



ANNUAL MEETING - JUNE 1955

Report of the Scientific Advisers to Panel 4

The Scientific Advisers to Panel 4 met at St. John's, Newfoundland on March 18 and 19, 1955. The following were present:

<u>Canada</u>	<u>France</u>	<u>United States</u>
A.M.Fleming	M.J.J.Eude	J.R.Clark
J.L.Hart (Chairman)		H.W.Graham
B.G.H.Johnson		G.F.Kelly
A.C.Kohler	<u>Portugal</u>	A.F.Rollins
W.R.Martin		C.C.Taylor
F.D.McCracken	M.J.O.Ruivo	W. Terry
H.D.Macpherson		L.A.Walford
J.E.Paloheimo		J.P.Wise
E.J.Sandeman	<u>Spain</u>	<u>ICNAF</u>
H.J.Squires		
T.N.Stewart	A. Rojo	
W. Templeman		E.M.Poulsen

The St. John's meeting was a continuation of the meeting held in St. Andrews in December 1954. (See Document No.5).

Canadian scientists presented a review of catch statistics for Subarea 4 during recent years. Data for 1954 were not available for analysis.

31

Haddock: Landings in Canada and the United States averaged 308 thousand metric tons per year since 1910. (It is assumed that landings by European fishermen are negligible.) Since about 1948 Canadian and United States landings have been about equal. The proportion of scrod has increased. The United States took nearly all of its landings in Subdivisions 4X and 4W, with little from 4V and 4T. The Canadian catch also came mostly from 4X and 4W, but there were substantial contributions from 4V and 4T. All the United States catch was made by otter trawlers and the Canadian catch was made by otter trawlers, inshore hook and line, and dory schooners (in that order of importance). In 1953, 75% of the total catch was taken by otter trawlers. United States landings include a higher proportion of scrod than Canadian landings. Significant catches are made in all months of the year.

Cod: Landings in North America from Subarea 4 from 1933 to 1953 averaged about 103 thousand metric tons, with a peak in 1945 and 1946, and a subsequent decline. Most of the landings now are on the Canadian mainland. 4T is the largest producing subdivision, but all except 4R contribute substantially to Canadian mainland landings. Most cod are taken by inshore hook and line fisheries, which are concentrated in the summer months, but the proportion taken by otter trawlers is increasing, especially in 4T. Catch per unit effort by offshore otter trawlers shows a peak in 1943 and 1944 and a decline since then. The decline is disproportionately large among large steak cod. Cod less than 2 1/2 lb. are not a significant part of the catch. Since the post-war development of otter trawling in 4T, landings have been at a high level but the catch per unit of effort and the average age have declined. There is need for an analysis of back statistics for European landings from Subarea 4 on the basis of species and subdivisions. The Executive Secretary was requested to explore the possibility of acquiring such data.

The Canadian scientists reviewed the fishing history and related the size of mesh used in trawls to the yields of cod and haddock in Subarea 4. The report is attached as follows: The effect of increased mesh on yield - by J.E. Paloheimo (Appendix 1).

It was agreed that it would be advantageous to fish for haddock and cod in Subarea 4 with larger meshed trawls than those in current use, and use of mesh of approximately $4\frac{1}{2}$ inches is recommended as a suitable step in the right direction. As the fishing situation in Subarea 4 is complicated and unstable, and as the history of growth, recruitment, mortality rates and fishing efforts is not known accurately, it will be impossible to assess the effects of any regulation with precision. As a result conclusions will depend on the results of critical studies carried out in Subarea 5. Because the regulation is already being approximated by a substantial part of the gear in use in the area, the demonstration of benefits may not be feasible.

Canadian scientists pointed out the difficulties in defining mesh sizes. The difficulties were generally perceived and a small committee was set up to report on the ways in which nets are measured and to determine the mesh sizes of the nets used by all national groups in Subarea 4. An interim report is appended as Appendix 2.

The group recommends to Panel 4 that the Commission's secretariat be asked to assist in collecting data on mesh sizes used by European fishermen.

The mesh gauge in current use in the United States is considered as the most practical so far developed.

Exemptions were discussed from the points of view (1) of not interfering with lucrative fisheries and (2) of the feasibility of enforcement. It was agreed that a final recommendation be delayed until legal experts of the countries concerned can examine the question together in view of experience in Subarea 5.

The question of whether chafing gear interferes with the release of young fish was discussed, and it was agreed that a special study should be made on the problem. Canada and the United States will investigate the question as schedules of research vessels permit. No definite opinion on the subject is possible at the present time.

The group noted the necessity for having conversion factors for different net materials.

Canadians reported that their commercial fishermen favour a $4\frac{1}{2}$ in. mesh regulation in Subarea 4 on the condition that it is also adopted for Subarea 3. The fishing industry and enforcement officers agreed in favouring the certification of dry nets.

The group drew up a draft regulation which is appended (Appendix 3).

Joint Canadian and United States comparisons of age estimates by scales and otoliths showed discrepancies between the two methods of age determination which point out the necessity of intensifying critical research on methods of age determination.

In discussing research plans, it was agreed that:

The United States will

Continue to sample haddock and cod.
Continue to study the biology of redfish in Subarea 4.
Study the growth of small haddock in the Sable Island area from data collected by Albatross III.
Study distribution of eggs and larvae on Browns Bank to determine the origin of stocks of haddock in Subarea 4 and the fate of spawn produced on Browns Bank.
Engage in a study of selectivity of meshes of different sizes on catches of redfish and of meshes larger than $4\frac{1}{2}$ in. on haddock.

Canada will, through the St. Andrews Station:

Compare size selection of cod by otter trawls and by hooks.
Compare the selection of cotton, nylon and manila cod-ends.
Study whether "chafing gear" affects the selective action of cod-ends.
Tag cod in the western Gulf of St. Lawrence.
Continue to study growth rates by tagging, otolith reading, etc.
Continue the study of optimum mesh size for stocks of cod and haddock.
Extend the survey for eggs and larvae begun in 1954 along with routine hydrographic cruises.

Through the Newfoundland Station:

Tag cod in the Gulf of St. Lawrence along the west coast of Newfoundland.
Carry out a routine yearly redfish survey to follow the size composition in the northern Gulf of St. Lawrence.

France expects to have the research vessel L'Aventure in the Convention Area during 1955. The cruise is expected to include hydrographic observations in Subarea 4.

Portugal expects to sample the size and age composition of their trawler cod catches in Subarea 4.
Vertebral counts may also be made. Investigation of the parasites of cod will be begun. Hydrographic stations will be occupied and current drift will be investigated by releasing drifters.

Spain has no studies planned specifically for Subarea 4, but as the opportunity arises will study age and size composition of cod and haddock there. A comparison of mesh size in the nets of large trawlers and pair trawlers is also planned.

The Executive Secretary stressed the need for a decision concerning the conversion factors to be used in preparing Commission statistics. He urged that all material possible be obtained before the next annual meeting of the Committee on Research and Statistics.

The meeting recommends to Panel 4 that the Commission biologist-statistician attempt to obtain European statistics of catches from the various subdivisions of Subarea 4 for back years. Statistics obtained should be at least of such a nature that maximum figures for catches can be estimated.

- THE END -

Appendix 1

Canadian Investigations of Subarea 4

Cod and Haddock Stocks

The effect of increased mesh size on yield - by J.E.Paloheimo

Introduction¹⁾

In Subarea 4 the groundfish fishery is supported mainly by two species, cod and haddock. The total landings of those species for both Canada and the United States have been recorded since 1933 and for European countries fishing Subarea 4 since 1953. The European landings during previous years are not known, but they are assumed to be only a small fraction of those of Canada and the United States.

The catches of cod have been relatively stable since 1933, averaging about 120 thousand metric tons but with an increase to 190 thousand metric tons in 1945-46. The landings of haddock were low during the Second World War but reached the pre-war level in 1952, the total catch exceeding 50 thousand metric tons.

In fishing practice there has been a rapid change following the last war. During the previous years fish landed in Canada were mostly caught by hook and line, but in recent years otter trawling has become more and more to the fore.

The conversion to otter trawling has induced some disadvantageous changes in the fish stocks.

The average landings of haddock have increased with increased otter trawling. Simultaneously, the average size caught has declined rapidly and the fishery is becoming more dependent on landings of scrod haddock. At the same time enormous quantities of small baby haddock are discarded at sea as unmarketable fish. Those thrown overboard are dead or dying.

A marked reduction in the average size of cod landed has been observed too in recent years. This is particularly true in the areas where cod has been the mainstay of the fishery. The catch per unit of effort has decreased but at present it is not known how much of this is due to the fishing.

The wastage of small baby haddock, the reduction in the average size landed and the small catch per unit of effort have been of grave concern to Canadian biologists.

On the basis of some preliminary studies, Scientific Advisers to Panel 4 agreed in December, 1954, to recommend increasing the minimum mesh size to $4\frac{1}{2}$ inches. The basis for this recommendation will be given here for further consideration.

Status of the fishery¹⁾

Of the six countries fishing Subarea 4, Canada and the United States take the greatest proportion of the catch. According to Document No.28 of ICNAF's Annual Meeting, 1954, from the total 1953 catch of 269 thousand metric tons, 161 thousand metric tons were landed in Canada, 48 in the United States, 43 in France, and

1) For a more detailed account, see Document No.5 (Appendix 1)

13 and 3 in Portugal and Spain, respectively. European and practically all the United States catches were taken by otter trawlers. European vessels were using a 110 mm. mesh size corresponding to about 4.4 inch mesh. Since the mesh regulation went into effect in 1953 in Subarea 5, United States trawlers have been using a $4\frac{1}{2}$ inch mesh. A great part of Canadian landings were taken mainly inshore by hook and line, 77% of landings of cod and 44% of those of haddock. It is noted that the hook and line inshore fishery for cod is of major importance. In offshore fishing, otter trawling was the dominant fishing method making probably 97% of the total offshore landings.

Sizes of cod and haddock caught²⁾

There is a great fluctuation in the sizes of cod and haddock caught in relation to gear, area and season. During several offshore trips in Subarea 4, sizes of cod and haddock were measured and the quantities discarded at sea were recorded. It was apparent from these trips that in general fishermen tried to avoid schools of small cod and only occasionally large quantities of cod below the marketable size were taken. The selection by fishermen is probably comparable with that of a $4\frac{1}{2}$ inch mesh. The Gulf of St. Lawrence region is, however, an exception. According to the report of the Marine Biological Laboratory of Grand River, Quebec, large numbers of cod are discarded at sea; by numbers, approximately 25% of the total.

In contrast to cod, large quantities of haddock are discarded at sea during summer, fall and winter seasons. Later in winter and in spring the wastage of haddock is almost negligible. In Figure 1, the average length distribution of haddock as observed at sea is plotted against the distribution of wharf samples for months May-October (1951-53). In Figure 2, the corresponding graphs are given for the months February-April. It is apparent that few fish are taken below 30 cm. but they are fully recruited to the fishery around 38 cm. This coincided closely to the 100% selection points of present meshes of from $2\frac{1}{2}$ to $3\frac{1}{4}$ inches.

Mesh Selection²⁾

Several experimental trips directed by Dr. F. D. McCracken, in addition to the experiments conducted elsewhere, have established the selective properties of different mesh sizes. The selection is related closely to the length of fish and is almost the same for cod and haddock. From the results, the selection curves as they appear in Figure 3 are approximated for purpose of calculation by replacing the slightly sigmoid-shaped curve by a straight line. From the experimentally established selection curves for $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$ and $5\frac{1}{2}$ inch meshes, the selection of $6\frac{1}{2}$ and $7\frac{1}{2}$ inch meshes have been extrapolated. Until further mesh experiments are conducted, let it be emphasized that these meshes refer to mesh sizes having the selection as indicated in Figure 3.

In the following sections the relative yield for different mesh sizes for given recruitment is calculated in detail for representative cod and haddock stocks. The effect of an advance from $2\frac{1}{2}$ inch to $4\frac{1}{2}$ inch mesh is also estimated for other important populations in Subarea 4.

Growth Rates

Growth rates as they are used in further calculations are given in Figures 4 and 5 for Banquereau and LaHave haddock populations and for the Gulf of St. Lawrence cod populations. Observations

2) For a more detailed account, see Document No. 5 (Appendix 2)

were not available for ages 2-4 for Gulf of St. Lawrence cod. The values given in Figure 5 are therefore extrapolated. The same is true for haddock populations for ages 2-4 and as well for some older ages (Banquereau 13-14, LaHave 10-15).

Mortalities

In order to determine total mortalities, the Atlantic Biological Station has taken samples from different areas in Subarea 4 for length distribution and for age composition. It is realized that the number of different stocks and the large area involved have made some restriction to the available data. However, using the length distribution, together with the length distribution of different age groups, the data enabled us to estimate total mortalities for the main stocks in Subarea 4. In Figures 6-8 the length distributions of Banquereau haddock, LaHave haddock and Gulf of St. Lawrence cod populations are plotted against the theoretical length distributions for given mortalities. The theoretical length distribution is obtained by smoothing the observed length distributions of age groups and by adding them, using an appropriate total mortality, i.e. the mortality which gives the best fit of the theoretical length distribution, to the observed one. The method amounts to the same thing as weighting the individual age measurements according to the sample size in the corresponding length groups.

From the studies undertaken (Figures 6-8) it is apparent that the total mortality can be taken as constant (per year) for the ages and length ranges considered. For the older ages, not within the range of accurate sampling, a linearly increasing natural mortality is assumed up to a maximum age beyond which no fish survives. After establishing the total mortality for the populations in question, the problem of separating the two components, fishing and natural mortality, must be considered.

Only little is known about the magnitude of natural mortality of haddock. The tagging program carried out off western Nova Scotia (off Lockeport) indicated that the natural mortality might be as high as 20% per year. However, the high tagging mortality is believed to have affected the haddock taggings and the 20% is to be considered as a maximum.

The cod taggings indicated very low natural mortality and high fishing mortality. Even if the non-random sampling might have been present, it is apparent that a high proportion of the total mortality is due to fishing.

In the Gulf of St. Lawrence, dragging has been a recent development. Before 1950, very few otter trawlers were used but in recent years a number of new draggers have been introduced to the fishery. We do not know whether the total effort has changed or not. However, by comparing the average length distribution of the cod for the years 1948-49 against that for the years 1950-53 (Figure 8) it can be seen that there is a difference of 15% in the total mortalities; the mortality for the period 1948-49 being 15% and for the period 1950-53 being 30%. It may well be that the difference is attributable to the higher fishing pressure.

Optimum mesh size

Using the established selection curves of the different mesh sizes, growth curves and estimated natural and fishing mortalities the relative total and landed yields have been calculated. These yields of Gulf of St. Lawrence cod and Banquereau haddock are based on a recruitment of 10,000 fish at 30 cm. and a cull size of

41 cm. for landed fish, assuming the present level of fishing intensity.

Haddock

For Banquereau haddock it was assumed that the natural mortality was 15% for all ages. No maximum age was considered since because of the high total mortality the contribution of older ages was almost negligible. The relative yields are given in Figure 9.

It is obvious from Figure 9 that the production of fish from Banquereau can be established at a considerably higher level than at present; the optimum mesh size being $5\frac{1}{2}$ inches.

By advancing the present $2\frac{1}{2}$ inch mesh to a $4\frac{1}{2}$ inch mesh, an increase of 40% in landings can be expected. A further advance to a $5\frac{1}{2}$ inch mesh would result in a total increase of 60% from the present level of landings.

Cod

For Gulf of St. Lawrence cod we have assumed a natural mortality of 10% for ages 2-15 and beyond the age of 15 years a linearly increasing natural mortality up to a maximum age of 20 years. The total and landed relative yields are given in Figure 10 for 30% total mortality. The optimum mesh size for cod in the Gulf of St. Lawrence is $6\frac{1}{2}$ inch, about one inch larger than that estimated for the Banquereau haddock population. An increase of 47% can be expected from the present landing with a cull at 41 cm. if optimum mesh size is adopted. An advance to a $4\frac{1}{2}$ inch mesh would result in an increase of 30%.

The effect of a $4\frac{1}{2}$ inch mesh

In accordance with the policy as laid down by Panel 5, no major change in mesh size is advisable and only an initial step toward the optimum mesh size should be taken. It is realized that before a recommendation of an increase of three or four inches in mesh size can be considered, additional investigations have to be completed; population dynamics studies assuming an equilibrium stage may not be adequate to explain the effect of any major change.

A smaller advance from $2\frac{1}{2}$ inch to $4\frac{1}{2}$ inch mesh has therefore been considered and further studies have been carried out to estimate the effect of such a change.

Haddock

An increase of 40% in landings has been estimated for Banquereau using 15% natural mortality. The natural mortality was considered not to exceed 15% but even with a natural mortality as high as 20% an increase of 30% in landings will result from the change in mesh size, with the present cull at 41 cm. The fish caught on LaHave and Roseway Banks (off Lockeport) are partly taken by hook and line and partly by otter trawlers. Only line fishing data were available but because a great wastage of haddock is believed to take place on LaHave Bank the effect of the proposed mesh size in contrast to the $2\frac{1}{2}$ inch mesh is calculated. Thus, an increase of 24% is estimated for landings of haddock now exploited by a $2\frac{1}{2}$ inch mesh, assuming 15% natural mortality and 35% total mortality.

The lack of statistics has restricted accurate calculations for these stocks. However, studies of the growth curves convince us

that the situation is similar to those mentioned above in all haddock populations of Subarea 4.

Cod

In the Gulf of St. Lawrence, large quantities of small unmarketable cod are discarded at sea. From the proportion of Gulf population fished by a 2½ inch mesh, a benefit of 30% greater than the present one is expected with a 4½ inch mesh, assuming 10% natural mortality. Even if the natural mortality is as high as 15%, the increase would still amount to 18%. Apart from the Gulf of St. Lawrence area, a 4½ inch mesh will have a negligible effect on present landings of cod. There is some indication that an even bigger mesh than 4½ inches will be required to protect the cod fishery.

Discussion

The above calculations are based on the assumption that all fish landed from Subarea 4 are taken by a 2½ inch mesh. However, at present a high proportion of landings is already taken by large mesh nets (approximately 4½ inches). This has been particularly true since the summer of 1953 when the United States trawlers changed to a 4½ inch mesh. This advance will bring about an increase in the total yield in Subarea 4. Further increase is to be expected if all countries fishing Subarea 4 will adopt a mesh of 4½ inches.

The landings in 1954 were not known when writing this report. However, if we assume the distribution of landings as it was in 1953, according to the ICNAF Statistics (Document No. 28, 1954), it can be said that from the total haddock landings of 45 thousand metric tons, 20 thousand were taken by a 110 mm. (4.4 inch) or 4½ inch mesh, 11 thousand by hook and line and 14 thousand by 2½-3½ inch mesh. From 14 thousand metric tons, probably 8 thousand were taken during the summer, fall and winter seasons and in the areas where the wastage is likely to take place. If we estimate an increase of 30% for those landings, an overall increase of 5% would result above the increase to be expected when the United States otter trawl fleet changed to a 4½ inch mesh size. The total landings of cod will not be appreciably affected by the proposed increase in mesh size. More substantial gain can, however, be expected by an increase in mesh size beyond a 4½ inch mesh.

No significant initial decrease in landings is expected to result from increased mesh size if the cull remains high and recruitment is normal. If the year of change in mesh size happens to coincide with the year when the fishery is supported by a strong young year class, the initial effect would be more severe. However, it is not likely that this would occur simultaneously on all banks.

Measuring the effectiveness of the regulation

Since Subarea 4 consists of several cod and haddock stocks, each of which has quite a different pattern of growth and size composition and since there is some intermigration in the form of seasonal movements, the management of Subarea 4 is very complicated. The test of effectiveness, if the proposed mesh regulation is accepted, will be considered by calculating the index of abundance for back years, if possible, but it is probable that the only reliable test will come from Subarea 5.

--ooOoo--

Figure 1
Average length frequency of haddock caught and landed from Subarea 4 by Nova Scotian trawlers during the 2nd, and 3rd, quarters of the year

Banquereau, Middle Ground, Sable Island - 1951-53

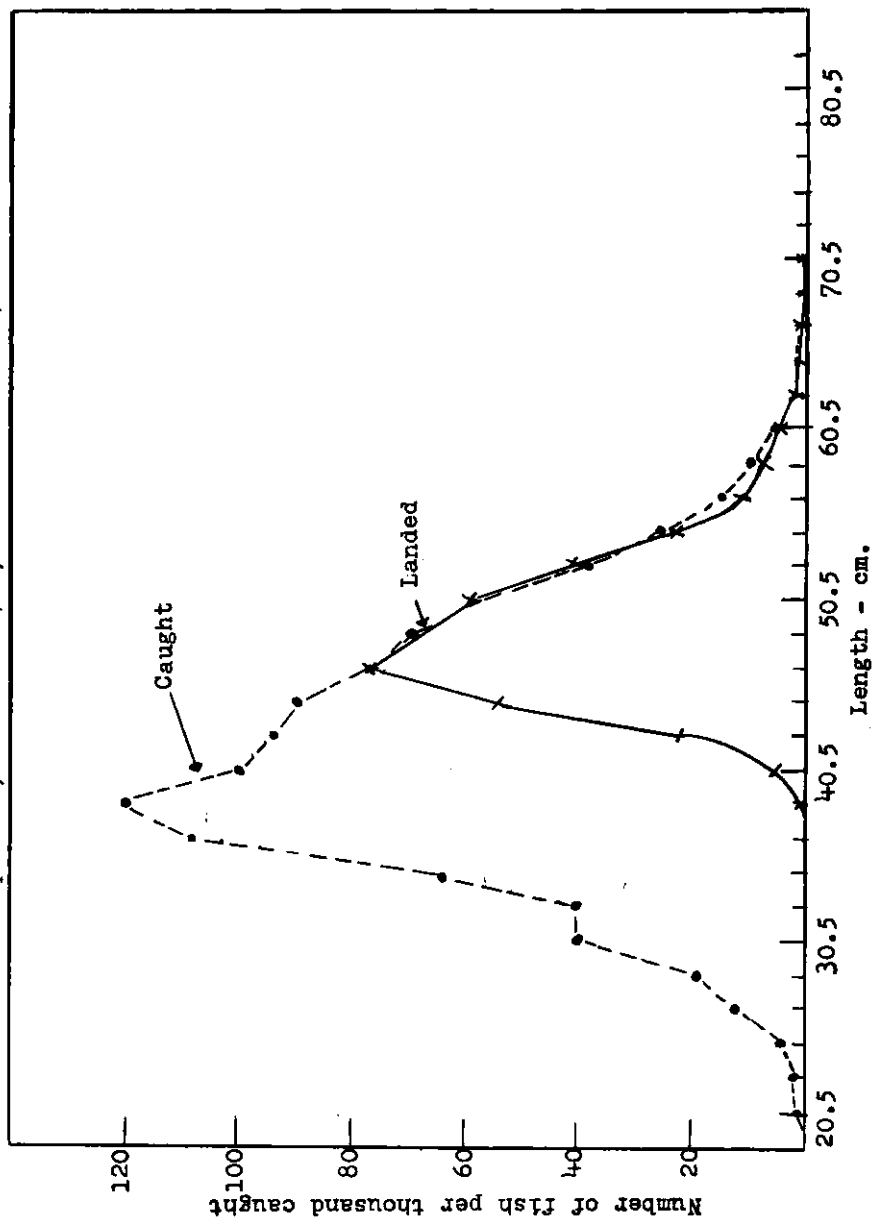


Figure 2
Average length frequency of haddock caught and landed from Subarea 4 by Nova Scotian trawlers during the 1st quarter of the year Western Bank, 1951-53

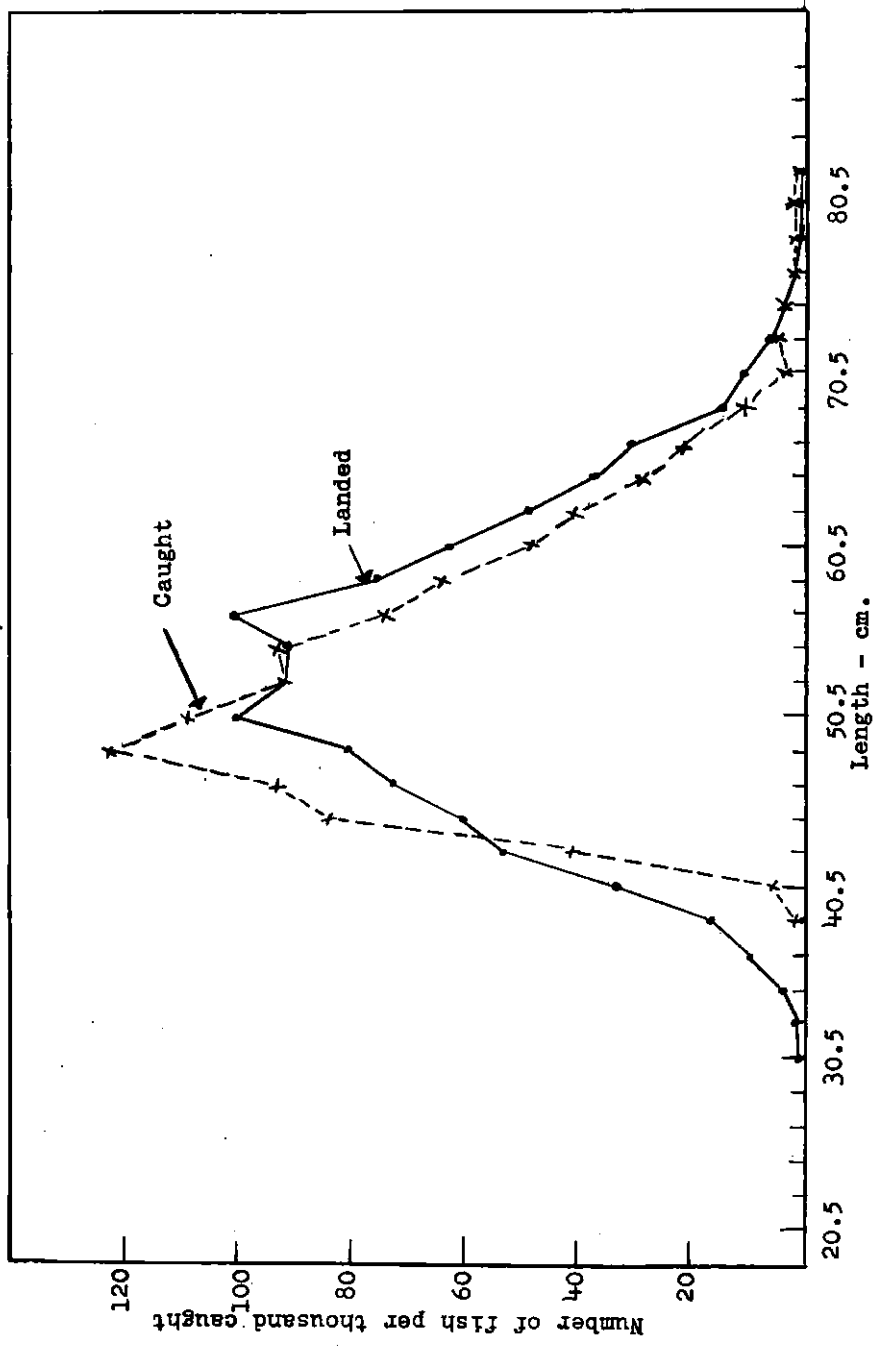


Figure 3

Diagrammatic presentation of mesh selection in relation to natural and total mortality

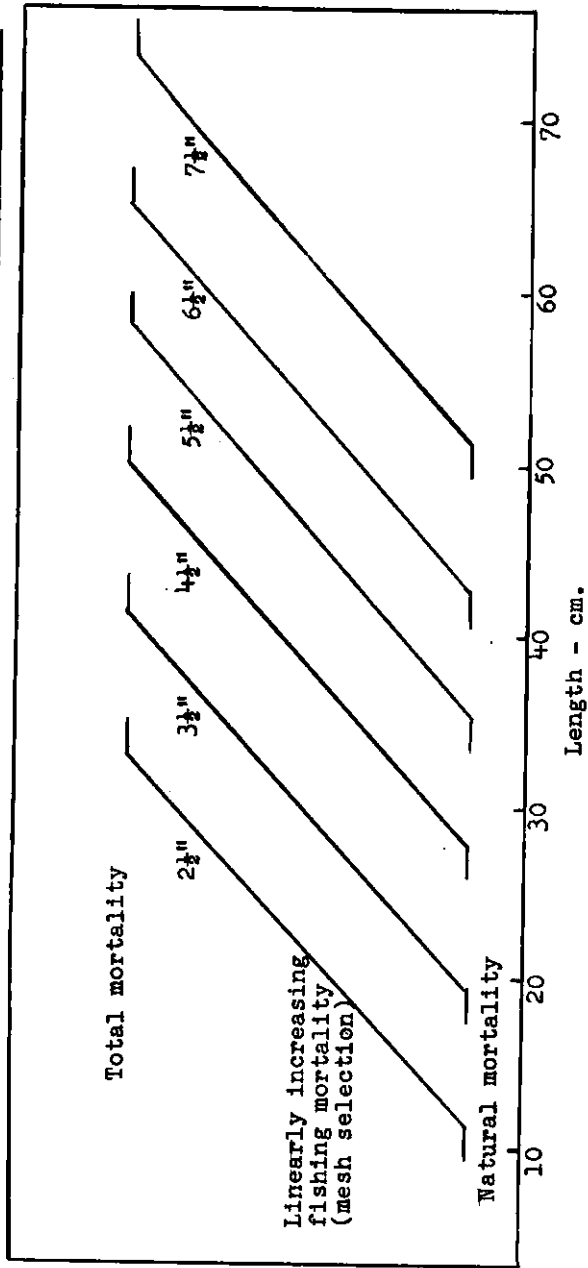


Figure 4

Haddock Growth Rates

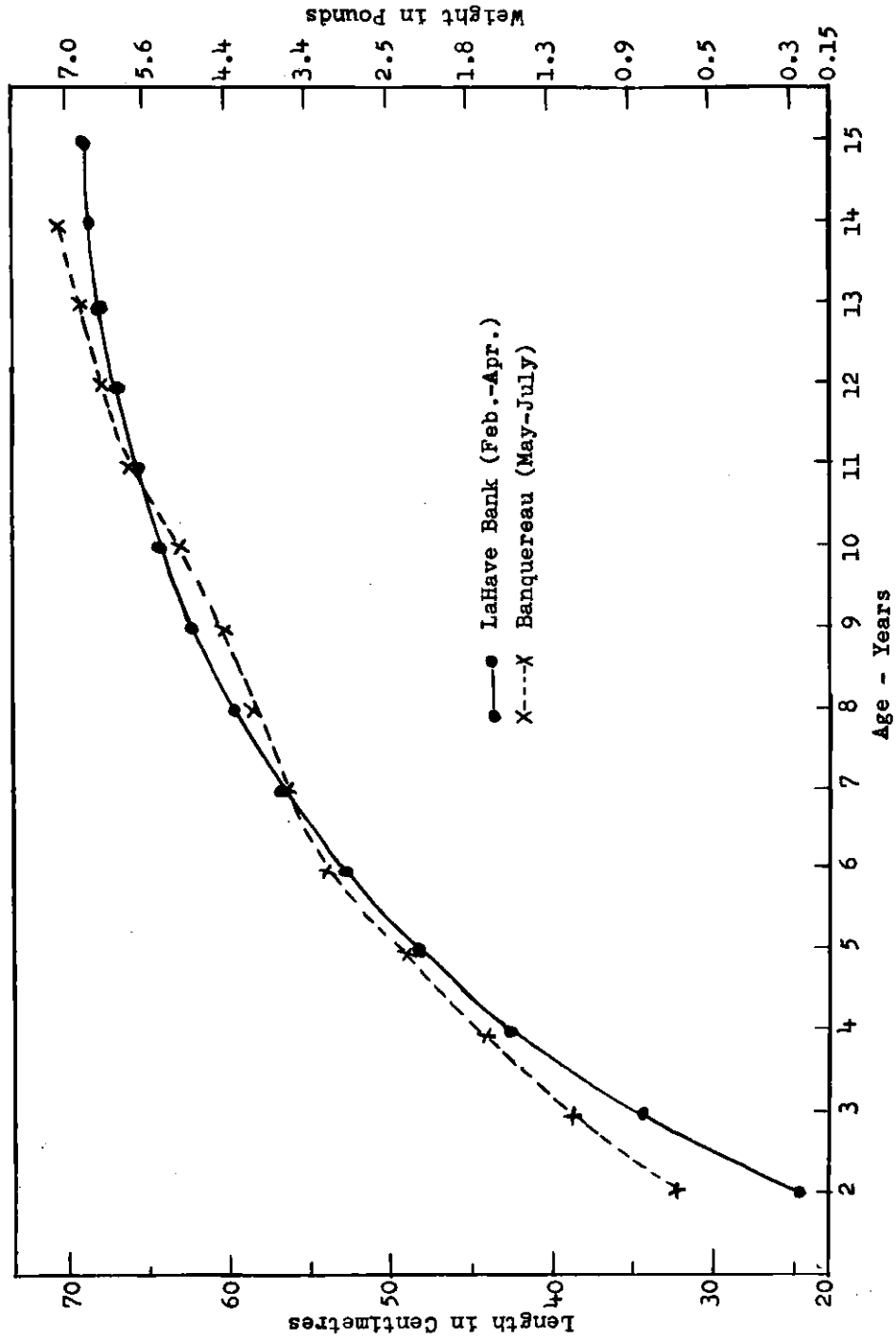


Figure 5

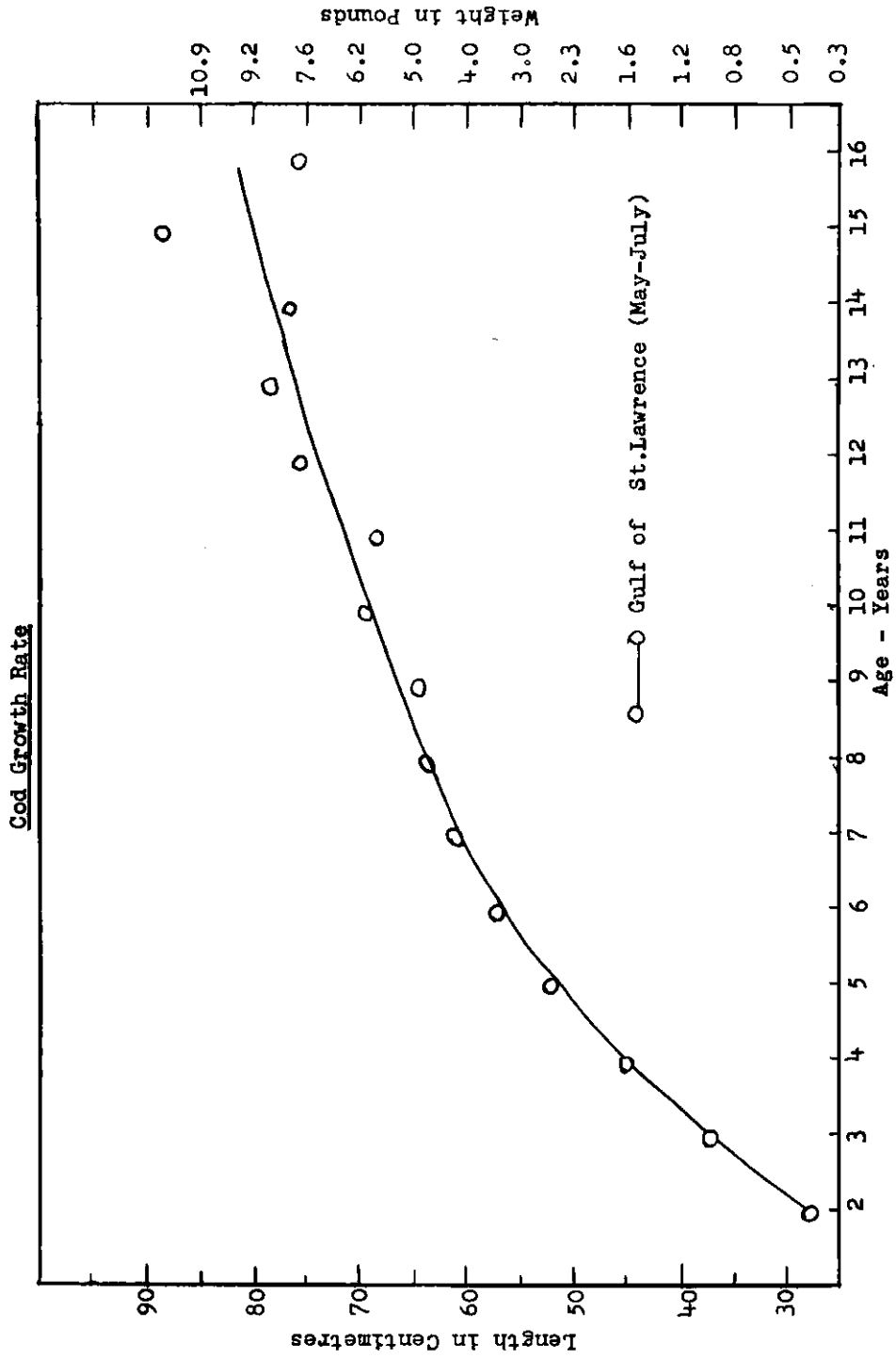


Figure 6
Relation between average length distribution of other trawler landings and the theoretical length distribution assuming 40% total mortality

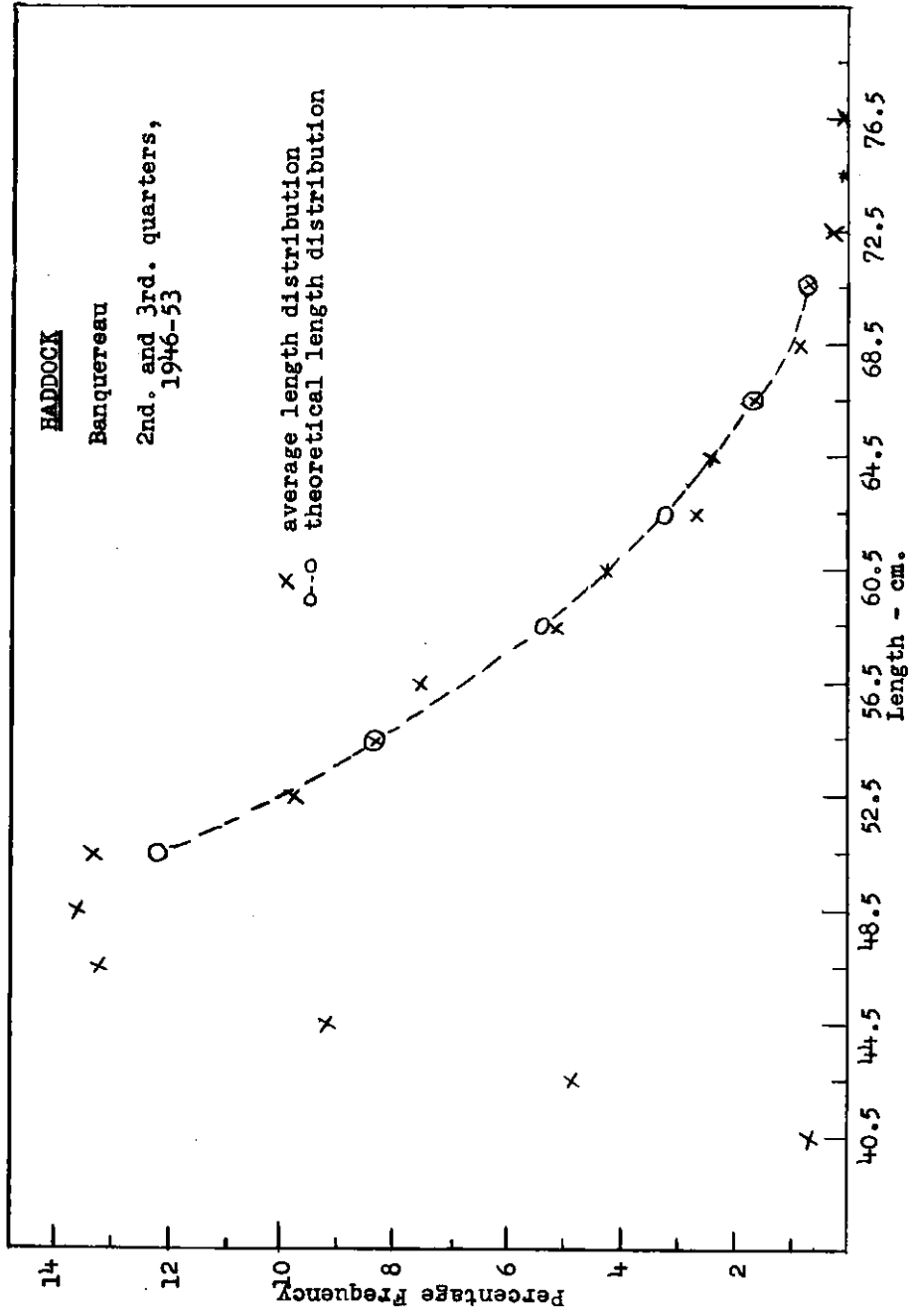


Figure 7 Relation between average length distribution of hook and line landings and the theoretical length distribution assuming 32% total mortality

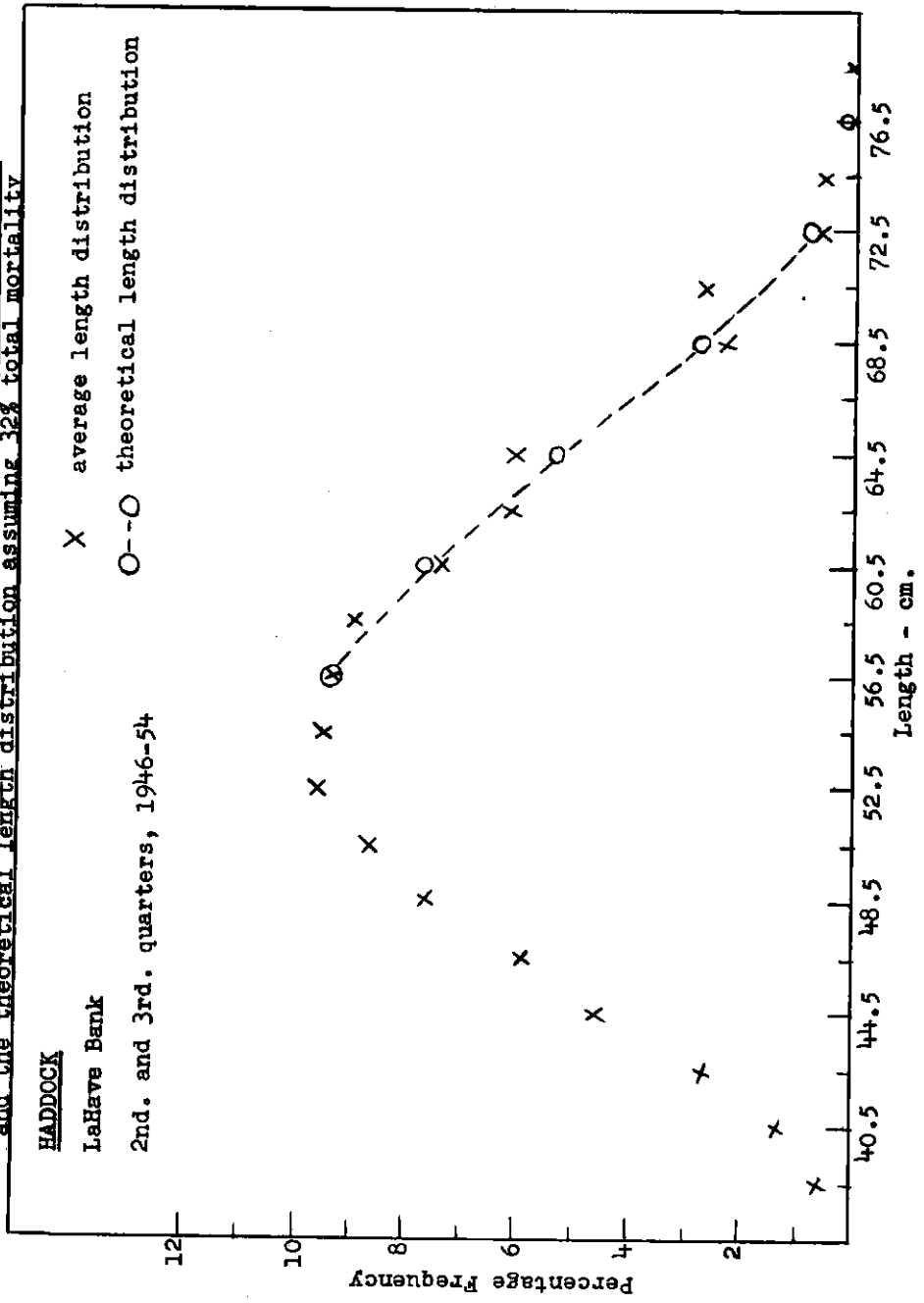


Figure 8

Relation of average length distribution of other trawler landings during 1948-49 and 1950-53 to theoretical length distributions assuming 15% and 30% total mortality

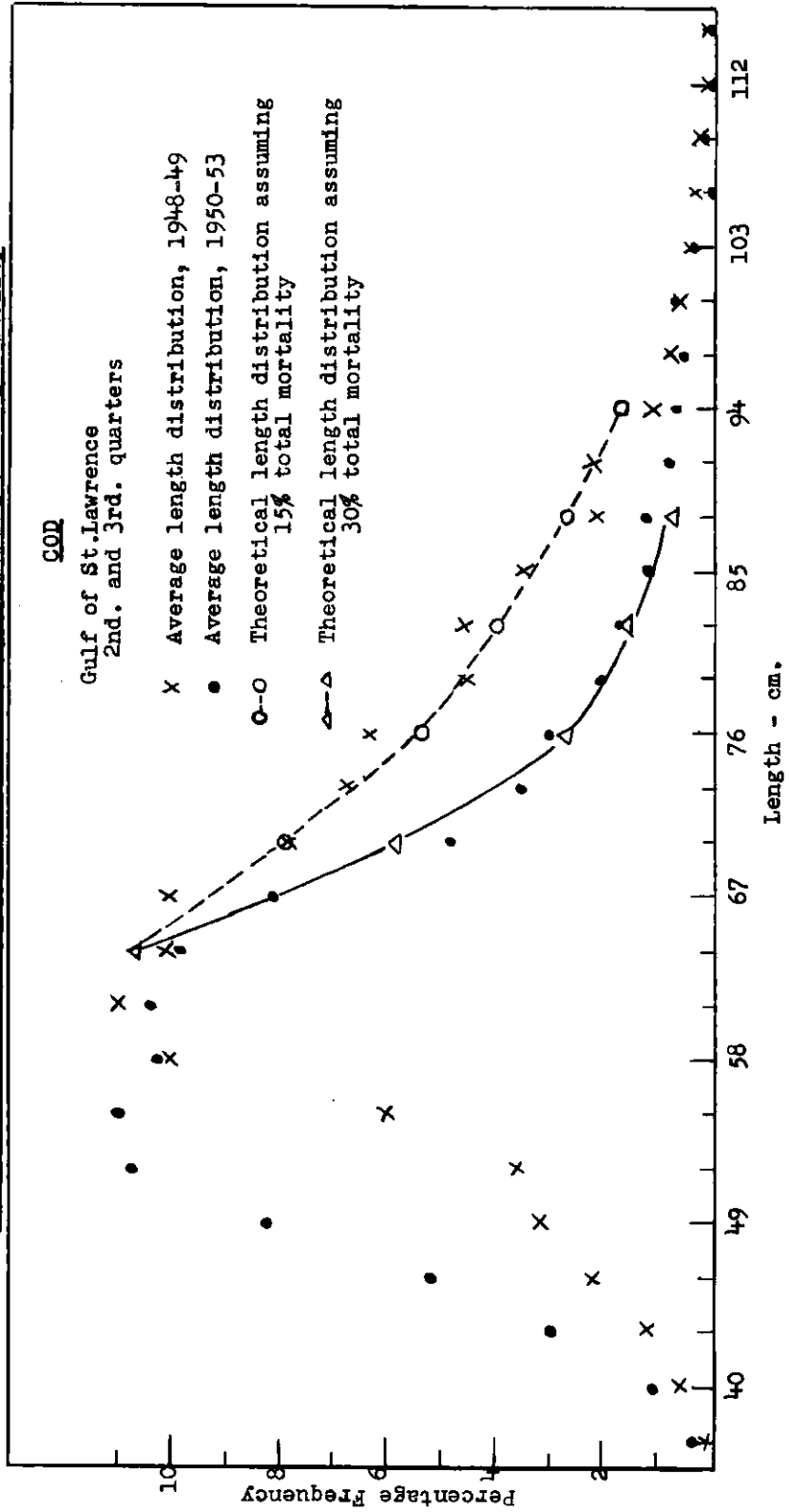


Figure 9
Relation of total and landed yield to mesh size

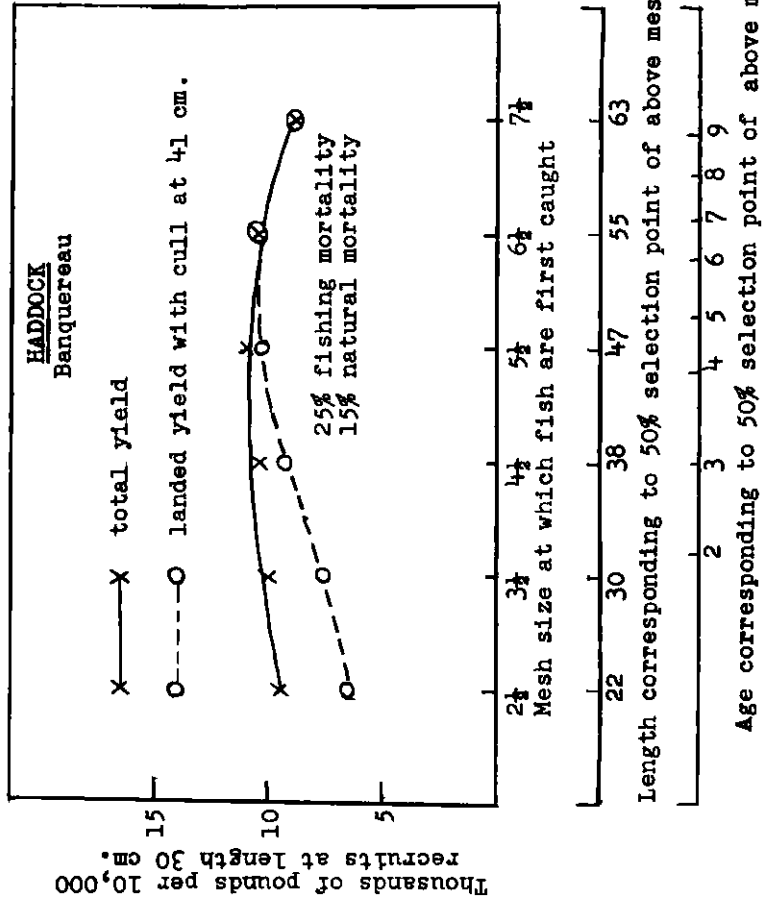
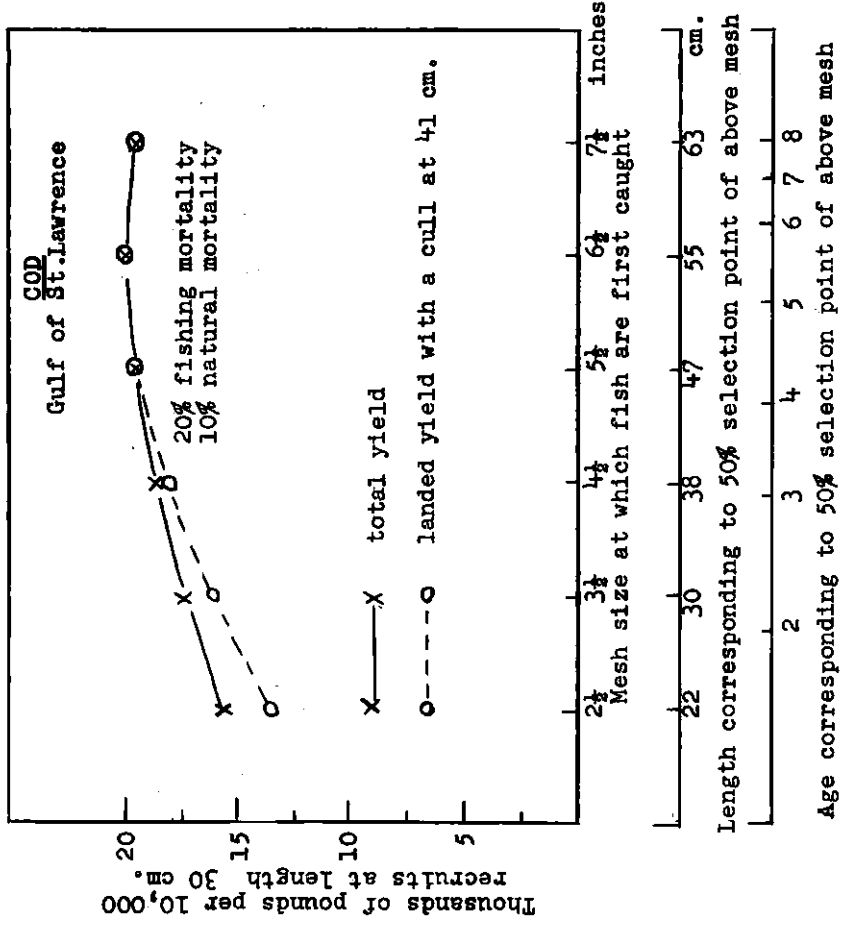


Figure 10

Relation of total and landed yield to mesh size



Interim Report on Otter-Trawl Mesh Sizes

Used by Countries Fishing Subarea 4

In the development of a mesh regulation for Subarea 5, it was concluded by the Scientific Advisers that the internal diameter of the mesh when wet after use was the only measure which could be effectively compared. This measure eliminates many of the problems arising when attempts are made to equate between different materials, size of twine, methods of manufacture, etc. A standard gauge and method of measurement was specified and described for use in Subarea 5.

Various statements have been made about the mesh sizes used by the countries fishing in Subarea 4. Considerable confusion exists as to exactly what is being used in terms of inside knot, used wet measure. This report outlines briefly what is known about those mesh sizes. It attempts to provide a basis by which more precise information can be obtained for the Meeting of Advisers to Panel 4 in June, 1955.

The following statements summarize what was reported to this meeting, about mesh sizes used, by nationals of the countries fishing Subarea 4. For the present only statements about the cod-end meshes are referred to.

Canada

Otter-trawlers fishing for cod and haddock use mesh sizes ranging from $2\frac{1}{2}$ inches to $4\frac{1}{2}$ inches as measured inside knots used and wet. Measurements are made with the gauge specified for the Subarea 5 regulation. Cod-ends purchased new range from $3\frac{1}{2}$ inches to 6 inches between knot centres dry measurement and vary in twine size from 100 yard 3 ply manila to 50 yard 4 ply manila.

France

Otter-trawlers use cod-ends of 140 mm. new dry measure and 114 mm. wet, used. The method of measurement was not defined.

Portugal

Otter-trawlers use cod-ends of 120 mm. mesh after use. The method of measurement was not defined.

Spain

Cod-ends are ordered with a mesh size of 130 mm. Measurements on the net of one Spanish trawler showed meshes of 127 mm. inside diameter new and 115 mm. inside knots used and wet. Measurements were made with a Scottish-type spring gauge.

United States

The cod-ends purchased average $5\frac{1}{2}$ inches between knot centres, new and are of 50 yard 4 ply double twine. They average $4\frac{1}{2}$ inches inside knots, used and wet measured with the gauge specified for the Subarea 5 mesh regulation. Measurements are made along the central portion of the top of the cod-end for all meshes in one row extending the length of the cod-end.

From the above information, it is impossible to establish a standardized measurement of the inside diameter of the used wet mesh now being used by a number of countries fishing Subarea 4.

In order to make a more accurate appraisal of the size of mesh now being used in Subarea 4, more specific information is needed.

It is recommended that each country fishing Subarea 4 submit specific information according to a prescribed form which is attached. A single form should be used for each trawler whose net is measured. For the present only, the meshes of the cod-end are considered since (a) these are likely to be the smallest and therefore the critical ones (b) by reducing the requirements to a minimum, some success may be attained by the June meeting.

It is also suggested that the Commission Secretariat be requested to assist whenever possible in collecting this information.

--ooOoo--

Draft Mesh Regulation for Subarea 4

The Scientific Advisers recommend that Panel 4 adopt the following proposal with a view to its submission to the Commission:

I. That the Contracting Governments take appropriate action to prohibit (except as provided in paragraphs II and IV hereof) the taking of cod, Gadus callarias, and haddock, Melanogrammus aeglefinus, in Subarea 4 by persons under their jurisdiction with trawl nets having a mesh size less than four and one-half inches* when measured wet after use, or less than the equivalent thereof when measured dry before use. For the purposes of this proposal, the four and one-half inch mesh size when measured wet after use shall be taken to be:

a. In the cod-end of the net, the average of the measurements of any fifty consecutive meshes running parallel to the long axis of the cod end, beginning at the after end of the cod-end, and being at least ten meshes from the lacings, or, if the cod-end contains less than fifty meshes, the average of the measurements of the meshes in any series of consecutive meshes running the full length of the cod-end, parallel to the long axis of the cod-end and at least ten meshes from the lacings, such measurements to be made with a flat, wedge-shaped gauge having a taper of two inches in eight inches and a thickness of three thirty-seconds of an inch, inserted into the meshes under a pressure of not less than ten nor more than fifteen pounds, and;

b. In any part of the net other than the cod-end, the average of the measurements of the meshes in any series of twenty consecutive meshes, such series to be at least ten meshes from the lacings, and such measurements to be made with a flat, wedge-shaped gauge having a taper of two inches in eight inches and a thickness of three thirty-seconds of an inch, inserted into the meshes under a pressure of not less than ten nor more than fifteen pounds.

II. That in order to avoid impairment of fisheries conducted primarily for other species which take small quantities of cod and haddock incidentally, the Contracting Governments permit persons under their jurisdictions to take cod and haddock with trawl nets having a mesh size less than that proposed in the preceding paragraph so long as such persons do not have in possession on board a vessel engaged in fishing primarily for other species, cod or haddock, respectively, in amounts in excess of 5,000 pounds or ten per cent by weight of all the fish on board such vessel, whichever is larger.

III. That the Contracting Governments prohibit the use by any person to whom this proposal would apply of any means or device, other than those described in paragraph IV, which would obstruct the meshes of the trawl net or which would otherwise, in effect, diminish the size of the meshes of the trawl net.

IV. That the Contracting Governments permit (1) any canvas, netting, or other material to be attached to the underside only of the cod-end of a trawl net to reduce and prevent damage and (2) a rectangular piece of netting to be attached to the upper side of the cod-end of the trawl net to reduce and prevent damage so long as such netting conforms to the following conditions.

* four and one-half inches throughout this proposal represents a mesh size approximating four and one-half inches - as stated in the report.

(a) The netting shall not have a mesh size less than four and one-half inches when measured wet after use, or less than the equivalent thereof when measured dry before use. For the purposes of this subparagraph, the four and one-half inch mesh size when measured wet after use shall be taken to be the average of the measurements of twenty consecutive meshes in a series across the netting, such measurements to be made with a like gauge inserted into the meshes as specified in paragraph I hereof.

(b) The netting may be fastened to the cod-end along its forward and lateral edges and at no other place in the netting; shall not exceed six feet in length measured parallel to the long axis of the cod-end; and shall not extend more than five feet aft of the splitting strap.

(c) The width of the area of the cod-end covered by the netting shall not exceed two-thirds of the width of the netting, such widths to be measured at right angles to the long axis of the cod-end.

--0000--

