the margins for handling, filleting, storing, etc. and

the export price, the actual physical functions involved, including exporting, would continue to be performed by the present trade.

We envisage that the Board will quote its selling prices "in store" at such exporting points as the Board may decide. The pricing policy of the Board presumably would be that the laid down cost of each fish and fish product at destination, would be the same regardless of exporting point. It is implied therefore, the "in store" export prices would vary in the amount of the difference in transportation costs.

10. We recommend that the Board have the authority to finance the fisherman with working capital.

Presently, the fish companies or dealers, provide this service. With the establishment of the Board the incentive for this service will have ceased. The Commission realizes that many fishermen are undercapitalized today and must be equipped by some person or organization in order to fish. Many fishermen have no collateral and have no ordinary banking facilities available to them. Moreover, the Board, or its agents, would appear to be the most likely agency to take over the provision of equipment and supplies after the fish companies cease to do this. Nevertheless, it is the firm opinion of this Commission that the Board should lend or advance only monies which it can expect to be repaid during the delivery period. In other words, the Board should provide only working capital or short term funds for such things as gasoline, oil, food supplies, repairs, etc. Even this limited financing operation of the Board should be handled separately from its marketing operation, so that financing cost could be ascertained accurately and levied equitably, i.e. on the borrowing fisherman and per dollar borrowed. Repayments would be made out of the borrower's account with the Board, which account would be credited with the initial and final payments on the borrower's catch.

The Board should not handle the financing of boats, motors and nets. Obviously, the monies provided by the Board for this purpose could not be recovered during the delivery period. This the Board could not justify, because in essence it is a trustee which holds funds in trust on behalf of the fishermen, which funds must be

accounted for by way of a final payment once a year. The Commission feels that the Board should also not administer the financing of boats, motors and nets with funds supplied by another source. This would compromise the position of independence of the Board versus fishermen, which independence is a prerequisite for a successful marketing operation.

At present a number of co-operatives receive financial assistance through the Indian Affairs Branch of the Department of Northern Affairs. This service might well be expanded to cover the financing of boats, motors, and nets, for individual fishermen upon the establishment of the Board. Actually, financing the fishermen with the needs for fishing would present much less a problem if all fishermen were members of co-operatives.

11. We recommend the establishment of standards and grades for fish and fish products, to promote orderly marketing, to guarantee a supply of prime quality fish, and to enhance consumer confidence in Canadian freshwater fish.

This recommendation and the following ones establish the environment which is a prerequisite for the successful operation of the Board. Standardization of grades and inspection are necessary to create confidence of the fishermen in the Board. Just as important, it would give the foreign consumer confidence in getting the type of fish preferred. While the Commission is particularly concerned with the inadequacy of grading and inspection today within the designated area, this recommendation would apply to the entire inland fishery.

Most, if not all, species should be graded by size. Fish should be brought from the fisherman as follows: (1) "round", i.e. as they come from the water, (2) "dressed", i.e. with viscera, gills and kidney removed, but with head, fins and scales still on, (3) "headless", i.e. same as dressed except with head removed. In addition, each of these categories may be either fresh or frozen.

Whitefish should be graded according to the rate of infection with *Tricnophorus*. Whitefish which can be expected to pass United States

inspection should be graded "clear", and those which cannot should be graded "infected". "Clear" should be the only kind marketed in Canada, as well as in the United States, except as filets, and should always be bought "dressed". For easy identification the "infected" should always be bought "round" or "headless". Details on the techniques for determining which lakes produce the "clear" grade and which the "infected" are readily available.

The grading of whitefish and pickerel should take into account whether they are caught in pound-nets⁽¹⁾ or gill-nets. Pound-net whitefish and pickerel realize at present a premium over gill-net whitefish and pickerel on the New York market.

Fish grades, obviously, must recognize quality. For the successful operation of the Board, the Commission is of the opinion that there should be only two quality grades of fish for human consumption; (1) good quality, (2) rejects. The Commission feels that "good quality" should represent a higher, more exclusive standard than acceptable for human food purposes. In order to assure quality, "rejects" should include all "whitegills", or "drowned" fish, meaning those which are dead when taken from the water.

Finally grading should take into account ways in which fish vary from lake to lake in fat content, in colour, and in other inherent characteristics which influence the ultimate consumer. There are sharply conflicting views on the relative merits, of fish from various lakes. It is our impression that local fishermen, dealers and officials are much more convinced of the inherent superiority of fish from certain lakes than are the United States buyers. Nevertheless, it is apparent that buyers are prepared to pay more for the fish from certain lakes because of inherent favourable characteristics. Certainly standards to determine these grades would be extremely difficult to establish, and in the actual grading it would be difficult to draw the line. However, it is desirable on the basis of equitable of the fisherman that the premium grades already recognized by the trade, be incorporated

(1) It is understood that for quality purposes "pound net" includes "trap net", and similar impounding gear.

in a grading system. The Commission has included tentative grades of fish based on grading practices presently recognized in the fish trade. This recommendation also expresses the need for standards and grades for processed fish products such as fish filets.

The Commission recommends that the setting of standards should be excluded from the authority of the Board. We feel that this function should be left to the Federal Department of Fisheries after consultation with all parties concerned with production and marketing. The grading, i.e. the actual sorting of the catch, would have to be done by the agents of the Board. It is recognized that the fisherman, with appropriate knowledge, could perform most of the grading prior to delivery, with the "agents" of the Board checking and certifying the grades delivered. Inspection for export, i.e. determining that the standards set for the grades are rigorously applied, is constitutionally within the jurisdiction of the Federal Department of Fisheries.

The Commission acknowledges the present policy⁽¹⁾ of this Department not to examine or inspect every shipment of fish leaving a province, and that therefore proper grading would be first the responsibility of the Board and its agents. Nevertheless, it is the opinion of this Commission that federal inspection on a somewhat expanded basis would be desirable.

12. We recommend that financial assistance be given to the secondary fishing industry to modernize cold storage facilities and processing facilities.

We feel that the Board cannot realize its aims of orderly marketing and quality control with the use of currently available storage and processing facilities. Financial assistance, as an incentive, might encourage an early modernization program. In providing financial assistance, we emphasize that attention should be given to the goal of the most efficient utilization of the freshwater fish catch within the designated area. The Commission recommends that similar assistance be provided the Board, if and when the latter finds it necessary to take over present facilities and to modernize them or when there is a need

to erect new facilities because private initiative is lacking.

In this connection, the Commission thinks of the provisions of and regulations pursuant to the Cold Storage Act, Chapters 52 and 313, Revised Statutes of Canada, 1952. While these regulations are presently not operative, it is our opinion that such assistance might again be made available with regard to cold storage facilities for freshwater fish, providing these facilities can maintain a temperature of -15°F.

13. We recommend that the Canadian Government make a formal approach to the Government of the United States to agree on a method of inspection of whitefish, which is mutually more satisfactory.

It is essential to the operations of the Board, that it be known with certainty as close to the source of production as is possible, whether fish which is graded as "clear" in Canada will be accepted as clear by United States Food and Drug Administration inspectors. At the same time, the Food and Drug Administration must be absolutely certain that fish which is graded as "clear" in Canada is indeed clear. Using the present sampling techniques, neither the Board nor the Food and Drug Administration could have this certainty. We recommend that discussions be undertaken which can resolve this problem.

14. We recommend a cooperative educational effort by all levels of government to acquaint the fisherman with the operations of the Board.

The Commission in this connection is concerned with informing fishermen of the grades which the Board would use in purchasing their fish. This would be necessary in the first place to remove any distrust between the fishermen and the Board's agent when the latter certified the grades delivered. In addition, knowledge would give a sense of participation which in turn would promote an active acceptance and cooperation.

The fisherman should not only be acquainted with the grading or sorting of what he delivered currently. He must also with this knowledge be trained in the ways and means of upgrading his

⁽¹⁾ This policy is given in Appendix C.

catch. In this connection, there is a need for a long-term educational program which will show the fisherman how to produce the best quality possible. The Board's success would largely depend on quality, and therefore, the groundwork to ensure quality would have to be prepared thoroughly. Where cooperatives are present, the execution of this recommendation would be greatly simplified.

15. We recommend that present legislation governing water pollution be strictly enforced and that governments take all further steps required to prevent pollution of Canadian inland waters.

Legislation should not only aim to make and keep water "safe" for human use, but should simultaneously by create an environment in which Canadian freshwater fish can thrive. Corrective and preventive measures with regard to pollution should keep in mind the needs of the freshwater fishery.

16. We recommend that research pertaining to freshwater fish and freshwater fish products be continued and expanded where desirable.

One specific area of research which the Commission considers would be highly beneficial is a means of detecting the cyst of *Tricrinophorus crassus* in the whole whitefish. At present, a portion of each shipment must be destroyed in order to determine the rate of infection.

It is noted that the Fisheries Research Board of Canada and scientists of several provincial governments are conducting a research whose ultimate objective is to increase the harvest of useful fish from Canadian inland waters. These research programs should be encouraged and expanded.

17. We recommend that the opening and closing of fishing seasons on lakes be determined collectively by the governments concerned in order to facilitate the coordination of supply and demand.

A summary of the benefits of the Commission's recommendations are:

- (1) there would be an improvement in the bargaining position of the western inland fishery in marketing freshwater fish because there would be one selling organization, which would coordinate supply and demand and which would provide standardization and quality control,
- (2) quality would be improved and the consumer could have confidence in Canadian freshwater fish products,
- (3) utilization of the catch in the western inland fishery would occur in a coordinated centrally-directed manner which would maximize its market value,
- (4) the costs of assembling, handling and processing would be lower than those which result from the present inefficient system,
- (5) the extension and development of markets for current commercial species and for fish not yet exploited, such as "rough fish" would be centrally planned and directed,
- (6) export earnings on freshwater fish would be higher than they would be without these improvements in marketing,
- (7) the higher export earnings would be passed on directly to the fisherman.

III A HISTORY OF COMMERCIAL FISHING IN INLAND CANADA

1. INTRODUCTION

Archeological evidence indicates that the fisheries resources of many lakes in what is now Canada have been utilized by man for milenia. The first European explorers noted that fish was an important item of food to most of the tribes native to Canada. Prior to exposure to European techniques, aboriginal Canadians fished with spears, with copper fish hooks, with fish traps, and with gill nets made from local materials such as the inner bark of willow and cedar roots.

The special importance of whitefish in the early history of Canada is emphasized again and again in the literature by statements such as the following by explorer Preble: "So important are whitefish as an article of diet, that the sites of many, perhaps the majority, of the trading posts, as well as the wintering stations of a number of exploring expeditions, places which have become famous in Arctic literature, have been selected with a view to the local abundance of this fish," or by Archbishop Tache of Greater Winnipeg: "I have lived for whole years on whitefish as my principal food and frequently the only food."

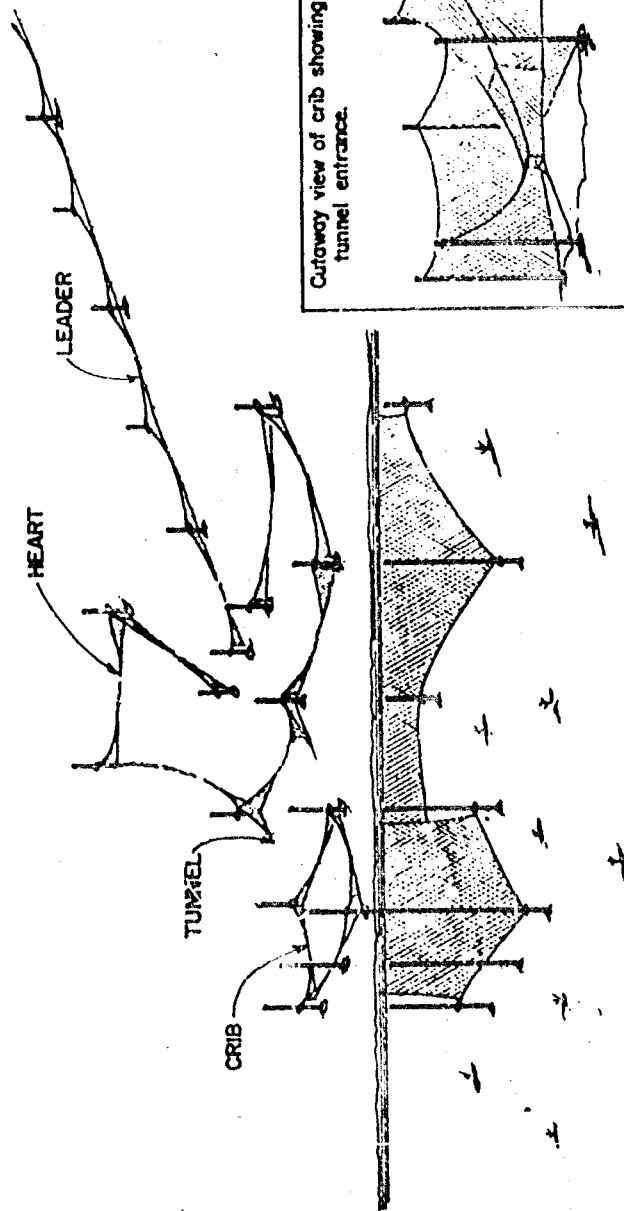
The earliest settlers caught and used local fish. As each settlement developed, some individuals, European immigrant or native, specialized in fishing, usually for local sale initially. As soon as there were adequate transportation and marketing facilities, these individuals often began fishing for markets outside the community. This history is essentially about such fishing for markets at some distance. It applies only to commercial fishing in the inland waters of Ontario, Manitoba, Saskatchewan, Alberta, Northwest Territories, and Yukon; commercial fishing in other inland waters of Canada is negligible by comparison. Fisheries for Arctic char along our northern coast are regarded as essentially marine and are not included, and a limited fishery in the estuary of the Mackenzie River is excluded on the same grounds.

2. LAKE ERIE

A remarkable abundance of fish, from earliest times, puts Lake Erie in a class by itself. In the 1700's Indians habitually gathered near Sandusky at the appropriate season to gather whitefish thrown on the beaches by northeast storms. Sturgeon could be taken in such quantities near Pelee Point that early Canadian settlers in that area found it worthwhile to spear them with pitchforks and haul them away by the wagonload to use as fertilizer on their farms. A U.S. government report on Lake Erie for 1883 says: "The fisheries of the lake are of vast importance, surpassing in extent those of any of the Great Lakes or of any body of fresh water in the world". This statement continued true for most of the period covered by this history. At present, roughly one-quarter of all the freshwater fish produced in Canada comes from the Canadian half of Lake Erie -- 35 million pounds in 1965.

By 1870, when the commercial fishery in Canadian waters first became appreciable, several of the then largest cities in the United States (Toledo, Sandusky, Cleveland, Erie, Dunkirk and Buffalo) were located on the shores of Lake Erie, and by the time modern transportation developed Lake Erie was reasonably close to the population centre of North America. As a result, Lake Erie fishermen have always been in a particularly favourable position for marketing their catch. With the greatest supply of fish and the readiest access to markets, the Lake Erie fishery has been much more prosperous than most of our freshwater fisheries. Most innovations in the freshwater fishing industry have originated in Lake Erie and gradually spread first to other Great Lakes, then to more distant fisheries. For this reason, the gear and methods used on Lake Erie are described in detail.

ROUND NET



Pound Nets

The pound net was particularly characteristic of Lake Erie. The web of the netting used in a pound net is relatively heavy material. "Stakes" (i.e., piles) which support the upper edge of the netting are driven several feet into the lake bottom and project several feet above the water surface. The stakes are carefully located in a predetermined pattern so that the net as fished will take a precisely determined shape. The pound net "leader" is essentially a straight fence of netting generally set at right angles to the nearest shoreline; when fish encounter it, they tend to move along it to its deeper end where the "head" of the pound net is located. The netting in the head is so arranged that fish are guided further and further into a trap from which retreat becomes increasingly difficult. Finally, they enter the "crib" (part of the head) where they remain like cattle in a pound until the fishermen "lift" by pulling up the bottom of the crib and concentrating the fish so that they can be easily and quickly brought aboard by dip nets.

About 1850 fishermen from Connecticut set the first pound net in the lake near Sandusky, Ohio. The first one used in Canadian waters was set near Wheatley in 1852. In 1853 two more were set in that vicinity and one was set at Lowbanks. From these localities at opposite ends of the lake the use of pound nets quickly spread along the whole Canadian shore, but they were particularly concentrated in the western third.

Pound nets have changed very little since they were first introduced. The biggest change has resulted from the introduction of synthetic fibres which, within the past 10 years, have almost completely replaced the cotton web and the manila or sisal rope formerly used. These new materials have largely eliminated the tarring of pound nets, formerly a time-consuming and unpleasant task.

Initially, pound-net boats were sailboats, 22 to 28 feet long with about 10 feet beam. They were flat-bottomed, of light draught, with removable rudder and centreboard, all necessary characteristics both to make it possible for the boats to enter the crib without fouling the netting and to enable them to be pulled out on the open

beach where they landed. During the first decade of the present century, gasoline-powered boats replaced sailboats. The new boats were also flat-bottomed; there was a universal joint in the propeller shaft so the propeller and shaft could be pulled up into a recess in the bottom when nets were being lifted or when the boat was beached. In the 1930's and 1940's steel hulls gradually replaced the wooden hulls used until that time, and power-driven aids to net handling were gradually introduced.

A floating pile driver is needed to drive the stakes which support a pound-net; the same vessel is also usually used to pull the stakes before freeze-up each year. Initially, both the "hammer" used to drive the stakes and the windlass used to pull them were operated manually. However, gasoline motors replaced manpower for these purposes early in the present century.

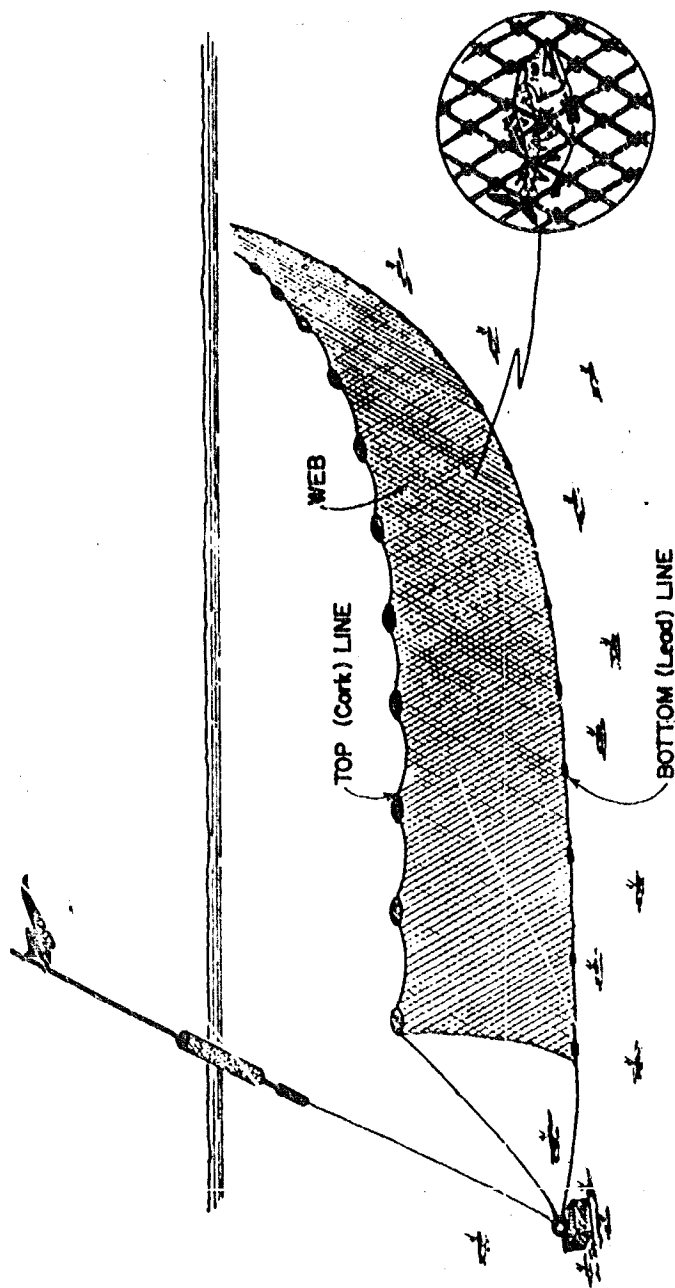
Gill Nets

The "web" of a gill net consists of tough, fine threads tied to one another in such a way as to make a network of equal-size squares, each called a mesh. Each of the long sides of the web is tied to stout cords of which one is weighted, the other equipped with floats. As usually fished in inland Canada, the weighted line of the gill net lies along the lake bottom; the floats are buoyant enough to keep the top line up but not float the whole net off the bottom. Fish become entangled in the web and are held until the whole gill net is pulled aboard the fishing vessel. Each fish must be individually removed from the mesh after the net is brought aboard.

On early gill nets stones were used for weights and crude chunks of wood for floats. However, early in the development of the commercial fishery, cast lead weights and shaped cedar floats became standard. At first the web was made of linen twine, but over a period of several decades, starting about 1900, cotton gradually replaced linen. In the 1940's hollow plastic "corks" replaced cedar for floats. About 1950 nylon twine replaced cotton in the web.

At first gill nets were fished from rowboats or from sailboats roughly 30 feet long. About 1880 gill-net fishermen began to use steam-powered vessels with screw propellers and by

GILL NET



1900 most gill-netting was done from "steamers". The first "steamers" were modelled after the steam tugs used for towing log booms, etc., and even had sturdy towing posts in the stern. Gill-net vessels on the Great Lakes have been called "tugs" ever since.

The early gill-net tugs were wooden-hulled, roughly 60 feet long, and relatively narrow. Working room on deck and stowage below were restricted because of the comparatively large space which the boiler, steam engine, and fuel occupied. The pilothouse was small. The nets were pulled by hand; a small roller was fixed to the rail of either bow for this purpose. Mechanical net pullers were developed about 1900, and soon all gill-net tugs were equipped with them. In the early 1900's gasoline and diesel motors gradually replaced steam power, hull design changed to give increased beam and blunter bows, and the space needed for propulsion machinery steadily decreased. Steel hulls gradually replaced wooden hulls between 1900 and 1930. Some shelter was soon provided for the men on deck, and shortly after 1900 some vessels had a deckhouse over the entire deck; by 1920 most tugs were so equipped. This deckhouse provided warmth and shelter to the fishermen as hour after hour they removed, one by one, the fish entangled in the gill nets and it also kept the gill nets on deck from freezing into a solid lump in the net box during cold weather.

Trap Nets

On the U.S. side of Lake Erie a new type of fishing gear, the trap net, gradually evolved. A trap net is essentially the same as a pound net, except that stakes are not used. Instead, the top edge is supported by floats while a system of anchors is used to hold the net in the proper shape. Unlike the pound net which extends from the surface to the bottom of the lake, the trap net usually extends from the bottom only part way to the surface. A trap net has several advantages over a pound-net; it can be easily moved; initial cost is less; operating costs are lower; more nets can be handled per boat; and it is less vulnerable to storm damage. Like the pound net, fish are held alive in the crib until the fishermen lift and scoop them out with dip nets.

For most of the period covered by this

history, trap nets were not permitted in Canadian waters. However, the ban on trap nets was relaxed in 1950 and by 1952 most pound-net fishermen had changed to trap nets. Cotton twine and manila or sisal rope was used at first, but these materials were soon replaced by nylon and other synthetics.

Seines, Fykes and Set Lines

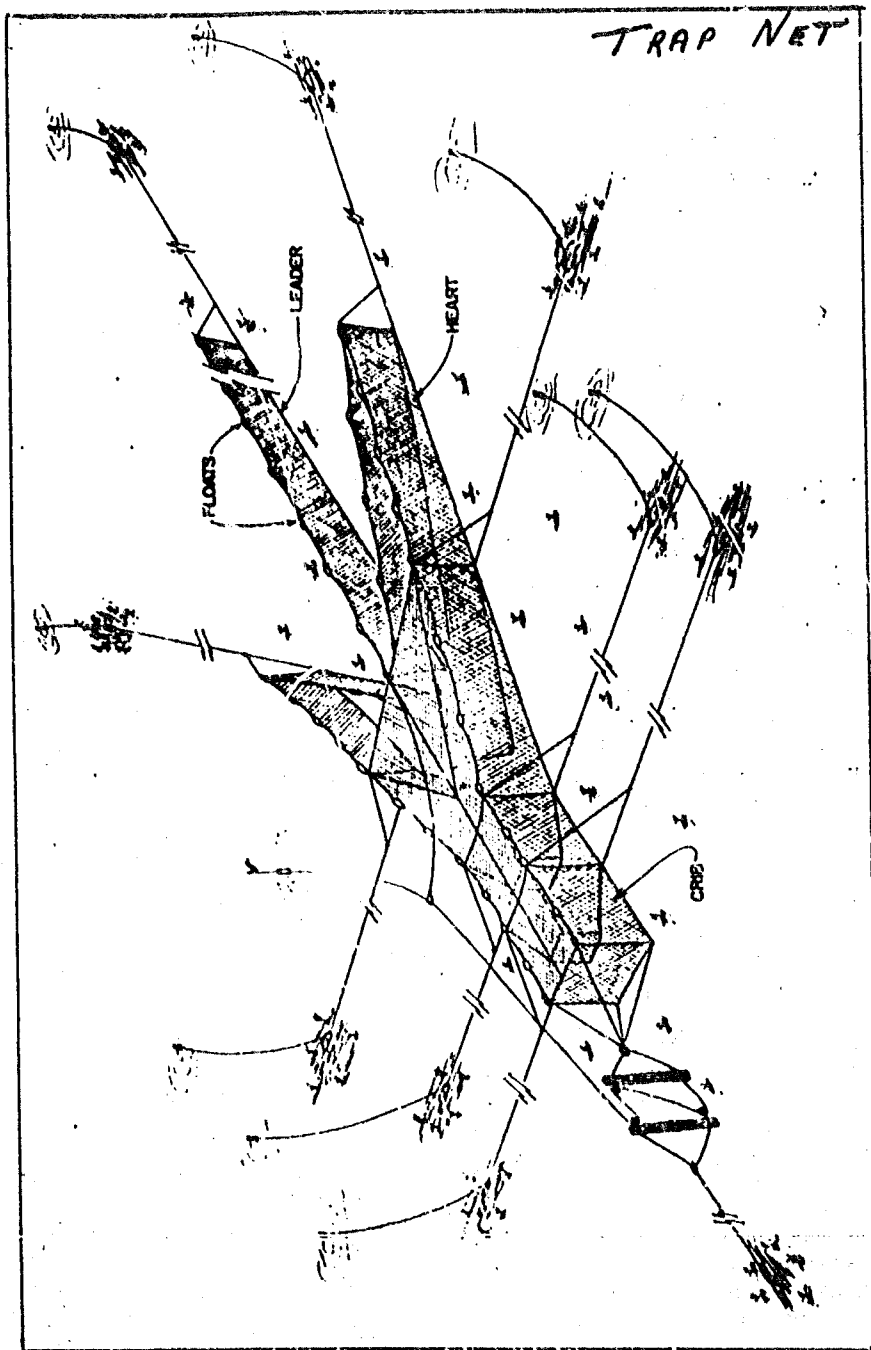
A seine is an oblong piece of netting with weights and floats which is set parallel to a beach, then pulled ashore, thereby enclosing fish between netting and beach. Seines were favored by the settlers, but were largely replaced by pound nets when the latter were introduced. Seines have played only a minor part in the fishery.

The principle of entrapment used in pound nets and trap nets is also used in fyke nets. However, fyke nets are much smaller. Round hoops, or sometimes square "hoops", are used to make fyke nets assume the required shape, and for this reason they are frequently called "hoop nets". They have played only a minor part in the fishery.

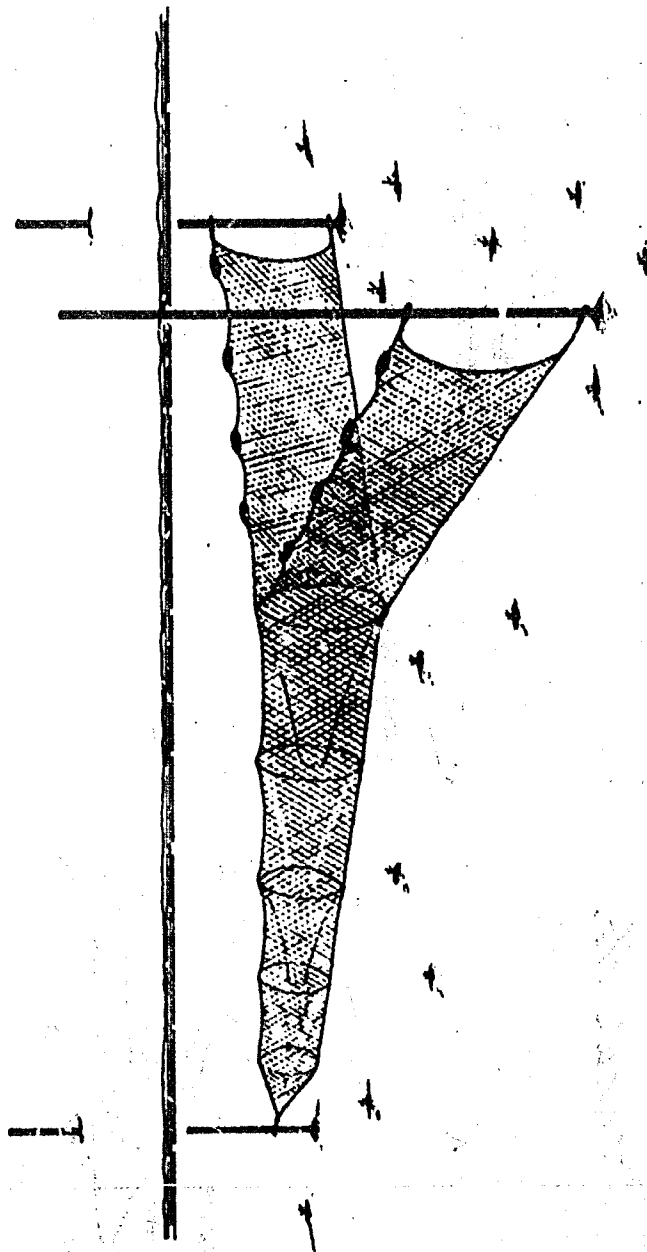
Although an appreciable part of the U.S. commercial catch has been taken by set lines, baited hooks have played only a minor role in the commercial fishery in Canadian waters.

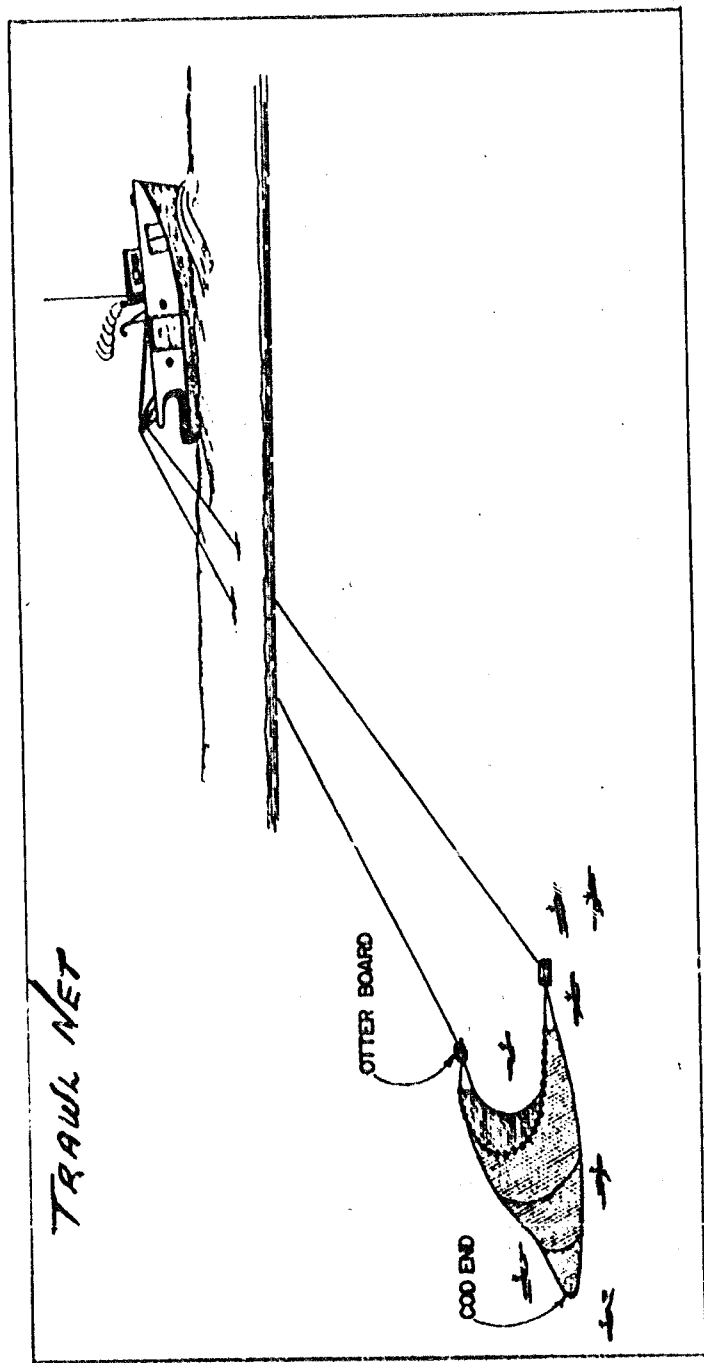
Trawls

Since 1959 otter trawls have been used commercially on the Canadian side of Lake Erie. The netting in an otter trawl is of heavy twine, and the net is roughly the shape of a flattened funnel. This funnel of netting is towed along the lake bottom big end first, engulfing the fish in its path, they accumulate in the little end of the funnel, called the "cod end". Attached to either side of the big end of the funnel are the heavily weighted wooden otter boards which look very much like small doors. A rope or cable leads from each otter board to the fishing vessel. The interaction of the force exerted by the tow rope and of the resistance of the water makes the two otter boards pull apart, thereby spreading the funnel sideways. Weights and floats spread the funnel vertically. The trawl is brought aboard periodically and the fish are easily removed from the cod end.



FYKE-(HOOP) NET





Changes in Relative Use of Fishing Gear

Until the 1920's, pound nets were the predominant gear on the Canadian side of Lake Erie. Although both pound nets and gill nets were used in the eastern two-thirds of the lake, the use of gill-net tugs was originally greatly restricted in the western third of the lake where pound nets were particularly concentrated. These restrictions were gradually relaxed during the first World War and subsequently, partly as a result of declining catches (1) and partly because of rising costs for wages and nets, the number of pound nets fished steadily decreased between 1925 and 1950. Meanwhile, the number of gill nets fished steadily increased. When trap nets were legalized in 1950, most pound-netters quickly changed to the new gear. However, trap nets were not the panacea that many had hoped, and the use of impounding gear has continued to decline. In recent years several gill-net tugs have been converted to trawling, so that gill-netting has declined somewhat from the peak reached about 1955.

Catch

By 1880 the once despised sturgeon was in demand and an important fishery developed for the species, particularly near Point Pelee. In spite of increasing fishing efforts, catches declined after 1890 and by 1900 sturgeon had become too scarce to be worth a special fishery.

From about 1850 until 1925, lake herring was the most important species in the fishery. Catches were particularly large between 1910 and 1925, then the species became scarce and catches declined to and stayed at a low level, except for good catches in 1945, 1946 and 1947, all based on a one particularly good hatch.

Blue pickerel have been an important species since at least 1885. While lake herring were plentiful, the fishermen used their gear in a way that would maximize catches of that species and blue pickerel were taken only incidentally. When lake herring became scarce, the fishermen made minor changes in gear and in techniques in order to maximize the catch of blue pickerel. Production of blue pickerel steadily increased after 1925 to a maximum about 1955. Shortly

after that they became scarce and catches declined drastically. Since 1960 blue pickerel have been so scarce that catching even one calls for comment.

The closely related yellow pickerel provided moderate catches from early times. Throughout the 1950's increasingly larger and larger catches were made. About 1960 catches began to decline and this species is now relatively scarce.

For over a century production of whitefish was moderate, although it has been an important species because of the high selling price. Unusually large catches were made in the 1940's. Since the early 1950's whitefish have become scarcer and scarcer.

Except for a decade about 1930, perch was a minor but steady contributor to the fishery until the late 1950's. Since that time, perch catches have increased considerably, and because of the scarcity of species which earlier supported the fishery, it has become one of the two important species produced.

Smelt are not native to the Great Lakes watershed. They were deliberately introduced into Crystal Lake which drains to Lake Michigan in 1912, and from there have spread through the Great Lakes. They were completely unknown in Lake Erie until the late 1940's and rarely seen until the early 1950's. During the past decade they have become abundant and an important fishery for them has developed. Smelt are small and at the price offered, the labour cost for untangling them from a gill net one by one exceeds their selling price. Pound nets and trap nets, from which a ton of smelt can be scooped in the time taken to untangle a few pounds from a gill net, are suitable for taking smelt when they are concentrated inshore for spawning but do not catch appreciable quantities at other times. Otter trawls, which take smelt in quantity at all seasons and from which they are easily removed, now produce most of the smelt taken.

Several other commercial species, including carp, catfish, sauger, white bass, sheepshead, redbreast, and suckers, have been and still are produced in moderate quantities.

(1) Attributed by many to relaxation of the restrictions on gill-net tugs.

Sturgeon, lake herring, whitefish, blue pickerel, and yellow pickerel have in turn each played an important part in the fishery. The history of the fishery for each species has been much the same. Production was relatively stable for a long time; then, following catches which for a few years far exceeded those of the long stable period, each species became and remained scarce. Since the pattern has been repeated for species after species, it is natural to suppose that there was some connection between the extremely large catches and the sudden decline in abundance which followed.

Although there likely was such a connection, other factors, particularly changes in the fish's environment, also probably contributed to a decline. One important change has been an appreciable increase in average water temperature since 1900, mainly because average air temperature has increased, but to some extent through man's activities such as in clearing the land, thereby decreasing shade and increasing the temperature of tributary waters. Temperature is known to be a very important factor in determining whether fish will survive in a given environment. For instance, recently published results of a scientific study show an important condition for a good hatch of whitefish in Lake Erie is a lower water temperature than has prevailed in recent years. Another change has been the deposition of sludge from sewage on many spawning grounds, making them unusable. Also, the chemistry of the water has changed considerably because of domestic and industrial sewage and of residues of chemical fertilizers from farmlands in the watershed; an important result has been the development from time to time of extensive areas in the lake where neither fish nor their food can live because of insufficient dissolved oxygen. Again erosion, both of the lake shores and along its tributaries as a result of clearing the land for farming and of other activities, has made the lake much muddier than it was a century ago; muddiness is known to have a considerable effect on whether fish thrive. Finally, the recent advent of smelt may have had an effect on the abundance of native species.

Marketing

Apart from strictly local sales, the early

production from the Canadian waters of Lake Erie was shipped across the lake (mainly by steamboat) and sold in the cities which were then mushrooming on the U.S. side of the lake, particularly Buffalo. Prices per pound to the fishermen in 1885 were: whitefish 5½¢; sturgeon 5¼¢; yellow pickerel 5¢; blue pickerel 4¼¢; lake herring 1¢. By the beginning of the present century, much of the catch was hauled to the nearest railway station by horses and shipped by rail, although some was still shipped across the lake in small steamboats. At first those who shipped by rail sold their fish by contract at a price to which both parties agreed before fishing started. After telephone became generally available about 1905, fish were usually sold by daily bargaining. By 1910 most pound-net operators packed their own fish in ice, hauled them by truck to the nearest railway station, and dispatched them by rail to New York or other markets. Some gill-netters also followed the same procedure, but since they were based on centrally located ports (as opposed to pound-netters who landed on open beaches all along the shore), many sold their fish in bulk to a local dealer who packed the fish from several tugs. In several cases local packers owned or controlled sizeable fleets of gill-net tugs.

In the 1920's wholesalers from Detroit began taking delivery of fish at the fisherman's packing house. By 1940 very few Lake Erie fish were moving by rail, most of them were moved by truck from the packing houses on the lake to wholesalers in Detroit, Chicago and other cities. Among the gill-netters, a growing discontent with the prices offered by local packers led to the formation of fishermen's cooperatives in a number of fishing ports to pack and sell their catch. Some of the co-ops still operate, but more have failed.

Until the 1930's most fish were shipped "in the round", i.e., just as it came from the water except for being packed in ice. As a notable exception, when the production of lake herring was heavy many were sold gutted with head on. In the past three decades more and more of the catch has been filleted, or in the case of smelt, gutted and beheaded. Filleting and smelt dressing have been carried out mainly by the packers at gill-net ports, including the co-ops. In recent years a good deal of the production from gill

nets, pound nets, trap nets and trawls has reached the market through one firm, which has become the biggest processor of freshwater fish in North America.

3- OTHER GREAT LAKES

Lake Ontario

The early beginnings of the commercial fishery are obscure. Apparently the local settlers combined fishing with farming and there was some trade in fish starting about 1800. By 1867, when the first records were kept, Lake Ontario was producing roughly 2 million pounds per year, a value only moderately less than the subsequent long-term average. The earliest fisheries were concentrated near Prince Edward County and on the Niagara Peninsula, but well before 1900 fish were being landed at ports all along the Canadian shore. During the past forty years the fisheries of the western two-thirds of the lake have gradually diminished, until now most of the fishing is based on ports in or near Prince Edward County.

Gill nets have always been, and still are, the principal gear used. Changes in netting material have been much the same as in Lake Erie. However, big gill-net tugs have seldom been used on Lake Ontario. Shortly after the beginning of this century, sailing craft and rowboats were replaced by gasoline-propelled, wooden-hulled open boats, typically about 30 feet long. The boats have remained about the same size, but there has been a gradual improvement in motors and in hull design. During the past two decades steel hulls have largely replaced wooden hulls and most boats have been fitted with net pullers.

Fyke nets have been and are of minor importance for taking some of the less desirable species, mainly within the Bay of Quinte. Seines have been used to a limited extent, particularly by the settlers. Production from other types of gear has been negligible.

Apart from the local trade, the earliest markets for Lake Ontario fish were Oswego, Buffalo and Toronto. Later, individual fishermen shipped a large part of the catch by rail to New York and other markets. In recent years most fishermen have delivered their catch to local

buyers who have packed it in ice and forwarded it by truck or rail to wholesalers in remote cities, mainly in the U.S.A.

Catches of ciscoes have fluctuated considerably, but the average catch has been roughly one million pounds per year, making it the most important kind of fish in terms of quantity produced. Production has been considerably below the long-term average during the past two decades.

Although lake trout production averaged roughly half a million pounds per year for two decades prior to 1930 and even exceeded one million pounds in 1925, the usual production for the past century has been considerably less. Production was particularly low during the past two decades.

Whitefish production during the century has fluctuated moderately around an average of roughly half a million pounds per year, except for the two decades prior to 1930 when considerably greater catches were made, as much as 2½ million pounds in 1923 and 1924. Recently whitefish catches have been well below the long-term average.

A landlocked form of the Atlantic salmon was prized in the early days, but production declined drastically after 1835 and the species was extinct in Lake Ontario by 1890. A number of minor species have collectively formed a substantial part of the catch during all or part of the past century. Roughly in order of commercial importance they are: pickerel (yellow and blue), pike, perch, catfish, carp, eel, sturgeon. During the past decade white perch, which were recently inadvertently introduced into the lake, have become a commercial species. Although alewives have been available in quantities throughout the history of the fishery, there have seldom been buyers for them.

Lake Huron

By 1800 there was a sizeable settlement in the vicinity of Michilimackinac and a local trade in fish. Although this early fishery was mainly in what are now U.S. waters, part was in Canadian waters and, in any case, the fishermen were mostly British subjects. In the early days settlers' wives unravelled linen cloth brought from Europe for clothing and used the threads to make the web

of the early gill nets. Before long, however, twine for net making purposes was being imported from Scotland. About 1860, cast lead sinkers and shaped cedar floats (i.e., "leads-and-corks") replaced the stone sinkers and the 2½-foot square boards (floats) used until then. About the same time, steam tugs began to replace the canoes, rowboats and moderate size sailboats used earlier. There was gill-netting in Georgian Bay as early as 1835 and at Southampton before 1855. By 1870 gill-netting was carried out in all Canadian waters of the lake. The development of techniques after 1860 was much the same as in Lake Erie, except for a larger proportion of small boats in Lake Huron and a slower change-over to diesel, steel hulls and enclosed decks. Gill-netting has been the principal method of fishing from the earliest times until the present.

Pound nets have been fished south of Goderich since 1882, and for almost as long south of Manitoulin Island and at some localities in Georgian Bay. The pound net has always been of secondary importance on Lake Huron. The use of seines and of other gear has been inconsequential.

By 1870, when the Canadian Lake Erie fishery was just beginning to develop, the Lake Huron fishery was already a thriving industry with an annual production of over 4 million pounds. Although total Lake Erie production has been the greater since 1900, the Lake Huron fishing industry was also a very healthy one until about 25 years ago when a drastic change came about because of the advent of the sea lamprey.

Lampreys are somewhat eel-like in appearance and are sometimes incorrectly called "lamprey-eels". There are five species of lampreys in the Great Lakes of which only one species, the sea lamprey, is of special interest. Adult sea lampreys feed almost entirely on the blood of fish. As an adaptation to this method of feeding, they have strong sucking mouths by which they attach themselves securely to their prey. Through the combined action of strategically placed teeth and of a corrosive oral secretion, a lamprey soon seriously wounds the fish to which it is attached, then feeds on its blood. Some fish survive a sea

lamprey attack but many, probably most, die either through loss of blood or because of subsequent infection of the wound. Thus sea lampreys kill fish many times their own size. Since they use only the blood, a small fraction of the total weight, the number of fish required per lamprey is much greater than the number required by a predator which eats all of its prey. Thus a comparatively small number of sea lampreys have a surprisingly great effect.

Sea lampreys are a widespread species, being native to both coasts of the North Atlantic Ocean. During prehistoric times, a special group within this species became adapted to freshwater life in Lake Ontario. Niagara Falls prevented these freshwater adapted sea lampreys from reaching the other Great Lakes until construction of the Welland Canal opened an invasion route. Although they must have reached the lake earlier, the first concrete evidence of their presence in Lake Huron is a 1937 report. The rapidity with which they then increased in numbers and spread to all parts of the lake was phenomenal. Although sea lampreys attack almost every species of fish, they do not seem to have seriously affected the abundance of any species except lake trout. Their effect on lake trout abundance has been drastic.⁽¹⁾

Until the advent of sea lampreys, lake trout were the most important fish taken from the Canadian waters of Lake Huron. For half a century, about 4 million pounds of lake trout had been produced annually. Then, as a result of lamprey predation, trout catches declined rapidly after 1936 to less than a million pounds in 1945.⁽²⁾ Catches declined further to virtually nil in recent years.

For most of the past century, annual production of whitefish has generally been between one and two million pounds. A notable recent exception has been spectacular catches in Georgian Bay during the 1950's which were entirely the results of an unusually good hatch of whitefish in 1943.

(1) Repeated attempts to find a correlation between the decline in lake trout and factors other than lamprey predation have failed.

(2) The 1945 production was mainly in Georgian Bay where sea lampreys became established later than in the main body of the lake.

During the past century, cisco catches have fluctuated considerably around an average of about one million pounds per year without an over-all trend to increase or decrease. There seems little doubt that catch has been governed by demand rather than by supply.

Several other species have contributed in a small way to the fishery, including sturgeon, pike, pickerel, and perch. Smelt have been locally plentiful since the 1930's but there has been almost no commercial fishery for them.

By 1870 fish were regularly shipped by steamboat from the Duck Islands, Georgian Bay and the North Channel to wholesalers in Detroit. During the next few decades, railways replaced steamboats for transportation, although fish were in some cases moved considerable distances by water to the nearest railway station. Since 1930, trucks which haul fish directly from the fishermen to the wholesaler have replaced rail transportation in some areas, particularly for ports between Sarnia and Tobermory. Marketing methods have developed about as on Lake Erie.

Lake Superior

From early times,⁽¹⁾ the Ojibways came from considerable distances to Sault Ste. Marie in order to carry away, after smoking, whitefish which they caught in the St. Mary Rapids at the foot of Lake Superior. In the 19th century it was quite common for two men in a canoe with dip nets only to take over 1000 pounds of whitefish per day.

From 1832 to 1842 small quantities of whitefish caught near Grand Portage (now Fort William) were salted, packed in barrels, and sent by boat to Detroit. About 1860 a similar fishery operated in the general vicinity of Rosport. Starting about 1885 most of the catch was sent to market as fresh fish packed in ice, and the newly built railway was used increasingly for shipping to market fish from the northern part of the lake. However, some fish from the area were moved by boat to U.S. ports as late as 1928. In recent years the use of trucks has steadily increased.

Prior to 1880 there had been a small fishery near Sault Ste. Marie for local use. In 1882 U.S. capital financed a fishery in the Canadian waters and, as a result, production increased several fold in the next decade. The fish were landed at small communities which were established for the purpose along the shore north of Sault Ste. Marie, about as far as Pancake Bay by 1885; later similar fishing communities developed still further from Sault Ste. Marie. Steamboats gathered the fish from these small communities and brought it into Sault Ste. Marie, where it was iced, packed and forwarded by lake freighter (later by rail) to Chicago and Detroit. The gradual development of roads, in the past 30 years, particularly in the past decade, has resulted in the fish being moved to Sault Ste. Marie by truck rather than by boat. In recent decades the fish have usually been packed at the fishing communities rather than in Sault Ste. Marie.

Although some pound nets and other gear have been used, the fishery has been mainly by gill nets. A few larger fishing tugs have been used, but most of the fishing over the years has been carried out from smaller vessels, typically sailing vessels until about 1915, since then wooden-hulled, gasoline-powered boats without net lifters,⁽²⁾ with a skipper and one helper or even with one man alone; such vessels usually fished close to their home port.

Lake trout was by far the most important species in the Canadian waters of Lake Superior during the first half of this century. From 1835 to 1950 the annual catch averaged about 1.5 million pounds and was never less than one million pounds. As a result of sea lampreys, first reported in 1946, lake trout catches declined steadily after 1950 from the long-term average to 3% of that average by 1960. Because of massive, expensive plantings of hatchery-reared young, the catch has since increased slightly to about 8% of the pre-lamprey level.

Whitefish was the most important species initially. After 1900 it became secondary to lake trout and mainly caught incidental to the lake trout fishery, about one pound of whitefish

⁽¹⁾ Reported by Jesuits in 1640.

⁽²⁾ Net pullers have been used increasingly during the past two decades.

for every five pounds of trout. Since the advent of the sea lamprey, whitefish production has decreased.

Cisco production has been quite erratic, sometimes exceeding lake trout in quantity, although always far less in total value. It seems likely that production has depended on demand rather than on supply, although legal restrictions have also been a factor in limiting production.

Although catches of yellow pickerel have gradually increased for the past century, production is still relatively small. Sturgeon was an important species for a short time in the late 1800's, but catches in this century have been negligible. No other species have been of importance.

Smaller Lakes

Although Lake St. Clair is a link in the Great Lakes chain, it is not usually regarded as one of the Great Lakes because of size. Canadian production has fluctuated only moderately around an average of slightly less than one million pounds per year for almost a century, a substantial production when relative area (1/40 of Lake Superior) is considered. It is of historical interest that the catch included substantial quantities of lake trout and ciscoes until 1893, and of whitefish until 1920. The disappearance of these coldwater species strongly suggests that the lake is appreciably warmer than 100 years ago. In recent years pickerel and carp have been the most important species, although several other are also taken.

Pound nets and seines have been the principal means of production. Baited hooks have also made a significant contribution. Gill nets have not been used. The fishing boats have of necessity been small and of shallow draft. Marketing procedures developed much as in Lake Erie, although strongly influenced by the fact that all parts of the lake are close to Detroit, a good market. An interesting recent development is a growing market for live fish to stock privately-owned ponds, mostly in the United States, where the general public angle for a fee.

Although there was some commercial fishing on Lake Nipigon as early as 1898, the first

fishery of any consequence began in 1917. Gill nets have been the only fishing gear used. Fish tugs equipped with net pullers, but decks not enclosed, were used from the first; only in recent years have tugs with enclosed decks been used. The catch has been mainly whitefish and lake trout. Pickerel and sturgeon have been of less importance, and a few other species have also been taken.

The earliest available records indicate that in 1885 Lake Nipissing produced 70,000 pounds, mainly pickerel, pike, and whitefish. Sturgeon, muskellunge, black bass, and cisco were soon added to the list and over 100,000 pounds per year were produced for several decades. In 1922 commercial fishing was drastically curtailed by law, and since 1930 the annual catch has usually been less than 30,000 pounds. Gill nets were the principal fishing gear until 1908; since 1908 pound nets have been the only gear permitted.

In 1615 Champlain noted that the Hurons were fishing in Lake Simcoe. Ojibways, who later moved into the area, also fished the lake. Europeans settled around the lake between 1820 and 1830 and soon were fishing, mainly using methods learned from the Ojibways. A good deal of the catch was used locally, but a commercial fishery to supply more distant markets also developed early in the last century. Fishing was carried out through the ice as well as during the open water season. Spearing has until very recently been a standard means of production. Gill nets were used in increasing numbers until 1885 when their use was restricted by law. By 1890 gill nets and most other fishing gear were illegal, and gill nets have not been an important factor in the commercial fishery in this century. Seines were the important gear from 1910 to 1929, then seining diminished to nil by 1950. Fishing with hooks has always been an important part of the commercial fishery and in recent years has been the only method used. It is not uncommon for one man to catch for sale by angling 100 whitefish per day, either through the ice or during open water fishing.

As a result of long-existing legal restrictions, production has never been great. Peak production, in 1895, was just over 300,000 pounds. The commercial catch has included

whitefish, lake trout, carp, cisco, black bass, sturgeon, pike, muskellunge, pickerel, and perch.

4 - LAKES OF SOUTHERN MANITOBA

Winter Fishing

On the Great Lakes there is very little commercial fishing between freeze-up and break-up, but in the rest of inland Canada the winter fishing season has from the beginning been an important part of the commercial fishery. Most of the basic techniques of winter fishing were worked out on the large lakes of southern Manitoba, particularly Lake Manitoba. The methods which are described below are used throughout inland Canada, except on the Great Lakes. Except as noted, methods have changed little since the 19th century.

Winter fishing is carried out by men standing on the ice surface; boats are not required. The first problem is to get a rope under the ice between "basin holes" a net length (about 100 yards) apart. When the ice is only two or three inches thick,⁽¹⁾ a small hole is made with an axe and a long piece of wood with rope attached is put under the ice and shoved smartly in the required direction. The piece of wood can easily be seen through thin ice and a hole is quickly made where it comes to rest and it is again pushed in the required direction. Half a dozen holes may be required in a net length. When the ice is thicker, by which time it is usually snow covered, a more tedious method is used. First, a basin hole about two feet in diameter must be opened in the ice, which is often two or three feet thick and late in the season or some lakes as much as six feet thick. Until recently, basin holes were chopped out by ice chisels or by "needle bars"; a needle bar is a long heavy iron bar which tapers to a sharp point at one end. Since about 1950 there has been a growing tendency to open basin holes by mechanical means, mainly power-driven ice augers, although chain saws are also used in

some places. When the basin hole is finished and the ice fragments scooped out of it, a "jigger" is pushed under the ice through the hole and headed in the required direction. The "jigger"⁽²⁾ is essentially a wooden plank about six feet long to which is attached a simple arrangement of iron levers, such that a sharp pull on the rope attached to the lever system is translated into a thrust against the under surface of the ice, which propels the jigger away from the man who provides the motive power. When the jigger has been propelled a net length in the required direction by a succession of sharp pulls, it is recovered by digging a second basin hole.

Recovering the jigger provides a rope under the ice between two basin holes. This rope is used to pull the gill net under the ice where it is usually allowed to settle to the bottom of the lake. In some cases, extra floats are put on the nets so that the top edge is just below the ice surface. Formerly there was risk that the net floats would freeze to the under surface of the ice. In recent years the practice has been to use inflated toy balloons for floats - they seldom freeze to the ice and when they do, a strong pull breaks them and allows the net to be pulled free.

In order to lift the nets, the basin holes, which have of course frozen over, are reopened and both ends of the net are brought up. A rope is attached to one end and the net is pulled onto the ice through the other basin hole; thus a rope is pulled under the ice for resetting the net. The fish must be quickly untangled from the gill net before net and fish freeze too solidly. They are frequently eviscerated immediately, although this onerous task is done later in a warm place if circumstances permit. Originally, all winter-caught fish were allowed to freeze on the ice, left frozen in piles often for weeks, and moved to market at leisure; this practice is still followed in many places. About 40 years ago, Lake

(1) Before contact with Europeans, the Indians used essentially this method even for thick ice. Prior to the jigger, commercial fishermen used the same method, having adopted it from the Indians via the fur traders.

(2) Although there are conflicting claims, it would appear that the jigger was invented in 1898 by John Sievin, a Lake of the Woods fisherman. Several fishermen from Lakes Manitoba and Winnipeg contributed to development of its present form; the last important modification was a noise-making device invented by J. V. Johnson of Gimli in 1927 as a means of locating the jigger when in operation. Since about 1920 jiggers have been standard equipment for winter fishing.

Manitoba fishermen, no doubt encouraged by particularly good rail connections to their lake, began to take special precautions to keep their fish from freezing in the sub-zero temperatures and to ship them unfrozen to market; the unfrozen fish brought a higher price. Fishermen on other lakes have gradually adopted this practice, particularly during the past 15 years, and it is now usual to market winter-caught fish in the unfrozen state where conditions permit.

There have been some recent improvements which have eased the lot of the winter fisherman, but the basic struggle with the elements remains almost unchanged. Winter fishing is always carried out at below freezing temperatures, generally below zero Fahrenheit, not uncommonly at 20 and 30 degrees below zero and sometimes at 40 degrees below. The wind has a clear sweep for many miles over the flat ice surface. The fisherman's hands are wet all the time he is fishing. Few Canadian win their daily bread more painfully.

Lake Manitoba

Commercial fishing started on Lake Manitoba in 1855, in which year almost half a million pounds were taken by a winter fishery. With minor exceptions (all before 1910), it has been entirely a winter fishery using gill nets. In spite of its early beginning, the fishery was relatively small until after 1900. However, during the past 50 years annual production has been substantial, particularly when the size of the lake is considered. Originally the fishery was primarily for whitefish, but by 1920 pickerel had become its mainstay. With the decline in cisco production in Lake Erie, production of Lake Manitoba ciscoes (tullibee) became for a time the second species in terms of quantity produced, although not in value. About 1930 saugers, which until then had been scarce, became a commercial fish of increasing importance, and by 1940 sauger production approached that of pickerel. Between 1940 and 1950 the catch of saugers frequently exceeded that of pickerel. Since 1950 sauger catches have declined and in recent years pickerel has again been consistently the most important species. Whitefish have been of

minor importance since 1930, and rare in recent years. Cisco production in recent decades has been sporadic, dependant on demand rather than supply. Perch and pike have consistently been a minor part of the catch through the years.

Lake Winnipeg

Fish from Lake Winnipeg were an important item in the diet of the Indians, of fur traders and of European settlers who lived on or near the lake. By 1872, if not earlier, some Lake Winnipeg fish were being sold in Winnipeg. The first substantial commercial fishery began in 1882, when one sailboat was used to bring fish regularly to Winnipeg for sale and produced a little over 100,000 pounds. In 1884 the first steam-powered fishing tug (no doubt, much like those on the Great Lakes at the time) was in use. In the same year, for the first time, the amount of fish exported to the United States exceeded local sales. The number of fishing tugs and smaller boats increased rapidly, and ice houses and freezers were built. By 1887 annual production was over 2½ million pounds of which about 60% was exported to the U.S.A. By 1893 there were 30 sailboats and 13 steam tugs in the fishery and the annual catch was almost 4 million pounds.

For most of the history of the Lake Winnipeg fishery, gill nets have been the only fishing gear used, in fact the only gear that could be legally used. Some seines and baited hooks were used in the early fishery and a very limited use was made of pound nets; they were not fished after 1890. A limited number of Lake Erie-type trap nets have been fished since 1950.

The gill nets used have been essentially the same as those described for Lake Erie⁽¹⁾; however, the gill nets used in western lakes have been deeper on the average (i.e., with the net extending farther vertically) than those used in the Great Lakes. Linen web was used until 1914, cotton largely replaced linen during the next decade, and nylon replaced cotton between 1948 and 1950. Three distinct fishing seasons developed at an early date.

The summer fishery has been primarily for whitefish, and mainly in the large northern basin

⁽¹⁾ This statement applies to all gill nets used in northern Ontario and in Manitoba, Saskatchewan, Alberta and Northwest Territories.

of the lake. By 1900 there were a number of wooden-hulled steam tugs displacing 10 to 25 tons from which gill nets were fished. Net pullers were not used; the nets were pulled by hand. Although there were in many cases bunks and messing facilities for a crew of about half a dozen who lived aboard for the fishing season, these tugs were not covered in as were fish tugs on Lake Erie. Many two-masted, wooden-hulled half-decked sailboats about 30 feet long with a crew of three also were used. Early each morning a tug would tow roughly a dozen sailboats to the fishing grounds, then each sailboat and the tug would proceed to the gill nets which its crew had set the previous day. After pulling the nets, removing the fish, and re-setting the nets, the sailboats would return to their home port on their own if the wind was favorable, otherwise they would be towed in by the tug at the end of the working day. In port (or perhaps on their boat while homeward bound) the fishermen would remove viscera and gills from their catch, then sell them in bulk to the operator of the local fish station. The operator either packed the fish in ice for forwarding as fresh fish or froze them at the fishing port by a salt-ice mixture. In either form, the fish were shipped south by freight-boat to the railway by which they were carried to the final market.

Between 1920 and 1930, the sailboats were gradually replaced by gasoline-propelled fishing boats. The practice of freezing fish at the fishing ports declined at the same time, and only unfrozen fish have been shipped for the past 30 years or more. The use of steam tugs was prohibited in 1934, and no vessels comparable in size to the Great Lakes fishing tugs have been used since that date.

The standard fishing vessel since about 1930 has been a wooden-hulled gasoline-powered boat about 40 to 45 feet long, with a beam of 10 to 12 feet, maximum beam well forward, square stern and round bottom. A small deck-house amidship was the only shelter provided. The usual crew was four men including the skipper. For many years nets were "walked in", a rather unique method of pulling by hand. The net was brought aboard over the port or starboard bow, depending on wind direction. One man walked as far forward as practical, grasped the net firmly and facing the bow walked backwards

for about 15 feet. While he was still in motion, a second went forward, grasped the net and began to walk backwards, and so on. The net came in steadily and with a minimum of physical effort. Although the design has remained basically unchanged since 1930, some steel hulls and diesel motors have appeared in recent years. Small net pullers have also been installed within the past decade on most of the boats. Methods of handling the catch have virtually remained unchanged since 1900 or earlier, except that salt-and-ice freezing is no longer used.

Since early in the century, there has been a distinct fall fishing season after the summer whitefish season and before freeze-up, primarily for species other than whitefish and in areas peripheral to the traditional whitefish fishing grounds. By custom and usually by law, the only fishing boats used have been skiffs about 20 feet long. Although the size of this fishery has increased greatly in the past 50 years, methods have remained essentially unchanged since the beginning of the century. Contrary to practice in most Canadian lakes, extra corks are often put on gill nets so that they float with the top edge at the surface; alternatively, a crude method suitable only for use in a small boat is often used to set them at a level intermediate between surface and bottom. Several skiffs are based at each of a number of small fishing stations where the fish, after being eviscerated, are bought by the station operator from the fishermen, then packed in ice for movement to market. About half the catch now leaves the fishing station by freight boats and about half by truck; originally, almost all fish from the fall fishery started its journey to market on a freight boat.

Although there has been some winter commercial fishing on Lake Winnipeg for almost a century, it was a comparatively limited fishery until after 1910. Introduction of the jigger, improved transportation and increased demand have led to a considerable expansion since that time. Until about 1930 most winter fishing was by men who stayed in isolated camps for the winter. Their catch was allowed to freeze, and was kept frozen on the lake often for months until it could be conveniently moved to the railway by horse-drawn sleigh. Between 1930

and 1950 mechanical vehicles replaced horses as a means of bringing fish off the ice. As a result of quicker transportation, a large part of the winter catch from Lake Winnipeg is now kept unfrozen, and many of the fishermen go to the fishing grounds daily from their homes rather than living in camps. The winter fishery is and has been largely for species other than whitefish and mainly on the periphery of the traditional whitefish fishing grounds.

Over the past eighty years average annual production of whitefish has been roughly 3 million pounds; production during the past decade has been consistently less than average. Pickerel was a relatively unimportant species until about 1900, then production increased markedly for two decades, and after 1930 it exceeded whitefish production. Pickerel has usually been the most important species in recent decades. During the past 30 years saugers have become an increasingly important part of the catch, sometimes greater than pickerel. Earlier, sturgeon were taken in substantial quantities, but catch has been negligible in recent decades. For about a decade after 1925, goldeye were an important product of Lake Winnipeg, but the catch has been negligible for the last 30 years. Ciscoes have formed a minor but consistent part of the catch; production has probably been governed by demand rather than by supply. At least 10 other species have had a minor place in the fishery, including burbot, a useless fish in most areas, which in recent years has been produced in substantial quantities for sale to fur farmers.

Lake Winnipegosis

There was a limited commercial fishery on Lake Winnipegosis by 1890. The fishery expanded rapidly after 1897 when the railway reached the lake. One tug and 63 other boats were soon fishing during the open water season, and a sizeable winter fishery quickly developed. In 1906 open water fishing was prohibited; among the reasons given for the prohibition was that the fishermen were paid only 2¢ per pound for summer-caught fish, compared with 5¢ per pound for winter-caught fish. In 1922 fishing during the open water season was again permitted, and a fishery with techniques and equipment much like those used in the Lake Winnipeg whitefish fishery soon developed and

still continues. Relatively more of the total catch has been and is taken during the winter season than on Lake Winnipeg.

The fishery was originally primarily for whitefish. However, whitefish catches have steadily declined since about 1930. Pickerel have always been important in the fishery and have become the principal species during the last three decades. For a few years about 30 years ago, substantial quantities of goldeye were produced; in recent years catches have been relatively small. Suckers, pike, sauger, and perch have been marketed in moderate quantities.

5 - GREAT SLAVE LAKE

Unlike every other major freshwater commercial fishery, the Great Slave Lake fishery is unique in that its history is short and well recorded.

Until two decades ago, the lack of suitable transportation prevented the development of a commercial fishery. One firm was able to overcome this problem by unusual methods. A complete fish processing plant, mounted on several barges, was floated down the Slave River and established in a well sheltered natural harbour on Devil's Channel near Gros Cap. The fish caught were immediately filleted and frozen. The frozen fish were later moved in refrigerated barges to Hay River, trucked to Alberta, from which they were shipped by rail to their final destination.

Commercial fishing began on Great Slave Lake on July 29, 1945. Because of its unique solution to the transportation problem, the company was initially the only fish buyer on the lake, and fishing was at first mainly confined to the fishing grounds near Gros Cap.

The Mackenzie Highway, which connects the settlement of Hay River with the road network of Alberta, was opened to normal traffic in August 1948. Even before the road was open to normal traffic, it was possible to use it in winter and some were shipped over it in January 1947. By 1949, 12 small fish companies had set up facilities at Hay River settlement to buy fish, to pack them in ice, and to ship them unfrozen over the new road. Since that time the number of companies has gradually diminished to four, each of which has grown. The initial producer has not been in business on that lake since 1960.

For the two decades of its history, there have been two distinct fishing seasons on Great Slave Lake. During the winter season, the winter fishing techniques described above have been used. A special consideration has been the extremely short period of daylight in winter, and the consistently low temperatures which eventually make the ice cover five feet thick or more.

During the summer season boats are used. The first fishing boats were 28 feet long, gasoline-powered with wooden hull, carrying crews of two. They were originally built for use on smaller lakes, and were too small for safe and efficient operation on Great Slave Lake. During the influx of new fishermen and fish companies which followed completion of the Mackenzie Highway, a remarkable mixture of fishing boats were brought in from various places in western Canada. More recently, the hodge-podge has disappeared, and most of the large fishing boats seen in recent years have been about 40 feet long with small deckhouses amidships and with crews of three or four. The nets were often "walked in", as on Lake Winnipeg. During the past ten years there has been a steady change-over from wooden to steel hulls and from gasoline to diesel motors. Also recently, many of the boats have been equipped with net pullers and echo sounders. However, there has also been a tendency in the past ten years to develop one-man fishing boats, a 20-ft. skiff with outboard motor.

The only fishing gear used has been gill nets. The first fishermen used nets with quite heavy cotton twine in the web. The fishermen who came later used a finer twine, also of cotton. A few nylon gill nets were used for the first time in 1950. By 1952 all the "new" fishermen were using nylon only, but most of the fishermen continued to use cotton nets at least as late as 1954, making them perhaps the last sizeable group of inland commercial fishermen in Canada to retain the less efficient gear.

The rapid influx of fishermen which followed the opening of the Mackenzie Highway resulted in a production of over 9 million pounds of fish in 1949. Then, as exaggerated preconceptions of the fish bonanza dissipated, the number of fishermen declined. Because less fishing was done and because catch per net decreased moderately (an expected and inevitable result of fishing),

the lake has never since produced as much as in 1949. It has also produced much less than the sustainable annual crop of fish which could be harvested because, at the prices that have been paid for fish on the lake, it has so far only been profitable to take that part of the fish crop which could be harvested most economically.

The catch has consisted mainly (90 to 95%) of whitefish and trout. Inconnu, although of minor importance, are of interest because they are not produced commercially in any other Canadian lake. Pike and pickerel are also taken.

6 - SMALL AND/OR REMOTE LAKES

General

Although the Great Lakes, the three large lakes of southern Manitoba and Great Slave Lake together provide the lion's share of the Canadian freshwater commercial production, a substantial part, particularly of high-priced lake trout and whitefish, come from several hundred other lakes, mainly in the Prairie Provinces. They range in size from lakes hardly bigger than ponds to Lake Athabasca and Reindeer Lake, each of which are larger than Lake Manitoba. Total annual catches have ranged from less than 1000 pounds to more than 2.5 million pounds per year. Sustainable annual yield varies from less than half a pound per acre to more than 30 pounds per acre. Each lake differs from every other lake in physical, chemical and biological characteristics.

But all are either relatively small, or relatively remote, and many are both. In spite of their differences, the fisheries of these lakes have much in common, and it is logical to group them for purposes of discussion.

Prairie Provinces

Commercial fishing began about 1885 in a chain of small lakes in the Qu'Appelle Valley, also in Last Mountain Lake. It is no coincidence that it developed immediately after the railway and settlers reached the Qu'Appelle Valley.

As the railway network spread and as the land was settled, more and more lakes were fished commercially. There were substantial fisheries on some of the smaller lakes in southern Manitoba by 1887. Commercial fishing began in several

lakes near Prince Albert in 1888, although the fishery was of little consequence until 1900. By 1892, there was a commercial fishery on some of the small lakes near Edmonton, and by 1893 fish were being produced from several lakes in the vicinity of North Battleford, also from Lac la Biche and neighbouring lakes. Shortly after 1900 fishing began on several lakes near The Pas, including Cedar and Cumberland lakes. Commercial fishing began on Lesser Slave Lake about the same time. By 1910 most of the suitable lakes in Saskatchewan and Alberta, as far north as Latitude 55° (or 56° in some cases), had been fished commercially for at least one season, and a majority still were fished. By 1920 lakes as much as 100 miles north or northwest and 200 miles northeast of The Pas were fished commercially. Commercial fishing began in Lake Athabasca in 1920, was soon discontinued and resumed on a more permanent basis in 1926. As transportation improved, particularly after caterpillar tractors and aircraft came into common use, the area within which there was commercial fishing extended even farther. By 1950 lakes were being fished even in the most northerly parts of the Prairie Provinces, and intervening lakes have been steadily added to the list since that time.

Meanwhile, in many of the lakes in the farmlands area commercial fishing has been restricted or prohibited during the past half century. On the other hand, the construction of reservoirs in southern Alberta has in recent years created some very productive commercial fishing waters.

The fishing gear has been, almost without exception, gill nets. Initially, most of the lakes were fished in winter using the techniques described for the large Manitoba lakes. Below freezing weather, which normally prevails during the winter season, was the factor which originally made it practical to fish the more remote lakes. The fish were allowed to freeze and were kept on the lake until it was convenient to move them. Frozen lakes, ponds and muskeg plus snow in the wooded areas made it possible to move frozen fish where roads in the usual sense did not exist. For many years winter-caught fish were hauled by horse and sleigh from the lakes to the nearest railway; dog sleds were sometimes used for short hauls. When trucks became available, they were

used where circumstances permitted. After 1930 caterpillar tractors, each pulling several sleighs, were used increasingly; in some places farm tractors were used in the same way on short hauls. Between 1945 and 1960, snowmobiles largely replaced caterpillar tractors for moving fish overland. Aircraft have played a minor but increasing part since about 1930. During the past twenty years, particularly during the past decade, there has been a growing tendency to keep the fish unfrozen and to move them quickly to market rather than to let them freeze and then move them when convenient.

Open water commercial fishing was originally confined almost entirely to lakes that were closest to railways; the eligible lakes have gradually increased in number as the railway network developed, particularly when new lines were laid north of the farmlands. Since about 1920, new roads also had the same effect whenever they were built. During the past decade, air transportation has made it possible to fish some of the more remote lakes during the open water season.

The original fishery was on relatively small lakes, so canoes and rowboats sufficed for open water fishing. Sailboats were used for a short time on Lesser Slave Lake, but were replaced by gasoline-powered boats shortly after 1920; sailboats were not used elsewhere. The fishing boats used since 1920 have varied greatly in size and other characteristics, but in general they have been either wooden-hulled boats roughly 30 feet long powered by inboard gasoline motors, or skiffs roughly 20 feet long with outboard motors, or freighter canoes with outboards. There has been nothing comparable to the fishing tugs of the Great Lakes. Mechanical net pullers have only been used during the past decade and then only to a limited extent.

Whitefish have constituted the bulk of the catch. Lake trout, pickerel and pike have also been important species. Sturgeon and goldeye, because of the high price per pound, have been important in some areas. Cisco production has been substantial on occasion; it could be increased tremendously if there was a demand commensurate with supply. Buffalo have recently become of local importance in some of the more southerly prairie lakes. Several other species have also been taken.

An unusual fishery has recently developed on Little Lake Manitou, near Watrous, Saskatchewan. The lake, which has no outlet, is more salty than the ocean and freshwater fish will not survive in it. However, it produces a heavy crop of 1/4-inch-long crustaceans known as brine shrimp. In recent years about a dozen outboard-powered, two-man boats have fished brine shrimp using small tow nets. The catch has averaged close to one hundred thousand pounds per year. It is processed in Watrous and sold as aquarium fish food, mainly in New York.

Northern Ontario

There was a commercial fishery on Lake of the Woods and on Rainy Lake in 1893, probably earlier. For sometime the fishery on these lakes, and in other waters which form the international boundary west of Lake Superior, was the only one in northern Ontario. Commercial fishing licenses for Lac des Milles Lacs and for Whitefish Lake were issued in 1908. In 1916 legal restrictions were relaxed and fishing began immediately on several other lakes. There has been a steady increase in the number of lakes fished during subsequent decades. Most of them have been comparatively small and the bulk of the production has been from a few of the larger lakes: Lake of the Woods, Rainy, Seul, St. Joseph, Temiskaming, and Abitibi.

Gill nets have been the most commonly used gear. Although the winter fishing methods developed in Manitoba have been used in many cases, most of the production has been from open water fisheries, using methods intermediate between those of the Great Lakes and those of the Prairie Provinces. Pound nets were first used on Lake of the Woods in 1893, and a few were used consistently there and in some other northern Ontario lakes until about 1950, then there was a change to trap nets and the number of trap nets now used exceeds the number of pound nets used before 1950. Hoop nets and seines have also been used to a limited extent.

In the early history of many of the lakes, sturgeon was an important, often the most important species, but in each lake sturgeon became scarce soon after fishing started. Since about 1900 whitefish have been consistently the most valuable species, with pickerel a close second.

Considerable quantities of pike have also been caught. Lake trout have been a minor species. In recent years goldeye have been produced from a few lakes. Several low priced species have collectively formed a substantial part of the catch through the years.

Yukon

Tens of thousands, sometimes hundreds of thousands, of pounds of fish have been taken annually from the lakes and rivers of the Yukon Territories since 1898. However, almost all of it has been consumed within the Yukon Territories. The important species have been whitefish, lake trout and cisco, and gill nets have been the usual gear. Limited quantities of spring and chum salmon and other species have been caught in the Yukon River near Dawson, mainly by "fish wheels", a unique type of fishing gear, essentially a current-driven paddle wheel with a few dipnet-like projections which dip into the water during each rotation and scoop up any fish encountered.

Northwest Territories

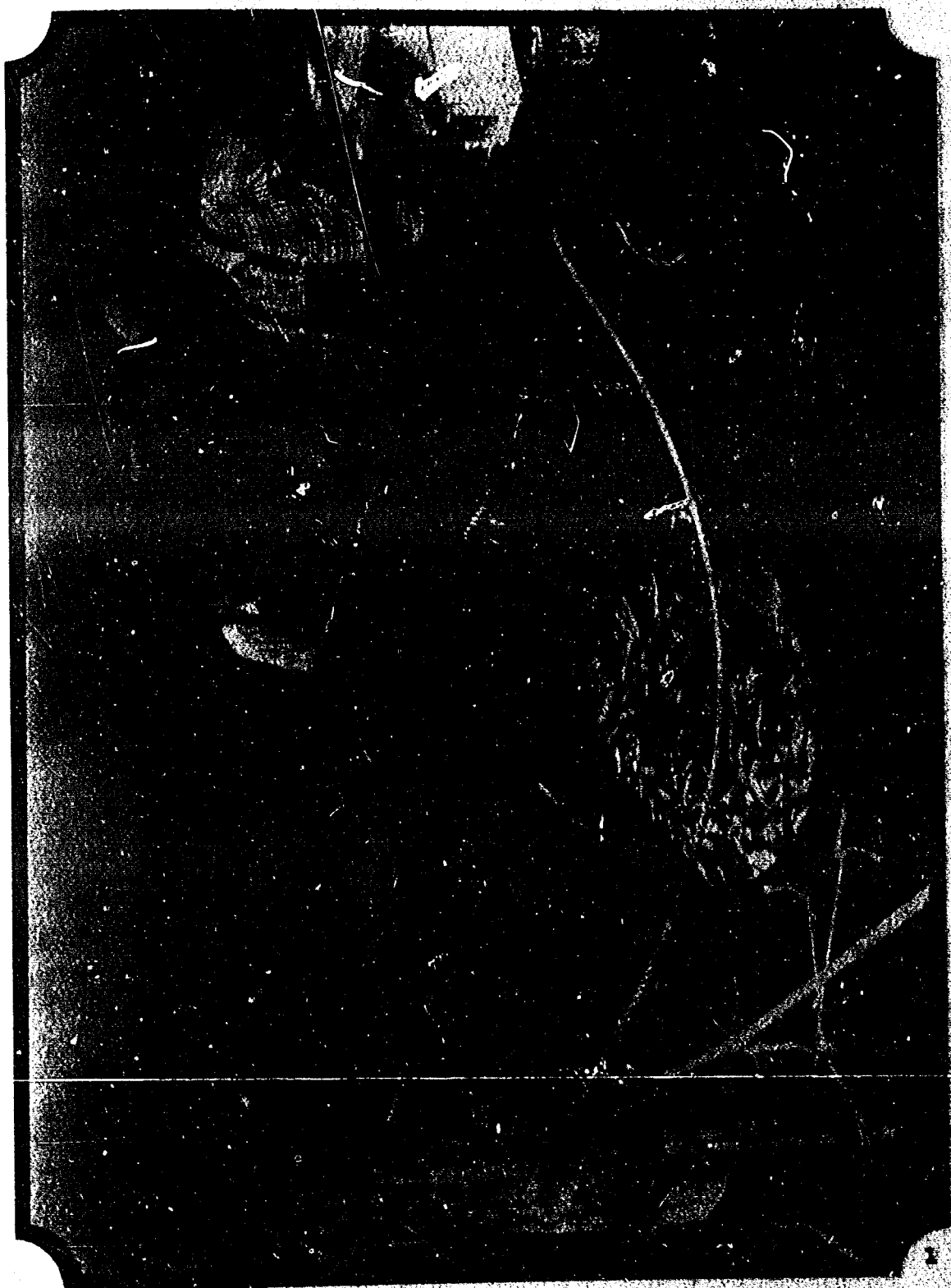
In the early days of the Great Slave Lake commercial fishery, several fishermen illegally fished adjacent lakes and marketed their catch as Great Slave fish. There were also abortive attempts to fish Kakisa Lake in 1947 and Neultin Lake about 1949. The first substantial commercial fishery in the Northwest Territories, exclusive of Great Slave Lake, was on Kakisa Lake starting in 1953. In 1954 three additional lakes near Great Slave were fished plus a fourth in 1955. There was no further expansion until 1960, when eight lakes near Great Slave were fished. Since 1960 the number of lakes fished by men based at Hay River has steadily increased, the furthest being 300 miles away. Within the past five years a limited fishery based on Lynn Lake, Manitoba, has developed in a few lakes north of Manitoba, and of eastern Saskatchewan.

The gear used has been gill nets. The fishery has been mainly through the ice, but a substantial part has been carried out during the open water season from skiffs with outboards and canoes. The fish have been moved mainly by snowmobile in the case of lakes near Great Slave, or by air in the case of more remote lakes. Because of a new road, fish have been trucked from Kakisa Lake for several years.

Most of the lakes have produced mainly whitefish and lake trout. Kekisa and Tethlina Lakes have produced mainly pickerel. The pro-

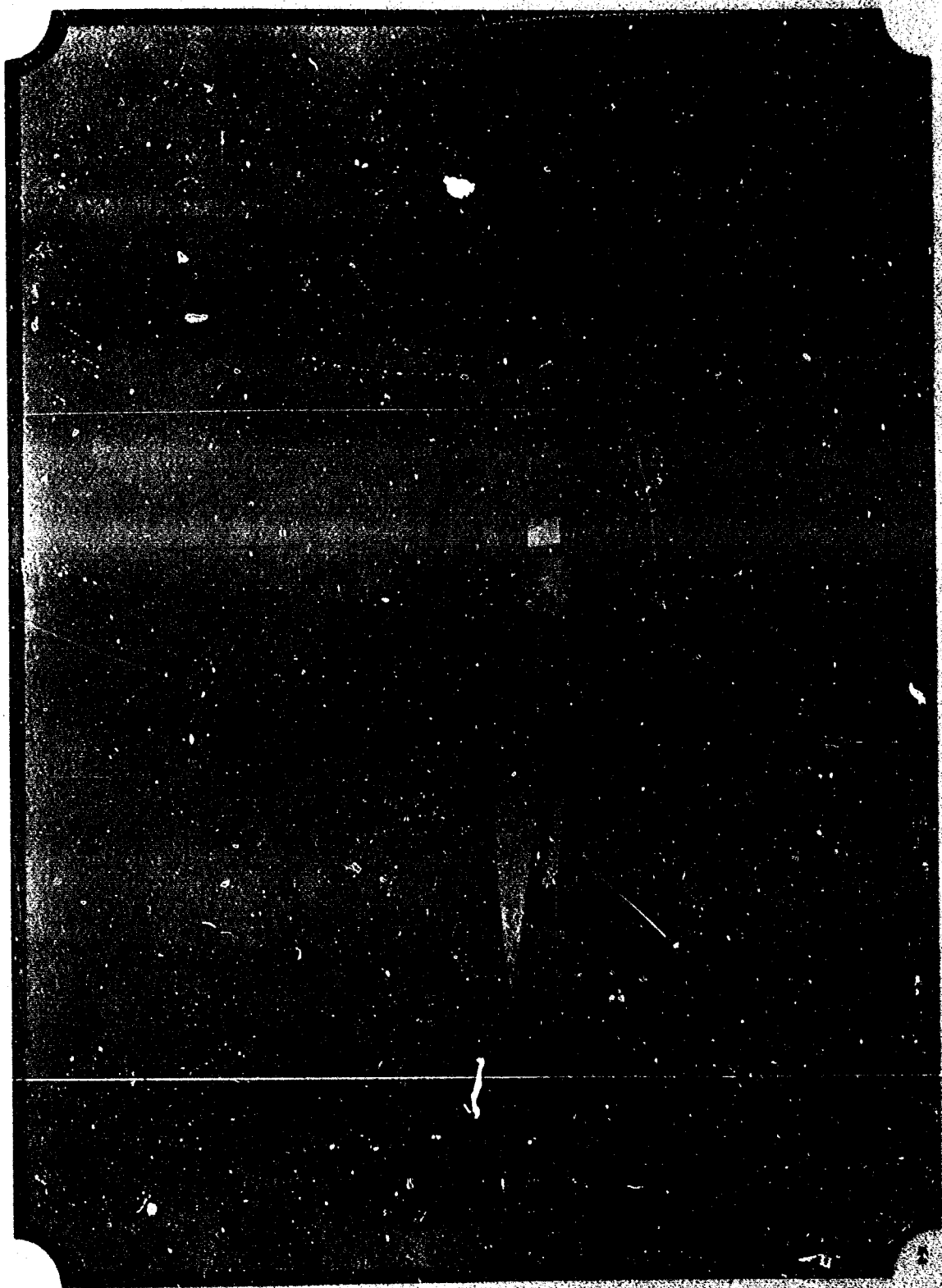
duction from all the lakes combined has been small compared with Great Slave Lake.

(Fig. 20.) Lifting a pound net. By overhauling the web, the fish have been herded into a restricted part of the crib from which a fisherman is scooping them aboard with a dip net.

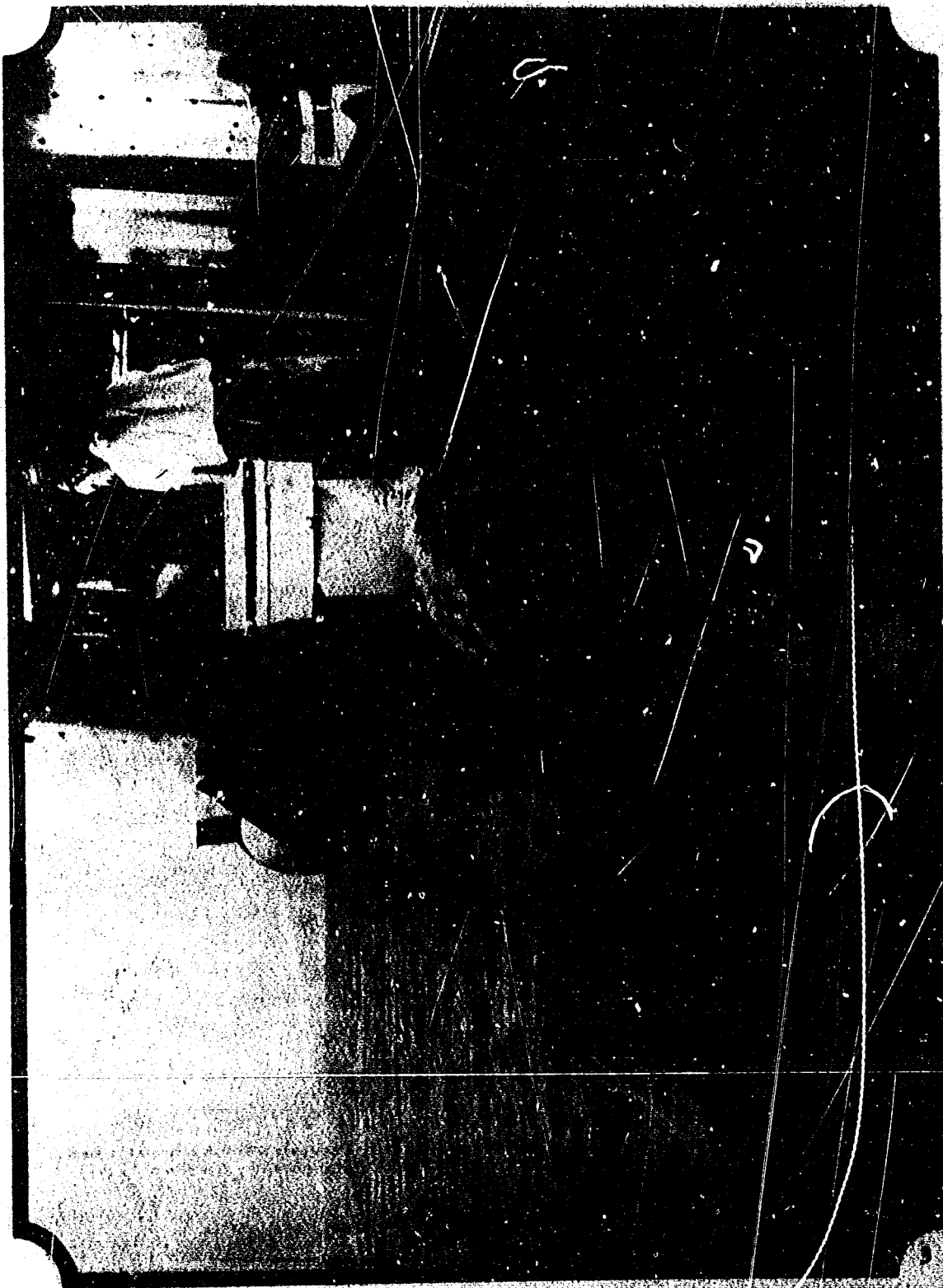




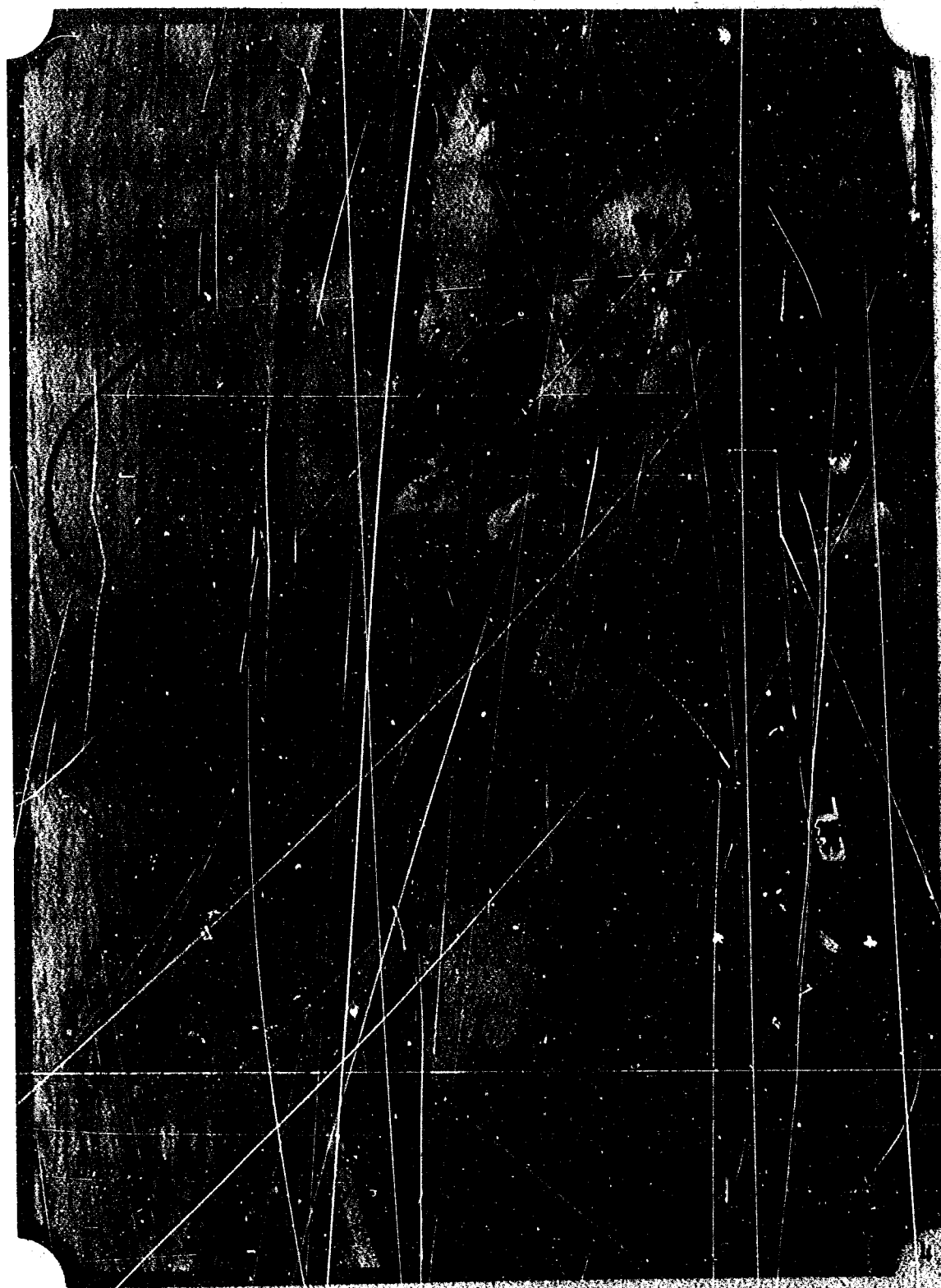
(Fig. 21.) A Great Lakes fishing tug pulling gill nets. Notice characteristic deckhouse.




(Fig. 19.) Looking forward along the port side of a Great Lakes fishing tug whose mechanical net puller is in operation. The gill net with fish in it comes aboard over a roller (which is kept in board except when fishing) and around the puller head (waist high and left of fisherman) to a fisherman who is coiling it in a net box. When net box is full it is pulled after where fish are removed.

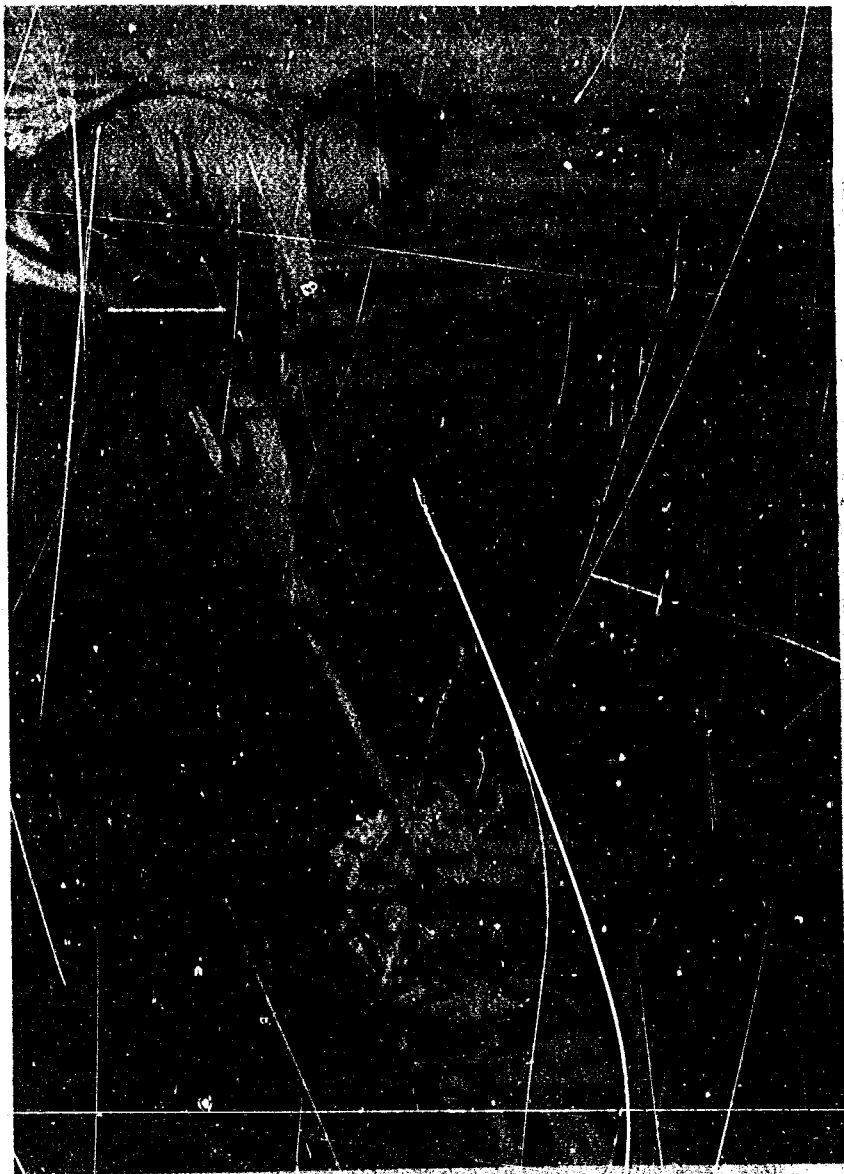


Fisherman removing fish (perch) from gill nets aboard a Lake Erie fishing tug. Nets with fish entangled in them have been piled in boxes and taken after. Fisherman pulls net across his lap untangling each fish as he comes to it. Note crushed ice on each box to maintain fish quality.





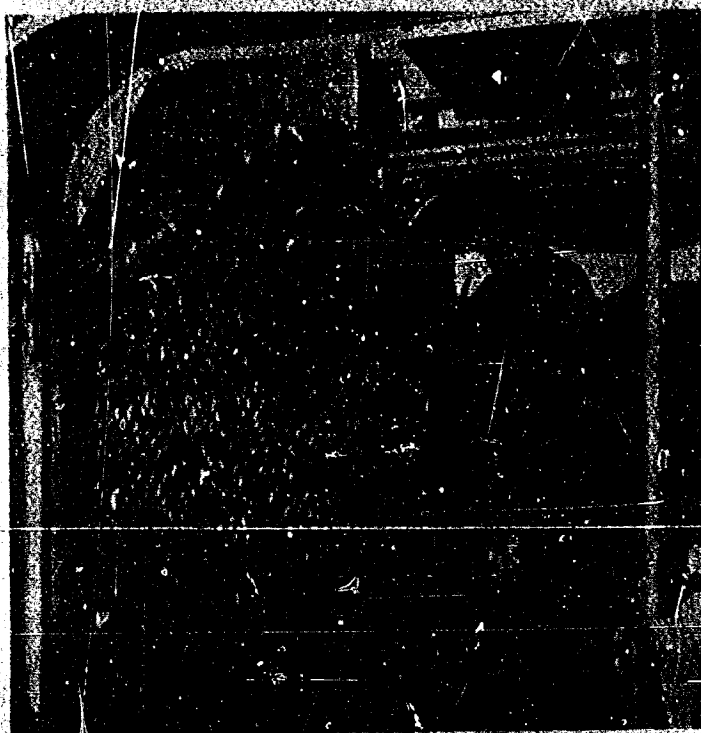
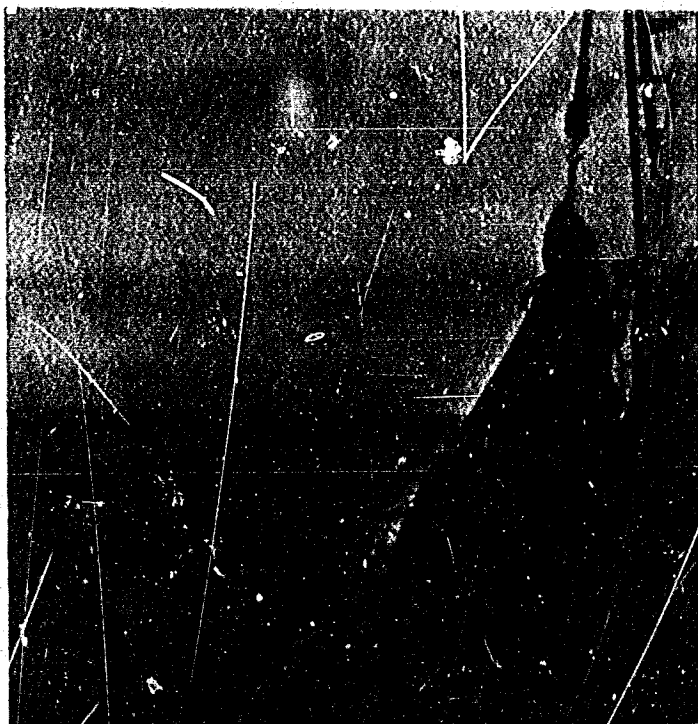
Fishermen using dip net to scoop fish from the crib of a trap net. The opening through which the fish are removed is laced up when the net is fishing.



THE PHOTOGRAPH WAS TAKEN
ON THE 10th OF APRIL 1964

Cod end of a trawl, full of fish, being hoisted aboard a Lake Erie gill-net tug which has been altered for trawling. Most of the trawl is still in the water; note floats left foreground.

Taken shortly after Photo 1. Cod end has been swung over deck. Man at lower right is ready to pull rope which will open cod end and allow fish to spill out.

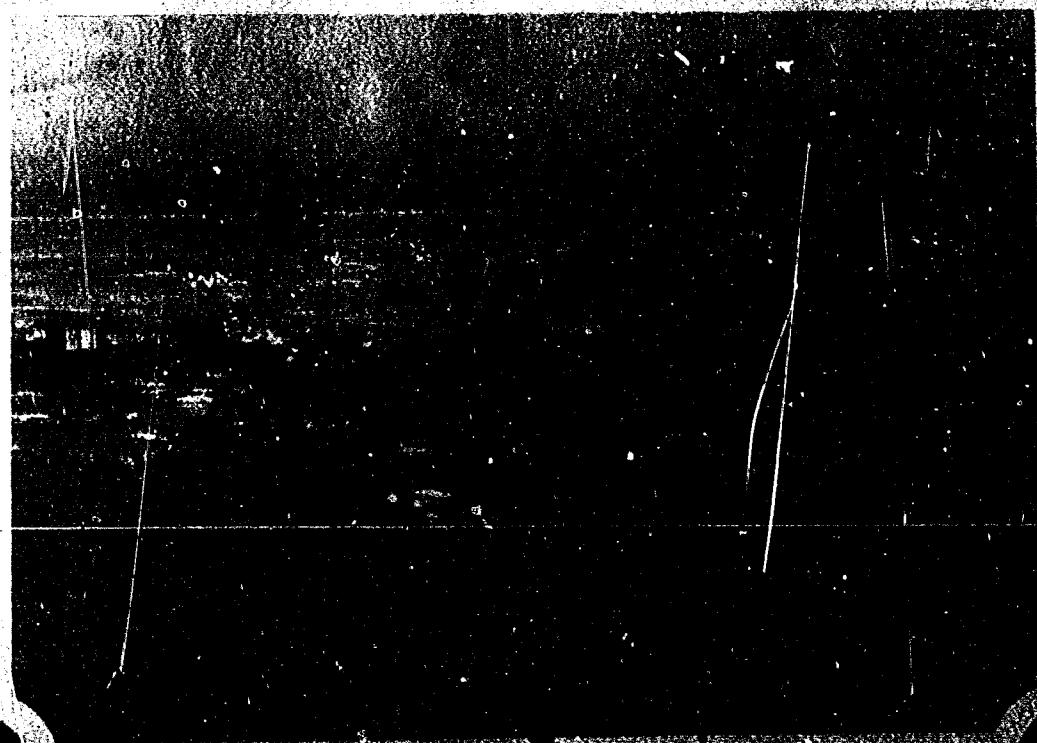


Taken shortly after Photo 2. Fish (mainly smelt) have been spilled from cod end onto deck.



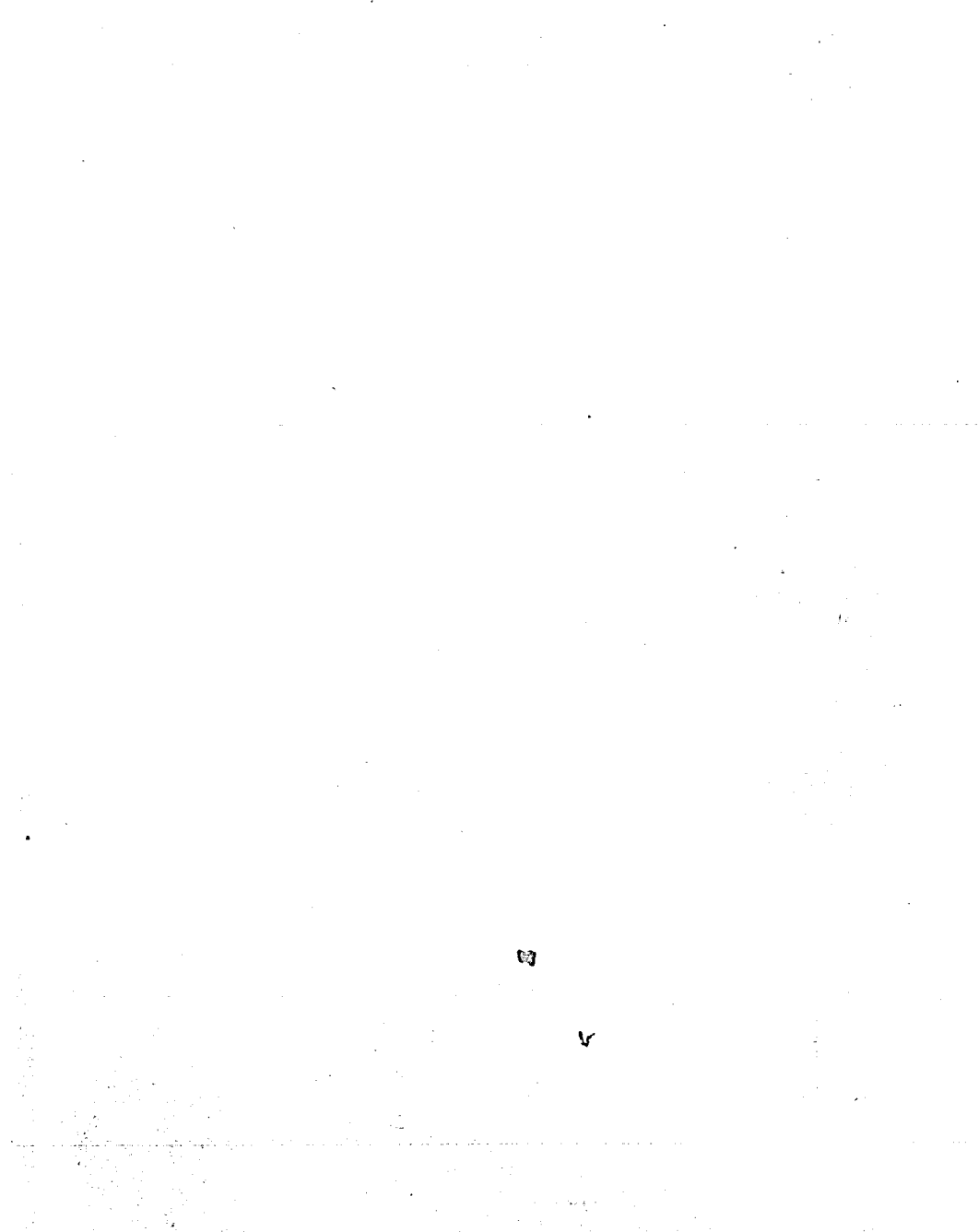
Winter fishing. Two cabooses on the ice several miles offshore. In many areas winter fishermen live for weeks at a time in such cabooses, generally two or three men in each.

Winter fishing. Fishermen removing fish from gill net. Note fish removed earlier scattered over ice, and small tree thrust into snow to mark location of basin hole.

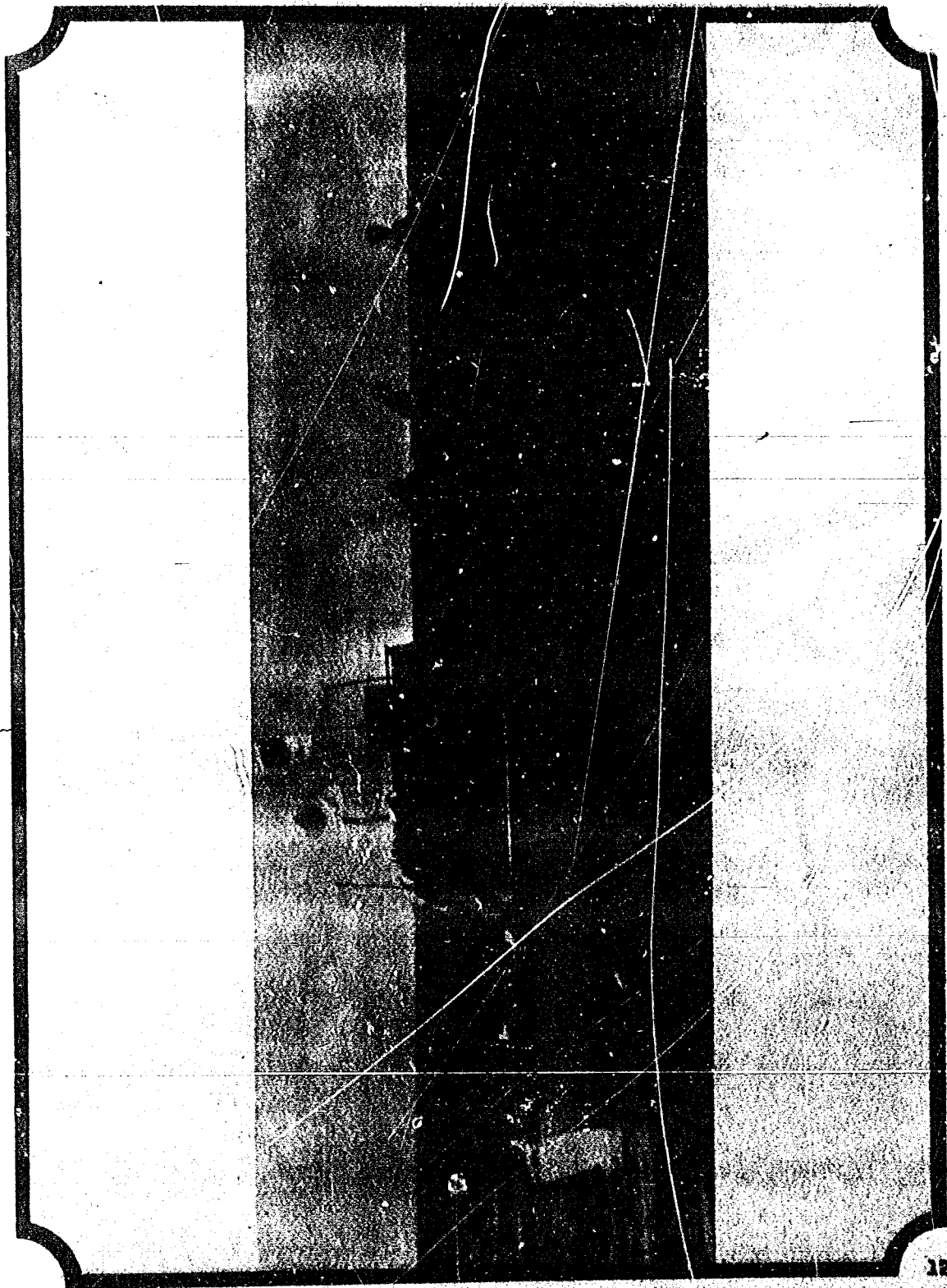


Winter fishing. Setting the gill net. Basin hole in middle foreground, needle bar to left, front end of snowmobile further left.





Lake Winnipeg type of gill-net boat. Gill net is being walked in over starboard bow.



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Small fishing boats typical of those used for commercial fishing in the smaller remote lakes of northern Canada.

