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Experimental fishing during the winter and spring seasons in the fishing areas southwest of Newfoundland and on the Scotian Shelf during the years 1961-1964

By E. Biester and P. Draffehn

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Experimental Fishing during the Winter and Spring Seasons in the Fishing Areas South-West of Newfoundland and at the Nova Scotia Shelf during the years 1961 - 1964.

By Dr. E. Biester and Diploma-Biologist P. Draffehn.

A total of 11 search and discovery voyages to the banks of Southern Newfoundland and to the shelf of Nova Scotia have been performed, the voyages undertaken mainly during the 1st and 4th quarters of the year. The best hauls were made at the St. Pierre Bank, at the Burgeo Bank, and at the South edge of the Grand Newfoundland Bank as well as at the Nova Scotia Shelf between the Banquereau Bank and Cape Breton. Main object was cod which forms winter and pre-spawning concentrations at the beginning of the year on said large banks, and ~~Norway haddock~~ redfish (red or rosefish). ~~Norway haddock~~ Redfish seldom exceeds 30 centimeters (12") in length, and remained below normal market size for this reason. The cod from the St. Pierre and the Burgeo Banks had a high percentage of big fish suitable for fillet, the cod from the Banquereau Bank reaching lengths of 50 to 75 centimeters (20" to 30") also. In contrast, the cod East of Cape Breton showed a noticeable decline in length, and was around the lower fillet limit with its 40 to 50 centimeters (16" to 20") length in the average.

The Europeans have been making use, for quite a long time, of the fishing areas in the South-West of Newfoundland and at the Eastern Nova Scotia Shelf. In the beginning, mainly the Spanish, the French, and the Portuguese were participating in the exploitation of these fishing areas besides Canada and the U.S.A. as countries next to these areas. Since the beginning of the sixties, the Soviet Union belongs to those nations fishing round the year in these areas.

The area covered by our investigations corresponds, according to the I.C.N.E.F. statistics, to the sub-areas 3 O, 3 P, 4 V and 4 W (see fig. 1).

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See translator's note on page 51

Translated from: "Fischerei Forschung" Wissenschaftliche Schriftenreihe 4 (1966) 1, pages 69 - 86. (East Germany)

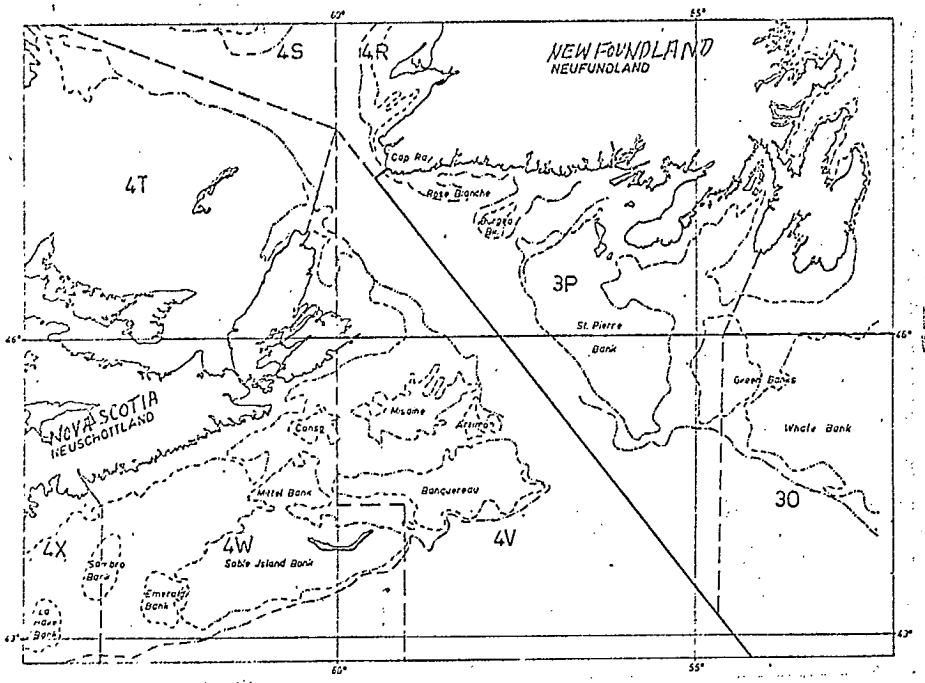


Fig. 1

Chart of the fishing areas South of Newfoundland and of the Eastern Nova Scotia Shelf.

Disregarding some variations, the yearly hauls in the above mentioned areas represented around 15% of the total landings from all of the ICNAF areas. Thereby the main portion consisted of the basic kinds of fish which are cod, haddock, ~~codfish~~ and ~~Norway haddock~~, and during the last few years of an increasing proportion of hake which was hauled preferably by the Sowiet Union in the area of the Nova Scotia Shelf.

Table 1 Comparison of the landed quantities from the sub-areas 30, 3P, 4V, and 4W, against the total of the landed quantities from all of the ICNAF areas, from 1953-1963, with an indication of the corresponding proportions of basic fish kinds (in 1,000 tons).

	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
ICNAF total landings	1206	1844	1777	1898	1979	1998	2144	2279	2400	2604	2783
share basic fish kinds	1043	1248	1213	1248	1287	1344	1471	1581	1709	1665	1652
from 30, 3P, 4V, 4W	88	279	318	276	296	234	316	339	422	372 /	480
% of the total landings	7,3	15,1	17,9	14,5	15,0	11,7	14,7	14,9	17,6	14,3	17,2
share basic fish kinds	75	239	270	235	244	193	257	287	367	294	243

The ICNAF statistics show that the largest landed quantities come from the areas 3 O, 4 V, and 4 W, during the first half of the year (see fig. 2).

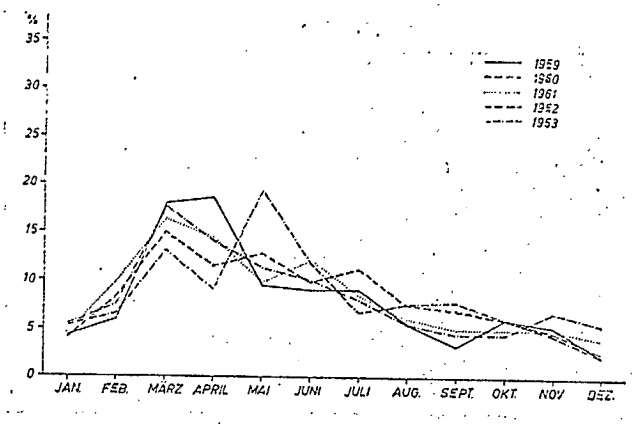


Fig. 2 Monthly proportion in % of the yearly quantities of the whole of the areas 3 O, 3 P, 4 V, and 4 W (basic fish kinds) for the years 1959 to 1963.

The high quantities in these areas are partially based on the winter and spring hauls at the outer banks, and partially on the abundance of the summer hauls of the Canadians at the banks close to the coast, within the fishing boundaries.

The considerable increase of the hauls since 1953, and the necessity to find new fishing areas for the modern long distance fishing fleets were a stimulation for a number of countries to undertake research voyages and to search for fishing areas in the South-West of Newfoundland. Therefore, the Soviet Union, France, England, and Western Germany performed relevant investigations during the first half of the year which time is most opportune in respect of fishing conditions.

During the time from 1961 to 1964, the institute for deep sea fishery in Rostock-Marienehe performed, on behalf of the DDR, four voyages to the banks south of Newfoundland and to the shelf of Nova Scotia, and prepared, and took care of additional search voyages to these areas of vessels of the V.E.B. Fishing Organization Rostock.

Table 2 gives a survey of these trips (working time in the search area, worked areas) of the participating vessels, and of the responsible scientists aboard.

Table 2 Compilation of the search voyages to the areas south of Newfoundland and Nova Scotia of vessels of the DDR.

Trip	Duration	Fishing Areas	Boat	Skipper	Guided by
1	16.3. - 6.4.1961	3O, 3P, 3V	"Hennigsdorf"	Westendorf	---
2	19.9. -21.10.1961	3N, 3O, 3P	"Brandenburg"	Warnack	J. Voss [1] [2]
3	5.3. - 4. 4.1962	3P, 4R, 4V, 4W	FFS"Eisenach"	Berndt	Dr.E.Bester
4	10.12.'62-3.1.'63	3N, 3O, 3P, 4V, 4W	"Gotha"	Klück	---
5	5. 1. - 20.1.'63	3P, 4W	"Leipzig"	Krohnke	J. Voss [1]
6	21. 2. - 8.4.'63	3O, 3P, 4V	FFS"Eisenach"	Störtebecker	Dr.W.Ranke
7	24. 4. - 25.6.'63	4X, 5Y, 5Z	FFS"Eisenach"	Berndt	U. Falk [2]
8	17. 1. - 10.2.'64	3O, 3P, 4V	"J.R. Becher"	Schütt	---
9	29. 2. - 21.3.'64	3O, 3P, 4V, 4W	FFFS"Haeckel"	Hoppe	Dr.W.Ranke
10	16. 9. - 12.10!64	3P, 4V, 4W, 4X, 5Z	"Cottbus"	Berndt	---
11	11.10. - 11.11!64	3P, 4V, 4W	"B.Kellermann"	Carlsburg	---

Diploma Biologist Draffehn participated as partner in the trips No 6 & 9

1) Diploma Fish Specialist

2) Diploma Biologist

The authors wish to express their special appreciation to the skippers of those boats of the VEB Fishery Organization, Rostock, who made available the relevant information of their logs in cases where no members of the institute had been aboard.

The first voyage in 1961, was a straight discovery voyage in the interest of fishery while sampling was started during the second trip. The fourth and fifth voyages were guided by the authors aboard the carrier and factory ship "Martin Andersen-Nexö". The trip of the trawling and factory ship"J.R. Becher"as well as the tenth and eleventh voyages were executed as search trips of the Fishery Organization.

The purpose of the four voyages of the fishery research ships "Eisenach" and "E. Haeckel" into the areas south-west of Newfoundland was stock taking and seeking of fish in these fishing areas.

Coursesof the voyages

1st Voyage, March 16, to April 4, 1961

For the voyage of ROS 210 "Hennigsdorf" under Skipper Westendorf, to the area of the banks South of Newfoundland, the Fishery Organization Rostack had established the task to make relevant investigations for the intended work of the carrier and factory ship "Martin Andersen-Nexö" and her trawlers. Furthermore, the possiblity of producing salted fillet was to be investigated.

According to the given instruction, one was particularly interested in large cod yielding fillets of at least 700 grams each. Therefore, the fishing area was abandoned quickly if the hauls included large quantities of small fish.

The course of the voyage is shown in fig. 3.

Fishing was mainly done at the south-western edge of the Grand Newfoundland Bank and at the Banquereau Bank because of the frequent occurrence of big cod in these areas. At the Green Banks, at the St. Pierre Bank, and West of Cape Ray, only few hauls were made because the fish was too small despite satisfying quantities.

The total number of hauls was 73. From a total trawling time of 154

hours results a duration of 2 hours and 10 minutes for each trawling turn. The average yield of the trip was about 9.2 baskets/trawling hour. However, it is to be noted that this information concerns the cod only which is suitable as fillet. The average increases to 10.5 or 11 baskets/ trawling hour if the proportion of other kinds of fish is included, as far as can be seen from the log.

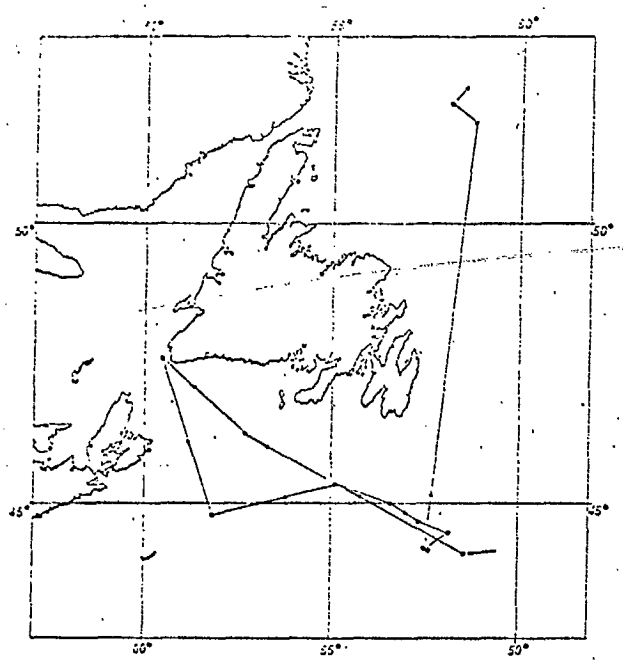


Fig. 3 Course of the voyage of the "Hennigsdorf" on her trip to Southern Newfoundland from March 16, to April 6, 1961

Nine net damages occured during the 73 hauls, as mentioned above, when trawling at the Banks South of Newfoundland which corresponds to a frequency of 8%.

Fishing had been started on March 16, 17, at the position 44° 10'N 51° 33'W at the south-western edge of the Grand Bank. 13 hauls were made in a depth of 70 to 80 meters, resulting in an average landing of 10 baskets/trawling hour. The best haul was about 16 baskets/trawling hour.

The yield consisted mostly of large cod of excellent quality up to average lengths of 100 to 130 centimeters (40" to 52"), and of 5 kilograms of fillet per fish.

Each haul included 4 to 10 pieces of halibut also. At this position, the gross haul was about 10 to 16 tons per day.

After trawling for a while at the banks further West, the"Hennigsdorf" came back to the same fishing area, at the end of the voyage, from April 2nd, to April 5th. The hauls increased in comparison to those of the previous month, and the best haul was done in April with 22 baskets/trawling hour. This reinforced the statements of the Spanish fishermen who say that the fishing season at this part of the Grand Bank starts normally during the first half of May.

During the 35 hauls done at this place, only five cases of light net damage occured (14%). The sea bottom consisted of solid sand ground of even profile and proved to be very opportune.

Whale Bank

Further West, till to the Whale Bank, only a few single hauls were made in a depth of 80 to 90 meters, however, they didn't yield results worth to be mentioned. Trial hauls at this fishing place done at the beginning of April showed that quantity and size of the cod increased toward East.

Green Banks

Two trawl hauls were performed at the Green Banks in a depth of 80 to 120 meters on March 26th. Only feed fish (lumpsucker), clams (shells), and crabs were cropped.

St. Pierre Bank

At the West side of the St. Pierre Bank, subsequently only 6 baskets, in two hauls, of cod suitable for fillets, and feed fish such as small ~~Norway haddock~~ redfish, cod, ~~coal fish~~ pollock, and haddock were landed.

Cape Ray

There were strong concentrations of cod West of Cape Ray in the middle of March, and the Spanish, Portuguese, and French fish salters were intensely fishing already before the "Hennigsdorf" arrived. The result of the "Hennigsdorf" was, at this fishing spot, about 30 baskets/ trawling hour. The landed cod had lengths between 50 and 70 centimeters (20"-28"), having a slim body and displaying an almost black colour. In this respect, the cod was considerably different from the cod at the Banquereau Bank which was of a light green shade and rather stout.

The bottom was good, and only sea weed was noticed.

Small quantities of medium size haddock were in the yield.

Although the fishing possibilities at Cape Ray were considered as good, the "Hennigsdorf" turned away after one haul because the weight per piece of fillet was to small.

Banquereau Bank

The second pivot of the fishing activity was at the Banquereau Bank over the Eastern slope of the Nova Scotia shelf.

In a depth of 80 to 100 meters, 28 hauls were made, resulting in an average of 8.7 baskets/trawling hour of cod suitable as fillet. The best result was around 39 baskets/trawling hour.

The cod had medium lengths of 50 to 75 centimeters (20" to 30"), and about 10% came up to sizes of 75 to 100 centimeters (30" to 40"). There were about 10% of ~~coal fish~~ pollock of about 32" included. Despite the quantities obtained, the cod was not very suitable for salt fillet production because 150 baskets yielded 1 ton of fillet only due to the small fillet weight proportion.

The best fishing at the Banquereau Bank was done at the 100 meters edge. There were many ~~cormorants~~ plaice x) below 90 meters (Hippoglossoides platessoides). The trawls covered mainly the East-West extension of the Northern edge of the bank. 20 to 30 miles further South, rocky ground was noticed which was not suitable for trawling.

Summary of the trip

The experimental trip of the trawler "Hennigsdorf" into the area of the banks South-West of Newfoundland and the Eastern Nova Scotia shelf was intended to find out about salt fillet production. Fishing was done at the South-West edge of the Grand Bank, the Green Banks, St. Pierre Bank, and the Cabot Strait West of Cape Ray as well as at the Banquereau Bank on the Nova Scotia shelf. The best results were obtained at the South-West edge of the Grand Bank, at Cape Ray, and at the Banquereau Bank. While the cod of the Grand Bank corresponded to the expectations in respect of fillet crop, the size of the fish at the two other banks was too small to justify a longer stay at these spots.

x) dabs

The other fishing areas had only small yields, and were usually abandoned after a few trial hauls.

Essentially, the results of the trip of the "Hennigsdorf" were stated by those of the French fishery, and of an experimental trip of West-German boats to the South of Newfoundland and Nova Scotia. However, French vessels netted 3 tons of cod/trawling hour at the same time at the South-West edge of the St. Pierre Bank in a depth of 250 meters which cod had lengths of 61 to 62 centimeters (24" to nearly 25") in the average, thus obtaining considerably better results in this area than the "Hennigsdorf". West German boats fished at the Burgeo Bank also where 1 ton cod was caught in depths of 190 to 250 meters, however only ~~Norway haddock~~ redfish, mainly of small size, was netted in depths exceeding 250 meters.

Table 3 Compilation of the results of the experimental fishing of the trawler "Hennigsdorf" in the area South-West of Newfoundland at occasion of the voyage from March 16, to April 6, 1961. The total quantities as well as the yields per trawling hour comprise only the quantities of cod suitable for fillet while the total netting is partially considerably higher. (A basket holds 60 kilograms or about 135 lbs).

Area	SW edge Grand Bank	Whale Bank	Green Banks	St.Pierre Bank	West of C. Ray	Banquereau Bank	Total
Number of hauls	35	3	2	2	1	28	71
Number of trawling hours	80,7	4,5	4,3	3,5	1,0	60.0	154
Total quantity of cod suitable for fillet	880,5	21,0	5,0	8,0	31,0	476	1421,5
Yield/trawling hour(baskets)	10,0	4,7	1.2	2,3	28,6	8,3	9,2
Optimum yield/ trawling hour	22,0	22,0	2,5	3,0	28,6	39,0	
Main type	cod	cod	Mix	cod	cod	cod	
Trawling depth	70-80	80-90	90-120	240-260	200-230	80-100	
Number of net damages	6	1	1	-	-	1	9

2nd Voyage, from September 19, to October 21, 1961

During a second voyage in 1961, the trawler ROS 221 "Brandenburg" visited the area of the Grand Newfoundland Bank in September and October where fishing was done particularly in the South-Eastern and South-Western parts of the bank including the Green Banks. Since the purpose of this trip was the pre-investigation for possible fishing operations during the winter, in the fishing areas South of Newfoundland, the results are to be mentioned also.

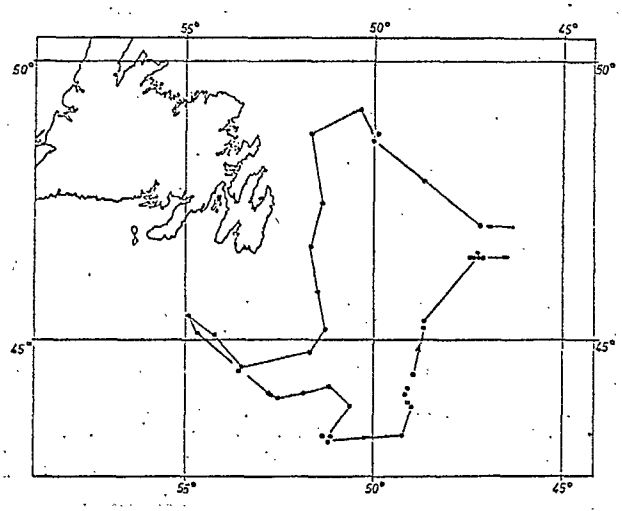


Fig. 4

Course of the search voyage of the trawler "Brandenburg" to the area of the Grand Newfoundland Bank, from September 19, to October 21, 1961

Fish Economist J. Voss participated in this voyage on behalf of the Institute for Deep Sea Fishery (Institut für Hochseefischerei).

At the beginning of the experimental trip, the Northern edge of the Grand Bank was visited, however with a success not worth to be mentioned. Above the bank itself, no quantities or small quantities of cod and feed fish were met (see table 4). At this time, the bank was covered by cold water.

The result of four trial hauls at the South edge of the Green Banks were just as negative, while two further hauls yielded 40 and 120 baskets, respectively, of small ~~Norway haddock~~ redfish.

When fishing along the South-Western edge of the Grand Bank, in depths of 200 to 450 meters, results of 50 to 250 baskets/trawling hour of ~~Norway haddock~~ redfish were obtained. However, the lengths of 20 to 36 centimeters (8" to 14 3/8"), and a maximum x) of 24 to 36 centimeters (9½" to 12¾") did not grant a success for our fishing fleet. (Fig. 5).

x) of size

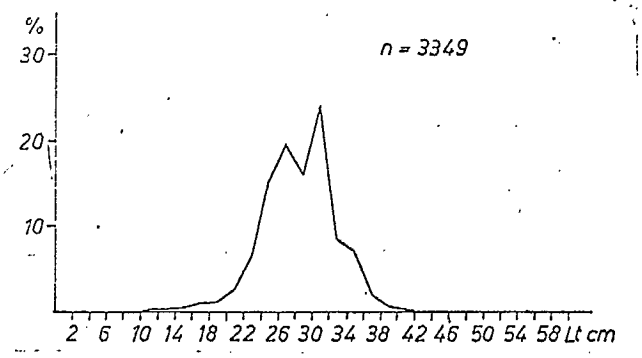


Fig. 5 Lengths distribution (in centimeters) of the ~~Norway haddock~~ redfish caught at the South West edge of the Grand Bank during the period from October 3, to October 6, 1961

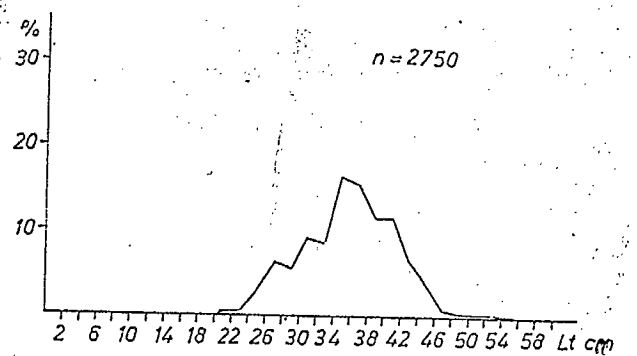


Fig. 6 Lengths distribution (in centimeters) of the ~~Norway haddock~~ redfish caught at the South East edge of the Grand Bank, from October 7, to October 11, 1961.

Subsequently, the "Brandenburg" abandoned this fishing area and continued the search at the South-East slope of the Grand Bank (Area 3 N). Here, at the position 43° 53' N; 49° ' W, for the first time on this trip, results+) were obtained which were good in respect of quantity and quality. Trawling hauls performed in depths of 250 to 440 meters yielded 100 to 200 baskets/trawling hour which, however, decreased in night time. The lengths of the fish varied from 24 to 45 centimeters (9½" to 18") with a maximum from 34 centimeters to 40 centimeters (12½" to 16").

Further North also good hauls were made at the position 45° 20' N; 48° 40' W of 30 to 80 baskets/trawling hour. Besides the predominant ~~Norway haddock~~ redfish, they contained, for the first time, larger quantities of cod (up to 40%). The ~~Norway haddock~~ redfish corresponded in respect of size scatter to the one caught further South. The cod was of a medium length around 90 to 120 centimeters (36" to 48"), representing a very good material for fillet. The trawling depth at this position was around 250 to 500 meters. Besides ~~Norway haddock~~ redfish and cod, varying quantities of flat fish (flounder) and ~~roach~~ skate (ray, thornback) were contained.

Summary

The discovery trip of the trawler "Brandenburg" had the purpose of exploring the possibilities for fishing at the Grand Newfoundland Bank. The North-East edge and the bank itself proved to be poor regarding fish which fact obviously had to do with the increased invasion of cold water above the bank.

The South-Western slope of the bank showed large ~~Norway haddock~~ redfish occurrences, however, the length in the average (24 to 32 centimeters) (9½" to 12¾") did not suffice.

+) (~~Norway haddock~~ redfish)

Subsequent experimental catches at the South East edge of the bank yielded very good ~~Norway haddock~~ redfish hauls with average fish lengths of 34 to 40 centimeters (13 5/8" to 16") which is satisfactory. These oberservations were reported to the fleet which trawled subsequently in this area.

At the Eastern edge of the Grand Banks, finally marketable ~~Norway haddock~~ redfish was located, and very big cod. This resulted in 50 to 80 baskets / trawling hour which means this was a good fishing area also.

It was noticed that all the fishing areas, visited during this voyage, had good trawling bottom with no exception, and the trawling could be done all over using one and the same trawl.

Table 4 Compilation of the fishing results of the trawler "Brandenburg" during the experimental trip, from September 19, till October 21, 1961, in the area of the Grand Banks of Newfoundland.

Fishing area	N.edge Grand Bank	Grand Bank	Green Banks	SW-edge Grand Banks	SE-edge Grand Banks	E-edge Grand Banks	Total
Number of hauls	6	4	6	8	14	30	68
Number of trawling hours	6,5	4,5	6,5	8	19	75	119,5
Total catch in number of baskets	53	8,5	179	780	1235	2335	4590,5
Catch/trawling hour (baskets)	8	2	27,5	97	65	31	38,4
Best haul/trawling hour	30	6	120	270	220	80	
Predominant kind of fish	cod	Mix	~~Norway haddock~~ redfish	~~Norway haddock~~ redfish	~~Norway haddock~~ redfish	~~Norway haddock~~ redfish cod	
trawling depths, meters	200-270	60-130	120-400	65-550	80-440	250-500	

3rd voyage, from March 5, to April 4, 1962

Because of the experience of the preceding year, it was intended to have the FFS "Eisenach", whatever happened, as early as at the beginning of March in the fishing area South od Newfoundland. After a delay of one week, due to ice conditions in the harbour of St. Johns, the "Eisenach" arrived on March 5, in the fishing area.

Main task of the trip was to survey the fishing chances of as many areas as possible South of Newfoundland and at the shelf of Nova Scotia. (See fig. 7)

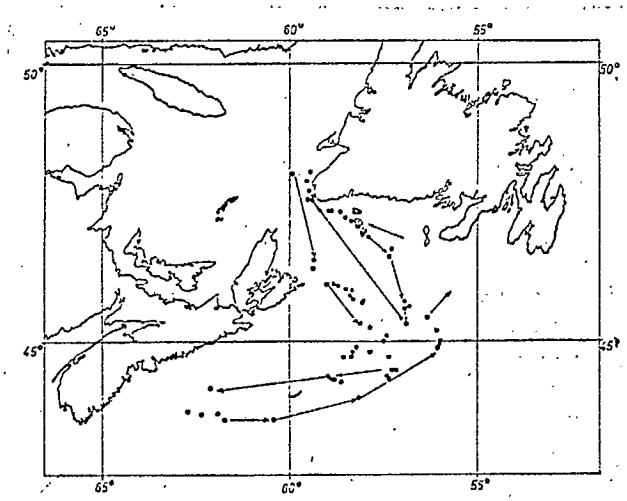


Fig. 7 Course of the FFS "Eisenach" during the experimental trip to the areas South of Newfoundland, and to the Nova Scotia shelf, from March 5, till April 4, 1962

The search work particularly concentrated on the banks on both sides of the Laurentian Canal including the Burgeo Bank, Artimon Bank and Banquereau Bank.

Burgeo Bank

The investigations of the fishing conditions started West of the Burgeo Bank. This bank was worked on several times during this voyage. During the periods of time from the beginning / middle of March as well as from the end of March / beginning of April

a total of 30 search hauls was made. The fishing depths were between 210 and 350 meters, and the average haul/trawling hour at the Burgeo Bank was 30.5 baskets. The best haul was 300 baskets of ~~Norway haddock~~ redfish.

Predominantly, ~~Norway haddock~~ redfish and cod were caught. While cod was predominant down to depths of 250 meters, the occurrence of ~~Norway haddock~~ redfish increased below 250 meters, and ~~Norway haddock~~ redfish only was caught below 300 meters of depth.

The cod lenghts ~~were scattered from~~ varied between 45 to 95 centimeters (18" to 38") with a maximum between 63 to 75 centimeters (25 ¼" to 30"). (Fig. 8)

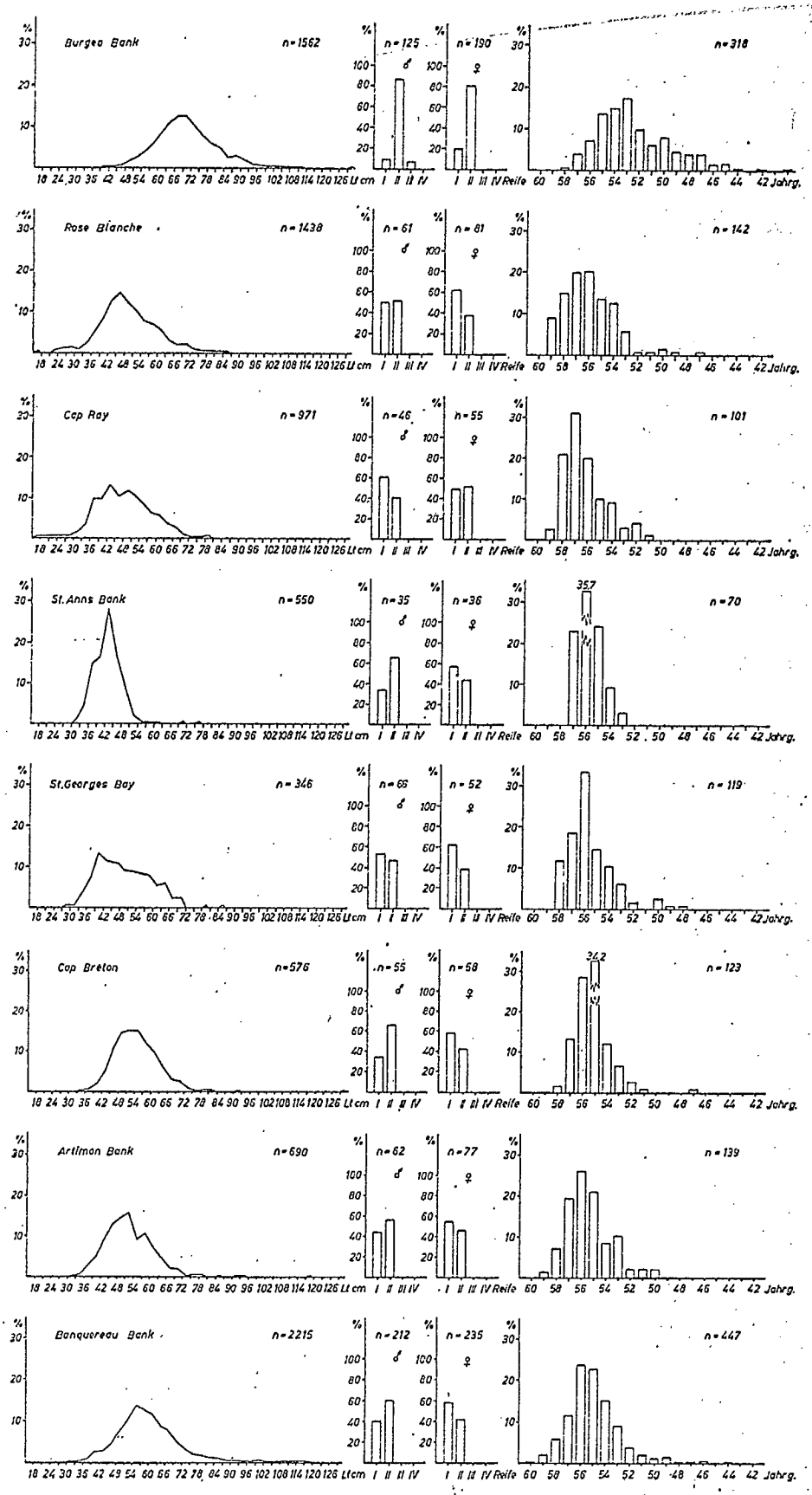


Abb. 8
Darstellung der Längen- und Altersverteilung sowie der Reifegrade des auf der Reise vom 5. März bis 4. April 1962 gefangenen Kabeljaus (Zusammenfassung aller auf den Bänken entnommenen Proben)

Fig. 8

Left:

Distribution of the lengths

Middle:

Maturity groups

Right:

Age groups

of the cod caught during the voyage from March 5, to April 4, 1962,

resulting from all of the samples from all of the banks.

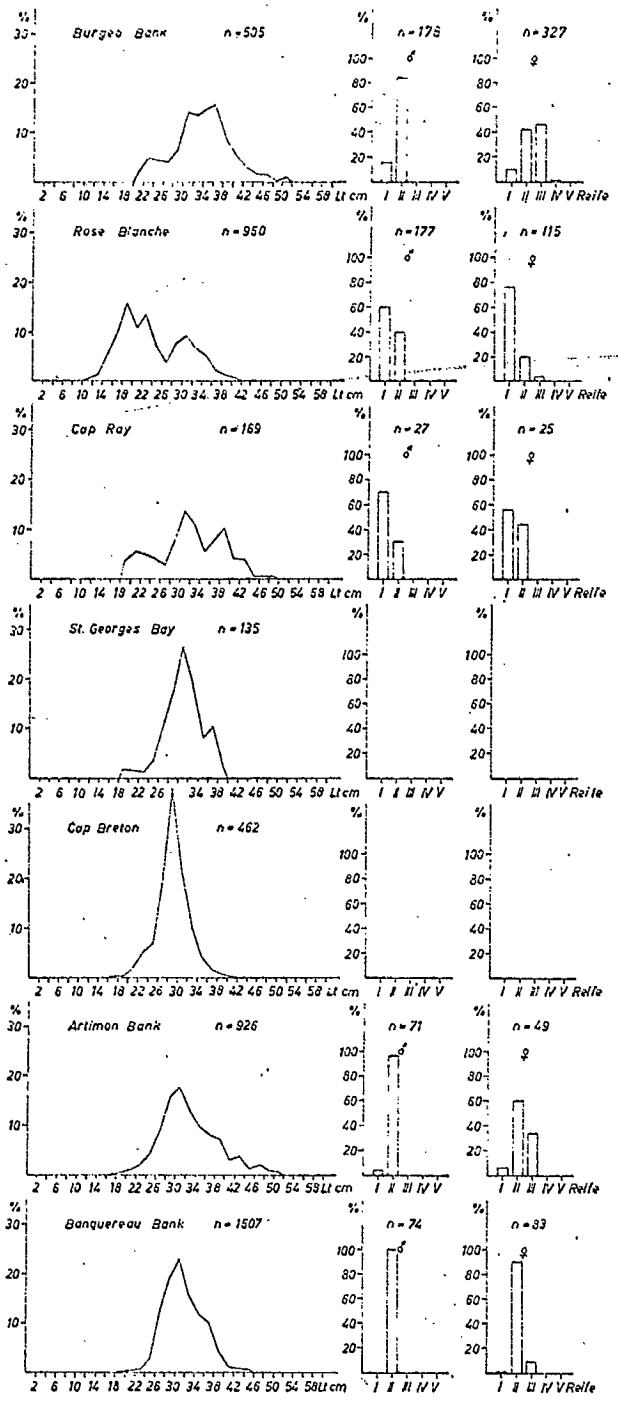


Fig. 9

Length distribution (in centimeters) and maturity groups of the ~~Norway haddock~~ caught during the voyage from March 5, to April 4, 1962

The ~~Norway haddock~~ redfish had a varied composition regarding its size. Besides a number of smaller fish (around 22 centimeters) (8 3/4"), the majority was 30 to 40 centimeters long (12" to 16"). In this second group, the smaller ones were males and the larger ones females. About 90% of the females were ripe for or about spawning, There were about twice as many females as there were males.

The bottom conditions in the area of the Burgeo Bank were good, however, a current was noticed while trawling in Western direction. The catches in night time were evidently lower than those in day time.

Rose Blanche Bank

In this fishing area only 7 hauls were performed which yielded an average catch of 17,5 baskets/trawling hour. Mainly cod was caught in depth of 180 to 240 meters, the results increasing with the depthsof the water. The cod was considerably smaller than that of the Burgeo Bank, lengths of 40 to 50 centimeters (16" to 20") were predominant.

The ~~Norway haddock~~ redfish of this fishing area also yielded a high percentage of young fish (see fig. 9), their main group of length falling between 16 to 24 centimeters (6 3/8" to 9 1/2") and 18 to 34 centimeters (7 1/4" to 13 5/8").

While trawling on the bottom of the Rose Blanche Bank, pelagic fish was observed by the "Eisenach" and fishing was done by means of a swim trawl (Literally translated it would read: "One ship swim trawl") Despite good readings (supposedly of the instrument), only 1,5 to 8 baskets of herring/haul were caught because the net could not be adjusted appropriately due to the lack of special indicating equipment.

Cape Ray

Fishing was done West of Cape Ray and North of it in depthsof 160 to 560 meters. The main catches were done in 160 to 190 meters, mainly yielding cod. One haul, +) from as deep as 560 meters yielded

+) in the Cabot strait,

picked dog fish, black halibut, and only a few cod.

The cod was very slim, yielding not much fillet. 10% of the catch had lengths of 35 to 55 centimeters (14" to 22") while the age groups 1957, 1958, and 1959 were predominant.

The ~~Norway haddock~~ redfish at this bank was relatively small and had a maximum length of 28 centimeters (11").

St. George's Bay

Despite light drift ice interference, there were good fishing conditions West of the St. George's Bay. The average catch/trawling hour was around 51,5 baskets of cod. This cod was much like the one at Cape Ray regarding its length while the age group 1956 was predominant here.

At the bank, fishing was done in depths of 200 to 250 meters whereby the haul from the relatively smallest depths consisted surprisingly of 90% ~~Norway haddock~~ redfish showing lengths of 30 to 32 centimeters (12" to 12 3/4").

St. Anne's Bank

The fishing area yielded the highest results but, at the same time, the smallest cod of the trip. The catch /trawling hour was around 100 baskets consisting exclusively of cod which was caught in depths of 140 to 160 meters.

The lengths of the cod varied between 35 to 50 centimeters (14" to 20"), the maximum being between 42 and 44 centimeters (16 3/4" and 17 1/2"), and the age groups 1955 to 1957 prevailing. The age group of 1956, was represented by 35% of the fish.

East of Cape Breton

In this area, mainly cod was caught besides a share of 20 to 25% ~~Norway haddock~~ redfish, and only 5% ~~coal fish~~ pollock were included.

The fishing depths were around 160 to 200 meters. The cod belonged mainly to the age groups 1955 and 1956, showing medium lengths of 45 to 60 centimeters (18" to 24"). The ~~coal fish~~ pollock

was a little bigger, its maximum being about 60 centimeters (24") while Norway haddock had average lengths of 28 centimeters (11"), again.

Artimon Bank

11 hauls were made at the Artimon Bank whereby fishing was done in depth levels of 125 to 400 meters. Althoug the depths changed during the individual trawling turns consistently, no net damages occured. The composition of the catches regarding fish kinds changed clearly with the varying trawling depth. While, in depths of 100 and 200 meters preferably cod and Norway redfish ~~haddock~~ was caught, the catches from 300 to 400 meters depth consisted mainly of Picked dogfish with a small portion of Gabeldorsch (sub-species of cod?) and cod.

The medium lengths of cod were around 45 to 55 centimeters (18" to 22") which was not satisfying either. Regarding the age group of cod, the 5 to 7 years old ones were predominant again.

The lengths distribution of the ~~Norway haddock~~ redfish corresponded to that of the banks mentioned above. Its average length was 32 centimeters (12 3/4").

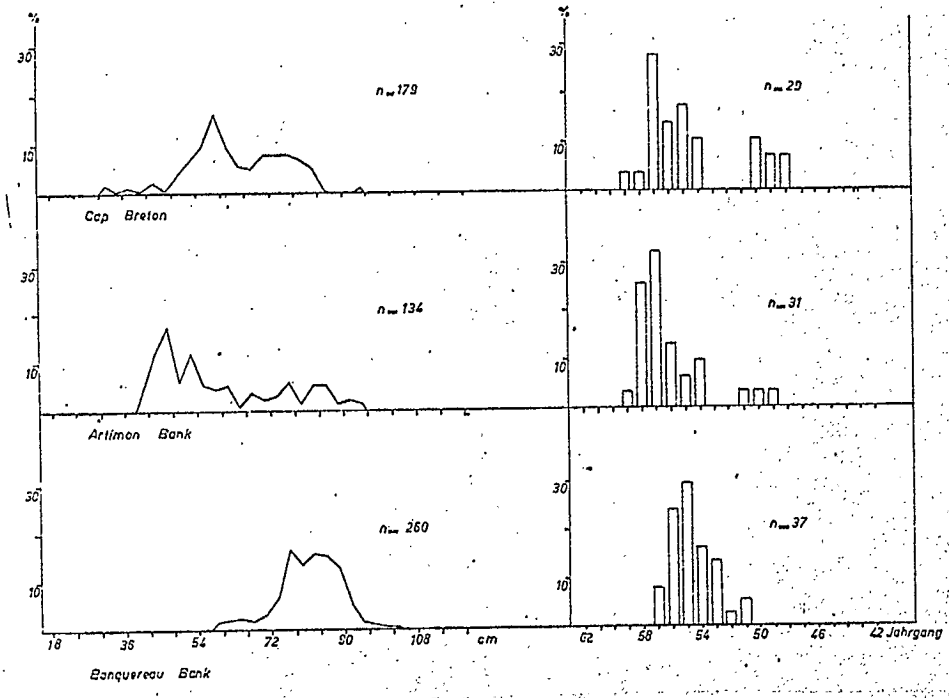


Fig. 10
Length distribution (in centimeters) and age groups of the ~~coal fish~~ pollack caught during the voyage from March 5, to April 4, 1962

Banquereau Bank

At the Banquereau Bank, 17 trial hauls were executed. However their results don't yield a complete picture of the fishing chances at the bank because of the largeness of the area. Fishing was done preferably at the Northern, the Southern and South-Western part of the bank. The fishing depths were between 60 and 200 meters. At the Southern slope of the bank, good cod and ~~coal fish~~ pollock catches were made. Both kinds of fish were represented by the age groups 1955 and 1956, whereby the average lengths of 75-90 centimeters (30"-36") of the ~~coal fish~~ pollock clearly exceeded those of the cod of 55 to 60 centimeters 21 3/4" to 24"). Some few pieces of cod measured up to 120 centimeters (48").

The fishing results in this area were good only when trawling was done in Westerly direction. In opposite direction, the quantity of the catches was the same, but instead of the Gadidae, only flat fish (plaice, flounder) and ~~roach~~ skate, (ray, Thornback) ware caught.

The ~~Norway haddock~~ redfish, also caught at the Banquereau Bank, measured 32 centimeters (12 3/4"), therefore belonging to the same size group as those caught in most of the fishing areas of this trip.

Emerald and Western Banks

Some experimental fishing at the Emerald Bank had almost no result. Only a few cod and haddock (in contrast to ~~Norway haddock~~ redfish) were caught. The results at the Western Bank were almost just as poor. Only one haul yielded a better result of 40 baskets haddock (in contrast to ~~Norway haddock~~ redfish) and 10 baskets of cod/trawling hour.

Summary

During the experimental trip of the FFS "Eisenach", of March to April 1962, the fishing areas at both sides of the Laurentian Canal were searched, and at the St. Pierre Bank,

Burgeo Bank, Artimon Bank and Banquereau Bank, fishing was done also.

The best fishing results were obtained at the Burgeo and St. Anne's Banks, however the lengths of the fish were around the lower limit regarding the fillet machines, sometimes even below this limit. The sea bottom was considered as good in the whole fishing area and only four net damages occurred during the 88 hauls of the trip.

Table 5. Summary of the fishing results during the experimental voyage of the FFS "Eisenach" of March 5 to April 4, 1962, to the areas South West of Newfoundland and to the Nova Scotia shelf.

Fishing area	Burgeo Bank	Rose blanche	Cape Ray Georges Bay	St.Anne!s Bank C.Breton	Artimon Bank	Banquereau Bank	West. Emerald Bank	Total
Number of hauls	30	9	7	9	11	17	5	88
Number of trawling hours	58.85	20.15	10.20	17.65	20.15	38.65	8.60	174.25
Total catch in baskets	1799	248	300	605	425	900	61	4338
Catch/trawling hour	30.5	13	29.5	34.3	25	23.3	7.1	25
Best catch/ trawling hour	120	30	55	100	40	72	50	
Main kinds of fishes	~~Norway haddock~~ redfish	Cod	Cod	Cod	Cod	Cod	Haddock	
Trawling depths in meters	170-320	180-280	160-560	140-200	100-400	60-210	80-180	

4th voyage, December 10, 1962, to January 3, 1963

During the 4th trip, the trawler "Gotha", under skipper Klück, sailed to the fishing areas of the Nova Scotia shelf and to the banks South of Newfoundland.

They started seeking fish on December 10, 1962, West of the Sable Island.

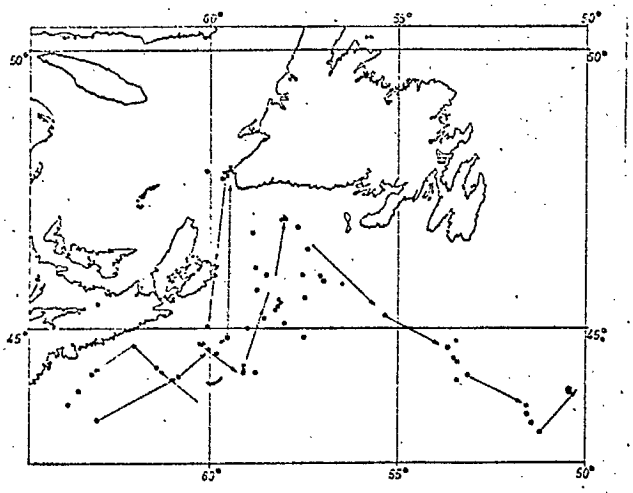


Fig. 11
Course of the search voyage of the trawler "Gotha" from December 10, 1962, to January 3, 1963

Sable Bank, Middle Bank

Fishing attempts at the Sable Island Bank, and North of it, at the Middle Bank, had no positive result all over. Only small quantities of cod and ~~Norway haddock~~ redfish were caught in a trawling depth of the 60 to 220 meters, the best haul yielding about 16 baskets/trawling hour from a trawling depth of 80 meters, mainly consisting of cod of a body length of 50 to 80 centimeters (20" to 32") .

Banquereau Bank, Artimon Bank, Cape Breton

The search for fish at the banks of the Eastern Nova Scotia shelf was continued, in the beginning, at the Banquereau Bank. In depths of 50 to 180 meters, only poor catches were obtained containing considerable quantities of dabs (Hippoglossoides platessoides), the catch yielding 2.6 baskets/hour as an average of 4 hauls.

The Artimon Bank was searched a little more intensely by making 10 hauls. An average 10 baskets per hour was not much better a result. The catches from depth levels of 70 to 260 meters consisted of about 50% cod and 50% ~~Norway haddock~~ redfish. The cod again had lengths of 55 to 80 centimeters (21 3/4 to 32"). There were two net damages in this fishing area.

East of Cape Breton, experimental fishing was done in depths between 140 and 340 meters. Here again, like at the other banks of the Nova Scotia shelf where fishing had been done during this trip, the results were not worth to be mentioned. The maximum catch was about 11 baskets/trawling hour, consisting of 75% cod and 25% ~~Norway haddock~~ redfish.

Cape Ray

Subsequently, the results West of Cape Ray were somewhat better. 12 hauls were made from a depth of 160 to 390 meters, the average yielding 16 baskets/trawling hour. Mainly small ~~Norway haddock~~ redfish was caught. In greater depths picked dogfish (Spur dog) was predominant, yielding the best catch of 53 baskets/hour-

Burgeo Bank, St. Pierre Bank, Whale Bank

After two hauls, with no result, in the Cabot strait, the search work concentrated on the fishing areas of South Western Newfoundland. The results at the Burgeo Bank where fishing was done first, yielded only small quantities like those at occasion of the previous voyages. The average haul, out of 8,

yielded only 16.5 baskets/hour, and only one trawl turn in a depth [x] resulted in 66 baskets ~~Norway haddock~~ redfish which was considered as a good result. The lengths of the fish of the individual hauls were very different. Therefore, this fishing area could not be recommended to the fleet as a makeshift area at this early time of the year.

The same situation was existing at the St. Pierre Bank when experimental fishing was done, the hourly catches being even lower than 3 baskets/hour. Cod was caught in a depth of 70 to 110 meters, and ~~Norway haddock~~ redfish at the slopes in depths between 350 and 500 meters. In the Halibut Channel, East of the St. Pierre Bank, 17 baskets/hour of cod were netted. The best result was 26 baskets/hour in depths of 150 to 190 meters. The cod had lengths of 60 to 80 centimeters (24" to 32"). Deeper levels, down to 500 meters, yielded an increasing proportion of ~~Norway haddock~~ redfish.

The Whale Bank and its slopes were searched for concentrations of ~~Norway haddock~~ redfish in depths of 135 to 500 meters. The hourly result of 15 baskets in the average, and the large portion of small fish proved here also the negative result of the search.

South Western and South Eastern edges of the Newfoundland Grand Bank

At the South Western edge of the Grand Bank, the trial hauls from depths down to 500 meters yielded average catches of 14.4 baskets/hour, consisting of about 50% cod and 50% haddock (in contrast to ~~Norway haddock~~ redfish), the latter predominating in lesser depths, and ~~Norway haddock~~ redfish coming from greater depths.

The South Eastern edge was briefly investigated also and yielded about 24 baskets/trawling hour of ~~Norway haddock~~ redfish (70%) and cod (30%). According to composition and quantity, this area takes the first place as a makeshift fishing area for our fleet when needed.

- 24 -

x) of 260 to 300 meters

Summary

The purpose of the voyage of the trawler "Gotha" was to investigate the fishing chances in the areas South of Newfoundland, and Nova Scotia around the turn of the year. Purpose of the investigation was to find out to which extent the fishing fleet could work these areas ahead of the real winter season. The very extended search stated that no stable fish concentrations were met at the Nova Scotia shelf and South of Newfoundland either which would have justified the operation of the fishing fleet during this part of the year.

Table 6 Compilation of the fishing results during the search voyage of the trawler "Gotha", of December 10, 1962, till January 3, 1963, in the areas of the Nova Scotia shelf and Southern Newfoundland.

Area	Sable Bank Middle Bank	Banquereau & Artimon Banks Cape Breton	Cape Ray	Burgeo Bank	St.P. Bank Whale Bank	SW edge SE edge Grand Bank	Total
Number of hauls	16	19	12	8	11	7	73
Number of trawling hours	23.5	34.7	23.5	15.5	18.8	12.1	128
Total result in baskets	65	280	378	256	225	223	1427
Catch per trawling hour	2.8	8.1	16.1	16.5	12.0	18	11.5
Best catch/trawling hour	16	26	53	66	43	48	
Most important kind of fish	cod	cod	redfish ~~Norway haddock~~	redfish ~~Norway haddock~~	cod	redfish ~~Norway haddock~~	
Trawling depths in meters	50-240	50-340	160-390	95-430	110-500	80-600	

5th Voyage, January 5th to January 20th, 1963

Subsequent to the voyage of the "Gotha", the trawler "Leipzig" carried out another search trip to the Sable Island Bank and to the fishing areas South of Newfoundland.

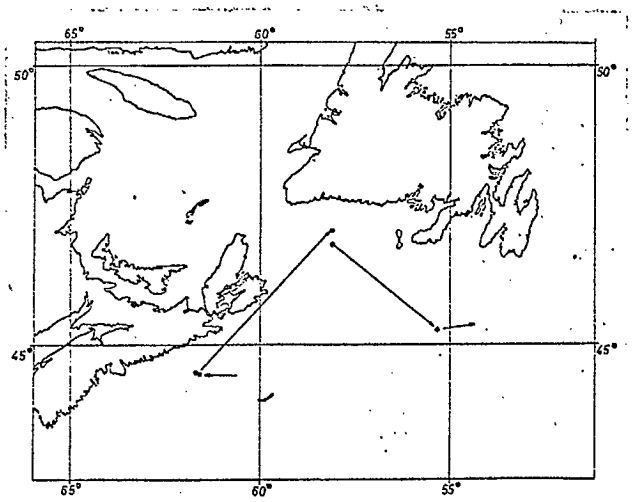


Fig. 12
Course of the trawler "Leipzig" to the "Sable Island Bank" and the banks South of Newfoundland during the time from January 5, until January 20, 1963

Sable Island Bank

The search work at the Sable Island Bank concentrated especially on the chances of hake fishing. Soviet boats, fishing at this bank, obtained daily quantities of 30 to 40 tons which result could by far not be reached by the "Leipzig" with hourly catches of 9.5 baskets. The caught hake had lengths of 23 to 35 centimeters (9" to 14"), the average length being 26 centimeters (10 ¼") (see fig. 13). It is assumed that the results were that low because a wide meshed net had been used in the beginning, permitting quantities of fish to escape.

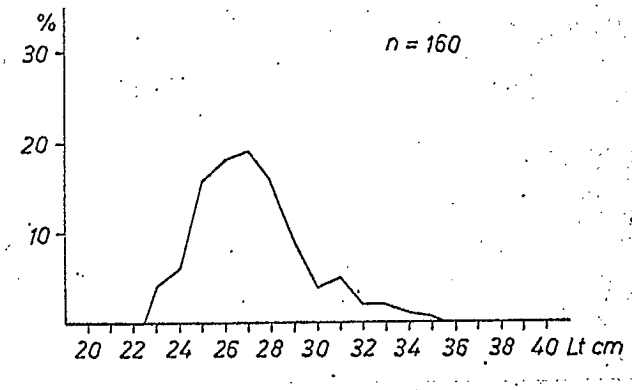


Fig. 13
Distribution of lengths (in centimeters) of hake at the Sable Island Bank. January 1963.

Beside hake, some ~~coal fish~~ pollock, haddock, cod, ~~Norway haddock~~ redfish, and flat fish were met which, however, represented only a very small portion of the catch.

The fishing depths at this bank were between 140 and 230 meters.

Burgeo Bank, Halibut Channel

From the Nova Scotia shelf, the trip was continued to the Burgeo Bank where four hauls were made in depths of 250 to 320 meters. The best result were 64 baskets ~~Norway haddock~~ redfish in one catch after a trawling time of 2½ hours. However, the net was badly damaged during this haul which fact resulted in a considerable loss of fish. The lengths of the ~~Norway haddock~~ redfish had two maximae, one from 24 to 26 centimeters, (9½" to 10¼"), and the other one from 30 to 32 centimeters (12" to 12 3/4"). (See fig. 14)

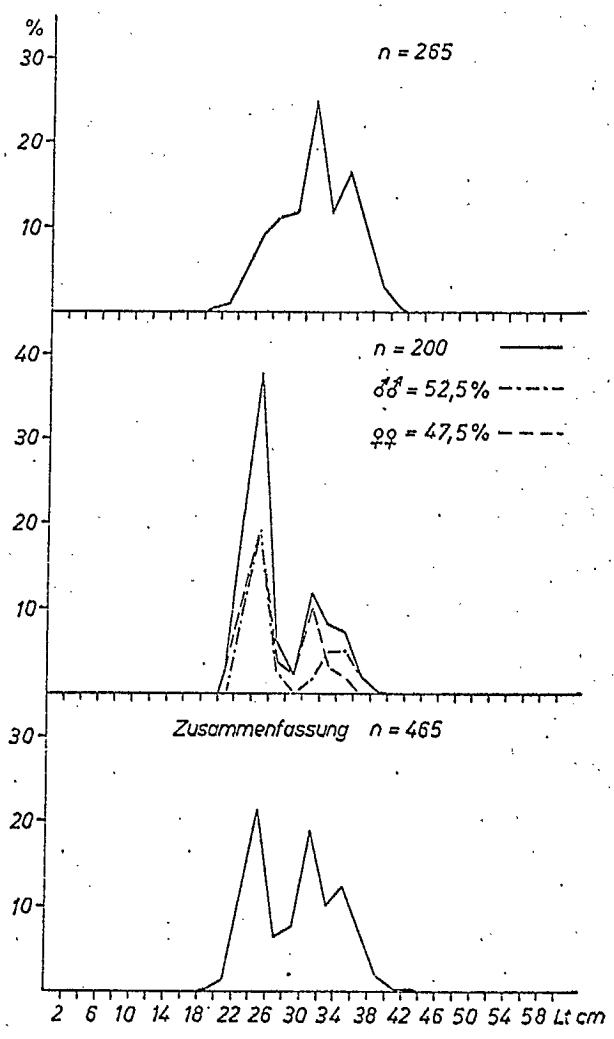


Fig.14
Lengths of ~~Norway haddock~~ redfish. Trawler "Leipzig". Burgeo Bank.

In the Halibut Channel, East of the St. Pierre Bank, at the end of the voyage, in a depth of 120 to 160 meters, a catch of 22 baskets/hour was landed, consisting of cod and haddock. The results in night time were considerably lower than that.

Summary

The purpose of the search voyage of the "Leipzig" was to investigate the chances regarding hake at the Sable Island Bank. But the result did not measure up to the expectations regarding both quantity and size.

Further insvestigations carried out South of Newfoundland yielded ~~Norway haddock~~ redfish in low quantities at the Burgeo Bank. Only 25% to 50% of the fish could be used for fillet. Cod and haddock (in contrast to ~~Norwegian haddock~~ redfish) in quantities of 1,1 ton/ trawling hour in the Halibut Channel, East of the St. Pierre Bank, represented the most appealing catches of the voyage.

Table 7 Compilation of the fishing results during the search voyage of the trawler "Leipzig" to the Sable Island Bank.

Fishing area	Sable Isl. Bank	Burgeo Bank	Halibut Channel	Total
Number of hauls	21	4	3	28
Trawling hours	47,3	6,5	4,75	55,6
Total, baskets	417	146	75	638
Baskets/trawling hour	8,8,	22,5	15,8	11,5
Best catch/trawling hour	20	28	28	
Most important kind of fish	Hake	~~Norway haddock~~ redfish	Cod	
Trawling depths	160-170	250-320	160-170	

6th Voyage, February 21, to April 8, 1963

Subsequent to the two voyages of the trawlers "Gotha" and "Leipzig", the fishery research ship "Eisenach" visited the areas of the banks South of Newfoundland and of the Nova Scotia Shelf, and worked there from March 10, to March 30.

The voyage was planned as a repetition of that of the "Eisenach" of 1962, however the weather and ice conditions reduced the operational radius of the ship (see fig. 15).

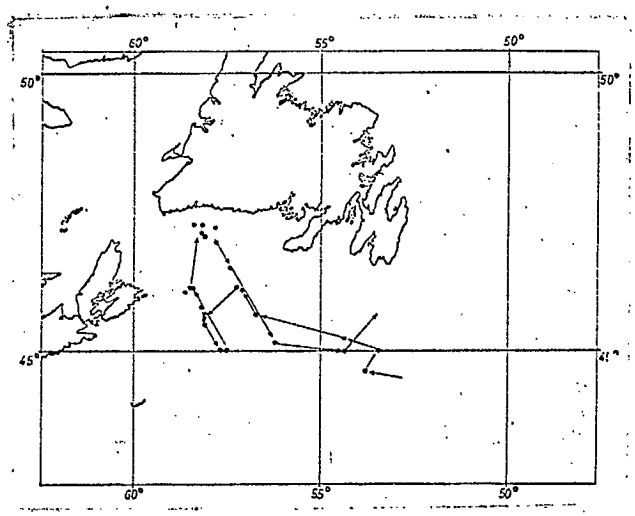


Fig. 15

Course of the "Eisenach" during the search voyage to the areas South of Newfoundland and to the Nova Scotia Shelf, from March 10, to March 30, 1963

Whale Bank to St. Pierre Bank

At the Whale Bank, fishing was done in levels between 80 and 200 meters, resulting in catches of 2.5 baskets/hour which is a very poor result. ~~Norway haddock~~ Redfish of 12 to 32 centimeters length (3 3/4" to 12 3/4") was caught.

The results were much the same when trying the Haddock Channel East of the Green Banks.

The results at the St. Pierre Bank of 7 baskets/hour were slim also. This bank was visited twice, at the beginning and at the end of the voyage. The catches yielded cod and flat fish, including some few white halibut. Shortly before the arrival of the "Eisenach" at the bank, at the beginning of March, the British factory ship "Fairtry" had left the St. Pierre Bank because of poor results.

Burgeo Bank

The conditions of the Burgeo Bank were investigated thoroughly by hauling 22 catches. The average catch/trawling hour yielded about 20,5 baskets- This fishing area proved to be rough on the equipment+) because 5 net damages were registered in this area alone.

The catches consisted of cod and ~~Norway haddock~~ redfish whereby cod was predominating in depths of about 150 meters, and ~~Norway haddock~~ redfish as far down as 250 meters.

The cod was very varied in respect of length distribution. The maximum size was around 60 centimeters (24") (see fig.16)

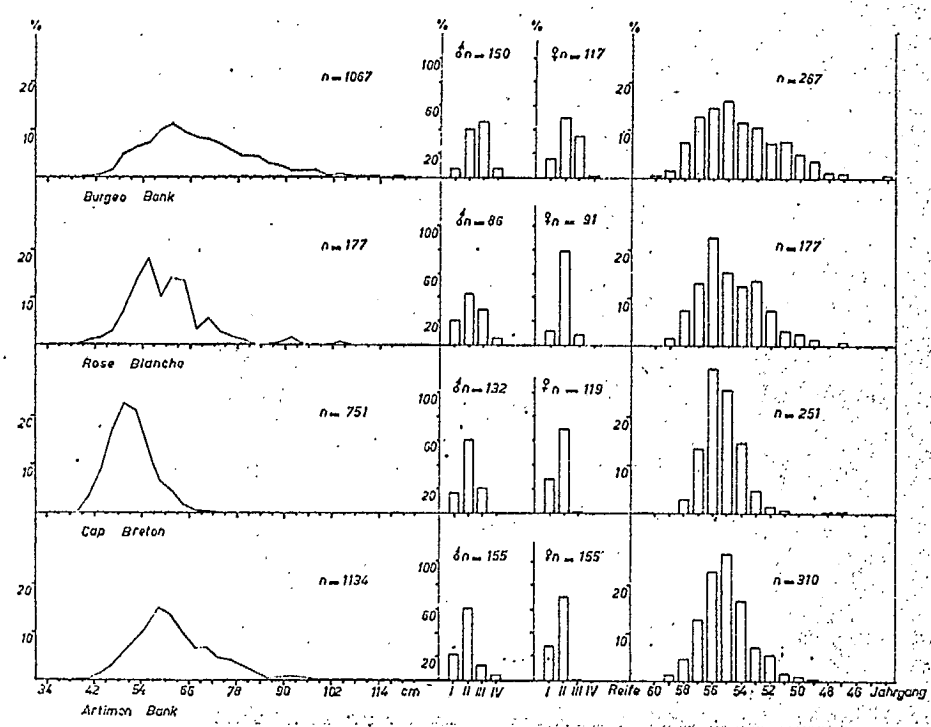


Fig. 16
Length distribution (in centimeters), maturity groups, and age groups of the cod, caught during the voyage of the "Eisenach" from March 10, to March 30, 1962

+) in contrast to the previous voyages

The share of older animals still was fairly large in these catches while the share of the age groups 1955 to 1957, was always around 10% of the total figure.

The ~~Norway haddock~~ redfish at the Burgeo Bank and at its slope toward the Rose Blanche Bank had two maximae, regarding length, one of 25 centimeters (9 7/8") and another one of 31 centimeters (12 3/8"). The larger fish was caught in depths around 200 meters while the smaller ones occured between 200 to 250 meters. The female ~~Norway haddock~~ redfish were in "non pregnant" condition or they still were very young while the males were in maturity stage III (pre-stage).

During the experimental fishing at the bank, from March 22 to 25, the share of the ~~Norway haddock~~ redfish declined grandually, and cod became predominant.

During the search operations, the Burgeo Bank was clear of ice for one week only. Afterwards, the drift ice blocked this bank and the Western Banks +) Newfoundland so the work in the St. Lawrence Gulf and in the Cabot strait could not be carried out.

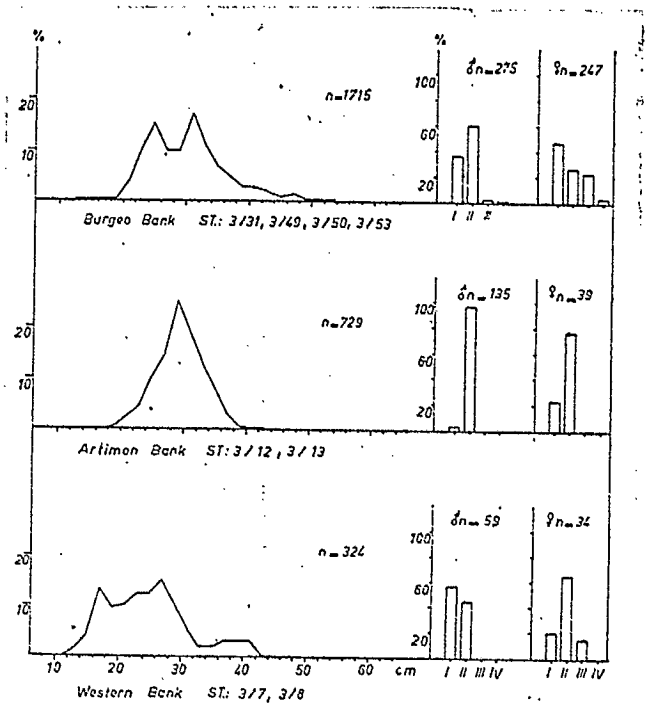


Fig. 17

Length distribution (in centimeters) and maturity groups of the ~~Norway haddock~~ redfish caught during the voyage of the "Eisenach" to the areas South of Newfoundland, from March 10, to March 30, 1963.

+) of Southern

Artimon Bank

The Artimon Bank was the first area of the Eastern Nova Scotia Shelf where fishing was done, by carrying out 13 hauls. In depths between 80 and 220 meters 11,5 baskets/trawling hour were landed in the average, yielding almost exclusively cod, and only one haul contained 10 baskets of ~~Norway haddock~~ redfish.

The hauls at the Artimon Bank concentrated on its Northern part since no good bottom could be found in the Southern part which would suit the trawling work.

The length distribution of the cod at this bank was fairly even regarding the lengths of 55 to 65 centimeters (21 7/8" to 26"), and the age groups 1955, 1956, 1954, and 1957, were represented in the first place.

The ~~Norway haddock~~ redfish had a clear maximum in length of 28 to 30 centimeters (11" to 12").

East of Cape Breton

In this fishing area, five hauls in depths of 180 to 200 meters yielded 25 baskets/trawling hour in the average. The average lengths of the cod of 45 to 55 centimeters (18" to 21 3/4"), however, was to short for fillet production. Therefore, this fishing area was abandoned soon. Regarding the age distribution, the age groups 1956, 1955, and 1957, were dominating.

In the area East of Cape Breton, during the time of our investigations, Canadian and French vessels were fishing, producing mainly salted fish.

Summary

During the search trip of the "Eisenach", the Burgeo Bank proved to be the best fishing area where daily results of 150 baskets of large cod occured, and where, at its Western slope,

good catches of ~~Norway haddock~~ redfish were made. However, due to drift ice at the time of the voyage, fishing was possible only during short periods.

The other banks of the area South of Newfoundland didn't offer fishing possibilities while, at the Eastern shelf of Nova Scotia, the size of the cod was too small for the vessels of our fleet, although medium quantities of fish were caught.

Table 8 Compilation of the fishing results of FFS "Eisenach" during the search voyage from March 10, to March 30, 1963, in the areas of Southern Newfoundland and of the Eastern Nova Scotia Shelf.

Fishing area	Whale Bank Hadd.Chann.	St.Pierre Bank	Burgeo Bank	E. C. Breton	Artimon Bank	Total
Number of hauls	5	5	22	5	13	50
Number of trawling hours	5	6,3	42,7	6,8	27,9	88,7
Total catch in number of baskets	9,5	45	869	160	221	1304
Catch/trawling hour (baskets)	1,9	7,1	20,5	23,5	7.9	14,7
Best haul/trawling hour	4	40	70	40	15	
Predominant kind of fish	Mix	Mix	redfish ~~Norw. hadd.~~	cod	cod	
trawling depths, meters	80-240	60-200	150-250	180-200	60-200	

7th Voyage, April 24, to June 25, 1963

FFS "Eisenach" sailed on her 7th voyage to the area of the St. George's Bank. At this opportunity, some trial hauls were made at the Nova Scotia Shelf, which are outlined below.

The main purpose of the trip was to find out about herring occurrences in the area to be investigated. First of all, fishing for herring was done at the Browns Bank, however with little success. Additional trial catches at the Brown's Bank and at the La Have Bank yielded mackerel, ~~coalfish~~ pollock and haddock (in contrast to ~~Norwegian haddock~~ redfish), the hourly catches resulting in 2 tons of fish.

8th voyage, January 17, to February 10, 1964

The 8th voyage was a search trip of the fishing and factory ship "J.R. Becher", under Skipper Schütt, to the areas of the Southern Newfoundland Banks.

The course of the voyage is shown in fig 18.

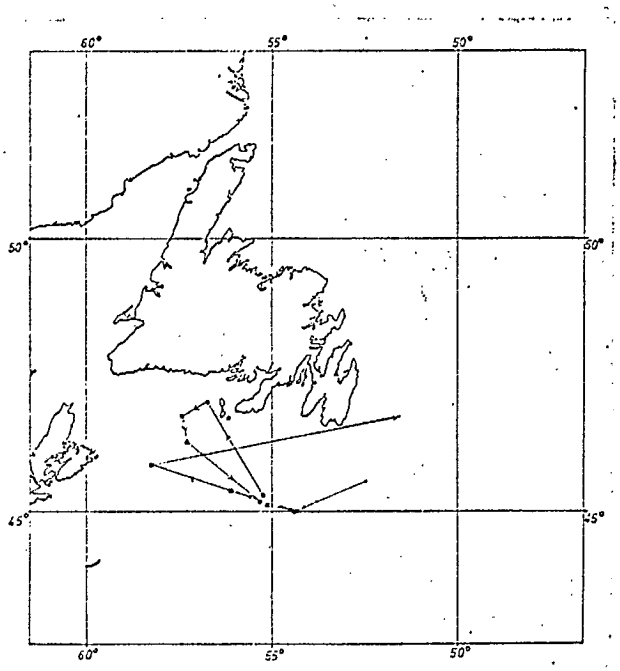


Fig. 18

Course of the fishing and processing ship "J.R.Becher" during the search voyage to the areas South of Newfoundland, from January 17, to February 10, 1964.

On this trip, fishing concentrated mainly to the St. Pierre Bank, the Green Banks, and for a short time to the fishing area East of Cape Breton. The bottom was very suitable for trawling, and minor net damages occured only in a few single cases.

Whale Bank, Green Banks

At the Green Banks and at the Whale Bank, fishing was mainly done at the Southern edges. The fishing depths were between 125 and 400 meters. In these areas, mainly large cod, mature for spawning, was caught with maximum catches of 250 baskets/trawling hour. The cod frequently had lengths of 1 meter (40") and over which fact resulted in difficulties with the fillet machine, type Baader 99. Besides cod, some haddock (in contrast to ~~Norway haddock~~ redfish) was caught in these fishing areas, furthermore ~~coal fish~~ pollock. thornback (ray), witch, and white halibut whereby sometimes up to 60 pieces of white halibut were netted in trawl turns of 2 hours.

St. Pierre Bank

During this voyage, the centre of the fishing activity was at the St. Pierre Bank where 94 hauls were made in the area between its Southern and its Northern edge.

At the Southern slope of the Bank, the fishing depths were mainly around 200 to 350 meters. There again, mainly cod was caught, which was of the same quality as that at the Green Banks, however with the increasing depht, a share of ~~Norway haddock~~ redfish was included.

The fishing activity at the Northern- and North-Western edges of the St. Pierre Bank yielded medium size cod of lengths of 60 to 75 centimeters (24" to 30") as well as a considerable share of haddock (in contrast to ~~Norway haddock~~ redfish) and ~~coal fish~~ pollock. The trawling depths were between 180 and 250 meters.

Besides the lower average size of the cod at the Northern edge of the Bank, the results per trawling hour were smaller also than at the Southern edge of the St. Pierre Bank.

Cape Breton

The fishing area East of Cape Breton at the Nova Scotia Shelf was visited as the last area of this voyage. There the highest fishing results of the trip were obtained, however, the cod was of medium and small assortment only, and did by far not reach the quality of the cod of the Newfoundland banks. The fishing depths were around 170 to 240 meters. The share of small ~~Norway haddock~~ redfish increased below 200 meters, it temporarily crowded out the cod, and was caught in quantities of up to 120 baskets/ trawling hour. However, the absolute, highest quantity in this fishing area was 140 baskets caught in 20 minutes. It consisted of very small cod.

Summary

The voyage of the fishing and factory ship "J.R. Becher", to the fishing areas South of Newfoundland, during the period of time from January 17, to February 10, 1964, had exceedingly good results in comparison to the previous search voyages. At the Southern edges of the Green Banks and of the St. Pierre Bank pre-spawning concentrations +) were met which made possible excellent catches. The Northern edge of the St. Pierre Bank and the fishing area East of Cape Breton yielded also good quantities of smaller and medium cod.

Within the worked area, frequently strong pelagic concentrations were met, obviously consisting of cod also.

All of the fishing areas had good bottom conditions and only minor net damages occured for this reason.

+) of large cod

Table 9 Compilation of the fishing results of the fishing and processing ship "J.R. Becher" during the trip from January 17, until February 10, 1964, into the areas South of Newfoundland

Fishing area	Green Banks Whal Bank	St. Pierre Bank	East of Cape Breton	Total
Number of hauls	43	94	14	151
Numberof trawling hours	75,2	146,8	12,3	234,3
Total catch in number of baskets	2560	7598	1120	11278
Catch/trawling hour (baskets)	34	52	91	48
Best haul/trawling hour	250	215	420	
Predominant kind of fish	cod	cod	cod	
trawling depths, meters	125-400	160-450	170-240	

9th voyage, February 29, March 21, 1964

The 9th voyage was carried out by FFS "Ernst Haeckel" during the period of time from February 29, until March 21, 1964, in the fishing areas South of Newfoundland and of Nova Scotia. The search for fish covered the Green Banks, the St. Pierre Bank, and the Burgeo Bank South of Newfoundland, and at the Nova Scotia Shelf the Misaine-, Artimon-, Banquereau-, Sable Island-, Emerald-, and Sambro Banks.

Green Banks

At the Green Banks, no fish concentrations were met worth to work on them. In contrast, in the trench between the Green Banks and St. Pierre Bank, ~~coal fish~~ pollock and cod were noticed in depths of 160 to 240 meters which corresponded to the conditions met by the "Becher" in January and February, regarding the length

of the fish. The average lengths of the cod and ~~coal fish~~ pollock were around 75 to 80 centimeters (30" to 32").

St. Pierre Bank

When fishing for searching purposes at the St. Pierre Bank, its Southern part and its Western edge proved to be outspoken vacant regarding fish while, at the North Western edge, from 3 to 15 baskets of cod/trawling hour were caught in depths of 130 to 240 meters. On top of this, the lengths of the cod were from 33 to 55 centimeters (13 1/8" to 21 7/8") only.

The picture was completely different at the Northern edge of the Bank where, in depths of 130 to 200 meters, 100 baskets of cod/trawling hour were landed. This cod reached average lengths of about 50 to 72 centimeters (20" to 28 3/4").

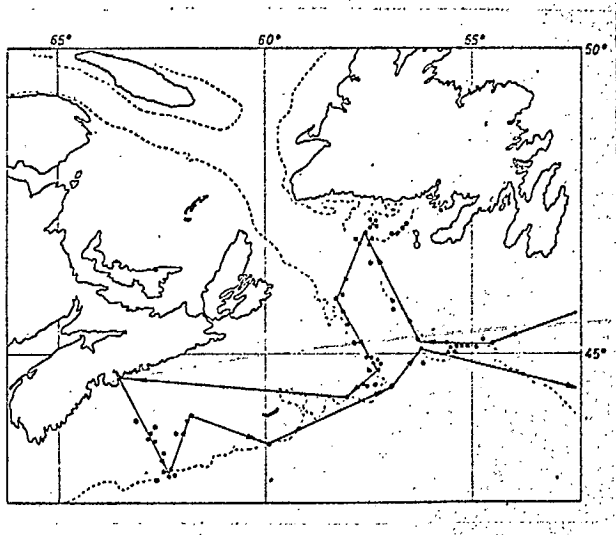


Fig. 19

Course of the "E. Haeckel" during the search voyage to the areas South of Newfoundland and of the Nova Scotia Shelf from February 29, to March 21, 1964

Regarding age groups, the 1958 group was dominating, representing more than 40% of the catch, but the 1957 and 1959 groups were also of importance.

25% of the fish were in the stage of pre-spawning while the largest part was in the stage I (juvenile).

The cod concentrations kept in a layer of less cold water of a temperature of +1° C to +2,7° C (roughly 33,8° F to 36,9° F) beneath a cold water layer which covered the bank, extending to a depth of 100 meters and having temperatures below 0° C (32° F).

The good fishing conditions at the Northern edge of the bank still were existing even after we left the fishing area, and many foreign ships made use of it during the whole month of March.

Burgeo Bank

The hydrographic conditions at the Burgeo Bank were similar to those which were met before at the St. Pierre Bank. There the cod concentrations also kept in a depth of 180 to 200 meters beneath a cold water zone, at the slope of the bank. The hourly catch was 15 to 40 baskets. However, the average lengths of the cod were around 65 to 80 centimeters (26" to 32") which is much more than at the St. Pierre Bank. Besides the age group 1956, the age groups 1957, 1955, and 1954 were almost uniformly represented in the catches. About half of the fish was in pre-spawning condition (see fig. 20). At the Southern slope of the Burgeo Bank, in a depth of 280 to 330 meters, ~~Norway haddock~~ redfish was caught of a length of about 30 centimeters (12"). The hourly catches were about 40 baskets.

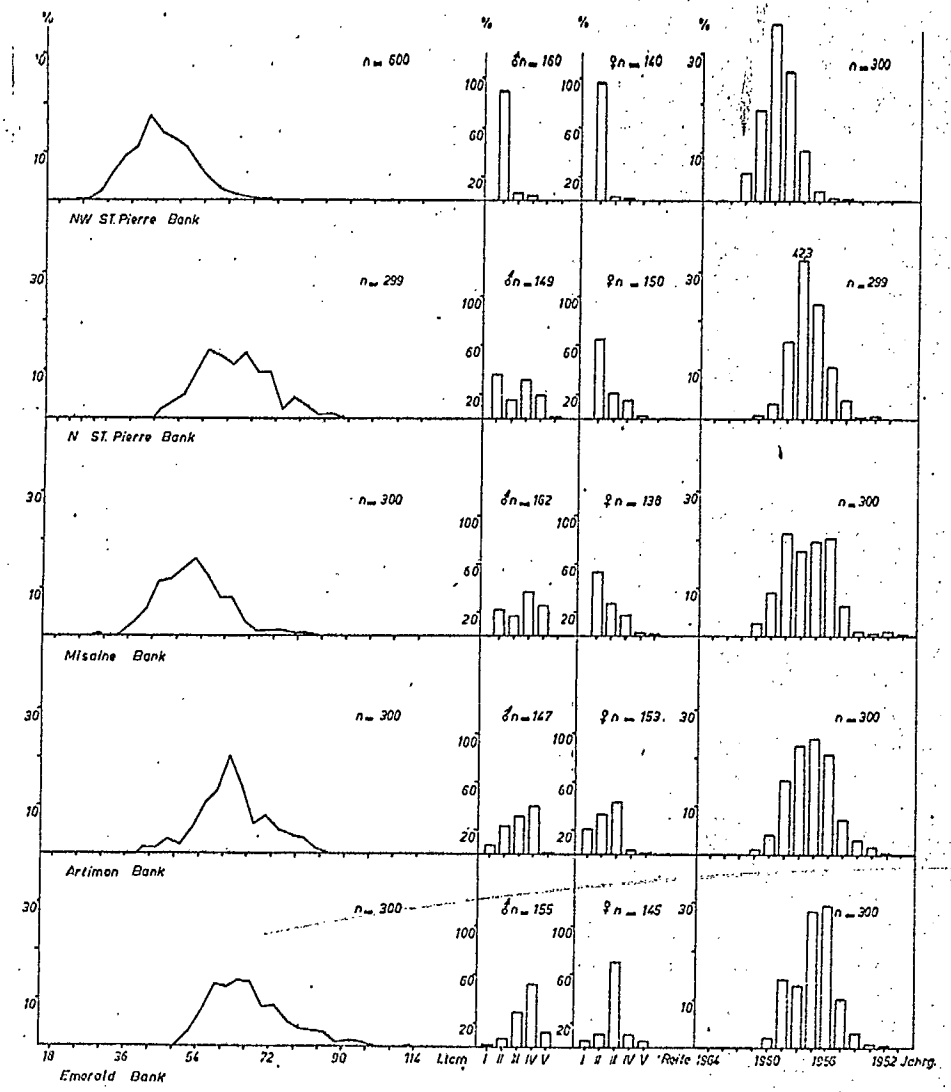


Fig. 20

Length distribution (in centimeters), maturity groups, and age groups of the cod, caught during the voyage of the "E.Haeckel" from February 29, to March 21, 1964

Misaine Bank

The first bank of the Nova Scotia Shelf was the Misaine Bank because the fishing areas further North, East of Cape Breton, were covered by drift ice.

At the Eastern edge of the Bank, in depths of 150 to 200 metens, 10 to 30 baskets of cod were caught per hour. Mostly, it was small and medium size fish, the average lengths of the cod being 40 to 60 centimeters (16" to 24").

The catches included about 20% fish of an age of 5 to 8 years. Most of the cod was juvenile, others were in "non-pregnant"(virgin ?) condition or in the first stage of the spawning maturity. (fig. 20). Fishing at the bank was difficult because of advancing drift ice and due to an uneven bottom profile.

Artimon Bank

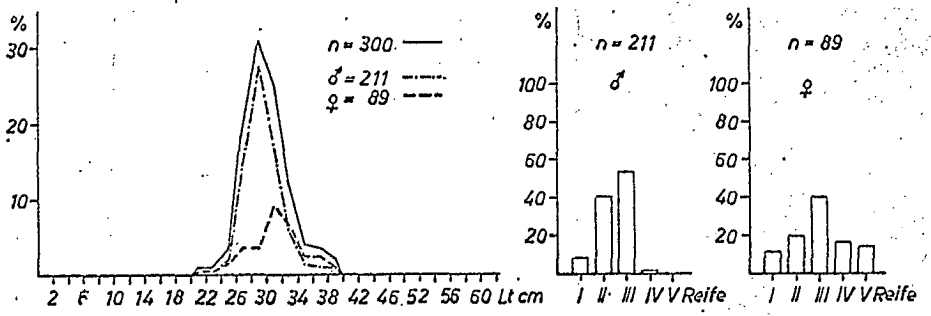
The hydrographic situation at the Artimon Bank was similar to the ones found at the other banks in more northern location. This bank itself also was covered by cold water while warmer water was found at the slope. At the slope of the bank, consequently 25 to 75 baskets of cod per hour were caught in a temperature range of 2,5° C (36,5° F). This fish had medium lengths of about 55 to 75 centimeters (21 7/8" to 30"). Corresponding to the conditions found at the Misaine Bank, here the age groups 1957, 1956, 1958, and 1959, were represented most frequently, however a larger number of fish were in the pre-spawning condition.

At the Artimon Bank, a large number of foreign fishing vessels were met during the experimental fishing of the "Haeckel" which vessels worked there during the whole month of March.

Banquereau Bank

At occasion of experimental fishing at the Banquereau Bank, in the middle of March, no concentrations of fish were

noticed which would justify fishing. Only one haul from a depth of 190 to 250 meters, at the South Eastern edge of the bank, yielding 50 baskets++)/trawling hour, represented an exception. The ~~Norway haddock~~ redfish, having lengths of 25 to 33 centimeters (9 7/8" to 13 1/4") was considered as small. (Fig. 21)



Sable Island Bank

The search for fish covered the Western and South Eastern part. While, at the South Eastern part, there/were no results worth to be mentioned, we had catches of 5 to 25 baskets of ~~coal fish~~ pollock and cod per hour at the West side of the bank, in a depth of 90 to 110 meters. The ~~coal fish~~ pollock was very predominant in the catches showing average lengths of 70 to 80 centimeters (28" to 32") exceeding those of the cod which was caught at the same time, having average lengths of 50 to 60 centimeters (20" to 30"). The water temperature+) at fishing level were between 1,8° C and 4° C (35,24° F to 39,2° F).

+) readings
++) of ~~Norway haddock~~ redfish and cod,

Sambro Bank

At the Sambro Bank, fishing was done only for a short time. No fish occurence was noticed.

Emerald Bank

Fishing conditions were varying strongly at the Emerald Bank, in March. At the beginning and at the end of the month, West-German, British, and Japanese vessels obtained good results at the bank while, at the time of our search work in the middle of March, only minor results were obtained at the Emerald Bank. There the results of the "Haeckel" were 2 to 10 baskets of cod/trawling hour. We met much better conditions South of the Emerald Bank. In a depths of 150 meters and at water temperatures at the bottom of 1,8° C (35,24° F), hourly catches of 300 baskets ~~coal fish~~ pollock were obtained. The ~~coal fish~~ pollock had lengths of 42 to 52 centimeters (16 3/4" to 20 5/8"), belonging almost exclusively to the age group 1960. (see Fig. 22).

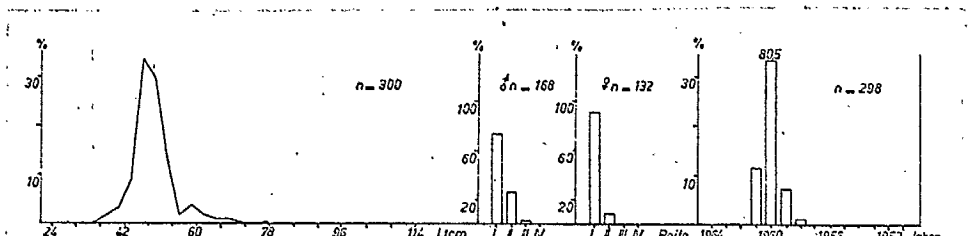


Fig. 22

Length distribution (in centimeters), maturity groups, and age groups of the ~~coal fish~~ pollock from the Emerald Bank, March 1964.

In the vicinity of the areas where the ~~coal fish~~ pollock was caught, cod and ~~Norway haddock~~ redfish was located in depths 150 to 190 meters, yielding about 20 baskets/hour. The cod had average lengths of 53 to 75 centimeters (21" to 30"). Moreover, some Herring was caught also.

Summary

During the voyage of the fishery research ship "Ernst Haeckel" to the areas South of Newfoundland and to the shelf of Nova Scotia, from February 29, to March 21, 1964, fishing opportunities could be proven at the St. Pierre, Artimon and Emerald Banks. Particular importance has the fishing area at the St. Pierre Bank. After the boat "Becher" had had excellent results there, during the previous voyage, the good fishing conditions lasted through the whole month of March. Main object at this location was large and medium size cod and ~~coal fish~~ pollock. (slopes, warm water)

Table 10 Compilation of the fishing results during the voyage of FFS "E. Haeckel", February 29, to March 21, 1964, to the South of Newfoundland and Nova Scotia.

Fishing area	Green Banks	St.Pierre Bank	Burgeo Bank	Misaine Bank	Artimon Bank	Banqu. Bank	Sable Sambro Bank	Total
Number of hauls	4	18	8	3	9	4	14	60
Number of trawling hours	3	24,8	12	3	9,2	3,8	15	70,8
Total catch in numb.of baskets	9	664	257	48	237	47	344	1606
Catch/trawling hour (baskets)	3	27	21,5	16	25,8	12,4	23	22,7
Best haul/trawling hour	4	110	45	30	78	50	270	
Predominant kind of fish	Mix	cod	cod	cod	cod	cod	~~coal fish~~ pollock	
trawling depths meters	90-360	120-310	170-335	150-350	100-210	125-200	90-170	

In order to obtain a preliminary final result of our research work at the Southern Newfoundland Banks and at the Nova Scotia shelf, another voyage of the FFS "Ernst Haeckel" to these areas was planned for the beginning of the year 1965.

However, we were forced to interrupt the voyage, before we reached the working area, because of a crankshaft rupture inmidst of the Atlantic.

Therefore, the provisional final result of the search work South of Newfoundland is represented now through the 2 voyages of the trawler "Cottbus" and the fishing and factory ship "Bernhard Kellermann" which voyageswere carried out successively from September to November 1964. We are dealing with both voyages simultaneously, for simplicity. Unfortunately, no log information of these two vessels is available so the data remain somewhat incomplete.

10th and 11th voyages, from September 16, to October 1964, ("Cottbus") and from October 11, to November 11, 1964, ("Kellermann").

The search trip of the trawler "Cottbus" was to visit the areas of the St. George's Bank , the Nova Scotia Shelf and the banks South of Newfoundland.

The Nova Scotia Shelf and the St. George's Bank.

The "Cottbus" startet the search for fish at the St. George's Bank and at the Brown's Bank which latter is located further North.

At the Brown's Bank, trial hauls were carried out in a depth of 100 and 200 meters, resulting in catches of 5 to 10 baskets/ hour, the composition of the catches alternating between haddock (in contrast to ~~Norway haddock~~ redfish) and small ~~coal fish~~ pollock. Some west German vessels had similar results. According to information obtained from them, fishing at the Brown's Bank was much more abundant at the beginning of September.

Subsequently, the search work was continued at the St. George's Bank. At the position 42° 06' N 65° 58' W, the "Cottbus" made catches of 50 baskets of big cod / hour in depths of 250 to 270 meters.

Foreign vessels made use of the cod concentrations at this location

successfully during several more days.

The "Cottbus" continued the search for fish in the meantime and met a large Soviet fishing fleet, fishing herring at 42° 12' N 66° 57' W, and which fleet obtained very good results of 30 to 50 tons/day.

The trawler left the St. George's Bank on September 21. The subsequent stations of the search voyage were the Emerald and the La Have Banks. The results in both of these areas were not worth to be mentioned. Subsequently, the Sable Island Bank, the Banquereau Bank, with the Gully South of it, and the Misaine Bank were visited. There the catches were very poor also, yielding results between 1 and 20 baskets after hauls of 2 hours duration.

The "Cottbus" obtained much better results in a fishing area East of Cape Breton. On September 26th, 50 to 80 baskets of fish were netted from hauls of 2 hours duration at 46° 00' N 58° 54' W. 80% to 90% of the catches consisted of large ~~coal fish~~ pollock while the rest was small ~~Norway haddock.~~ redfish

South Newfoundland Banks

Since the beginning of October, the "Cottbus" ~~had~~/changed the location of the search work to the banks South of Newfoundland. The St.Pierre Bank did not yield catches worth to be mentioned, the best hauls yielding about 10 baskets/hour.

In contrast, the fishing situation improved toward the Burgeo Bank where good ~~Norway haddock~~ redfish catches were made at 46° 42' N 57° 24' W. The catches varied from 80 to 100 baskets in day time and up to 30 baskets in night time, after hauls of two hours duration. The ~~Norway haddock~~ redfish was not very uniform regarding the size. Small fish was predominant which resulted in too small a yield when processed by machine. The "Cottbus" worked in this fishing area until the

"Kellermann" arrived, and left the fishing area on October 12. The"Kellermann" continued the search work of the trawler "Cottbus". After a short stay in the area of the Burgeo Bank and at the North-Western edge of the St. Pierre Bank where moderate catches +) were made, the "Kellermann" did intensive fishing work from October 16, to October 28, at the Banquereau Bank. The daily results were around 23 tons. Mainly fishing was done at 44° 20' N; 57° 40' W. A search for fish further South at the Sable Island Bank and at the Gully, was not successful.

From November 1, to November 5, the "Kellermann" searched the fishing areas of the Misaine and Artimon Banks and those East of Cape Breton. The daily catches varied from 11 to 30 tons. The average was 20 tons per day. In these fishing areas, predominantly cod and ~~coal fish~~ pollock were caught.

From there, the "Kellermann" sailed to the South-East edge of the Grand Newfoundland Bank. During three days fishing work at 44°00' N; 49°00' W, the daily catches were about 30 tons of small ~~Norway haddock~~ redfish which was not very suitable for the fillet production. From the Grand Bank the "Kellermann" sailed,on November 12, toward North in order to carry out commercial fishing in the Newfoundland area.

Summary

During the voyage of the trawler "Cottbus" in September/October 1964, fish concentrations,sufficient for fishing operations, were met as follows: Haddock (in contrast to ~~Norway haddock~~ redfish) at the St.George's Bank, large ~~coal fish~~ pollock East of Cape Breton, and small ~~Norway haddock~~ redfish at the Burgeo Bank. The high air temperature at the St. George's Bank was unfavourable regarding the storage of fish. All of the fishing areas visited during the voyage had a sea bottom favourable for trawling.

The fishing and factory ship "Bernhard Kellermann" worked mainly at the Eastern edge of the Nova Scotia Shelf (Banquereau- and Maisaine Banks, and Cape Breton), and at the South Eastern edge

+) of Norway haddock

of the Grand Newfoundland Bank. The Kellermann obtained maximum catches of 30 ton/day.

Discussion

The courses and outcome of the outlined 11 research- and search voyages show that the fishing conditions of the individual banks South of Newfoundland and of the Nova Scotia Shelf vary considerably over the years and with the seasons. Therefore, we are dealing further below only with the banks or fishing areas which made possible consistently good or medium catches or temporarily yielded very good catches.

The majority of the banks yielding catches which are too small or which don't satisfy in respect of the mixture of kinds of fish, are not considered anymore in this context.

Southern banks of Newfoundland

At the shelf South of Newfoundland, the best catches were made at the St. Pierre Bank and in the trench toward the Green Banks, and temporarily at the Southern edge of the Grand Newfoundland Bank.

St. Pierre Bank and Green Banks

The St. Pierre Bank has been known since long as a fishing area of Canadian and European fishing vessels. The most favourable fishing conditions were met during the months of December until April, and they are mainly based on the winter - and pre-spawning concentrations of cod which are met there. However, the results at the St. Pierre Bank depend on the hydrographic situation existing at a time and which situation may vary according to the influence of different water. Good fish concentrations are frequently met in the trench between the St. Pierre Bank and the Green Banks. (Corlett, 1962; Ancellin 1961). At this location, the "Becher" and the Haeckel" landed good

catches of large cod and ~~coal fish~~ pollock during their 1964 voyages. Furthermore, during these voyages, large cod occurrences could be located at the North- or North West Side of the St. Pierre Bank where the fish stayed below a depth of 120 meters underneath a cold water layer of 1 to 2,7° C (roughly 34° F to 36,9° F).

However in 1965, according to investigations of the "Herwig", obviously very unfavourable hydrographical conditions existed in the area of this bank in form of low water temperatures which prevented large fish concentrations from occuring.

Burgeo Bank

The Burgeo Bank yielded relatively uniform results of 20 to 25 baskets/trawling hour during the whole trip. The catches consisted mainly of ~~Norway haddock~~ redfish, most of it marketable, and large cod.

~~Norway haddock~~ Redfish occured particularly at the slope of the Bank toward the Laurentian Channel while the cod was caught right above the bank. The cod is considered as belonging to the West Coast stock of Newfoundland (Corlett, 1962) which spreads in Northern direction up to the St. George's Bay.

When considering fishing at the Burgeo Bank, one has to think of the fact that ice conditions hinder the work frequently during the first few months of the year at a time when the best fishing conditions exist. During our voyages, we happened to be several times in a position to carry out fishing experiments only for a few days since drift ice fields made further work impossible.

The South East and South West edges of the Grand Bank

The South Eastern and South Western edges of the Grand Bank near Newfoundland were visited only during some of our voyages. The results were varying whereby the voyage of the "Brandenburg" is outstanding with maximum catches of ~~Norway haddock~~ redfish of 270 baskets/

trawling hour. However, the search was carried out in September/ October which makes it difficult to compare the results with those of other vessels of our fleet.

Fishing results and estimates of foreign vessels, working in this area, were fairly varied also. After good results in the beginning, the catches started decreasing in the sixties due to intensified fishing activity (Corlett, 1962).

Besides ~~Norway haddock~~ redfish, being only of small average sizes of 24 to 30 centimeters (9 1/2" to 12"), haddock (Noskov, 1961), cod (Kamenow 1954), and flat fish (Zukowski, 1964) were met at the Southern edge of the Grand Bank. However, according to the landed quantities and sizes of these fish kinds, no favourable fishing conditions can be expected either in the future for our fleet.

Nova Scotia Shelf

According to the results of our investigations, the banks at the Eastern edge of the shelf, from Cape Breton to the Banquereau Bank in the first place, can be considered as makeshift fishing areas.

Main fishing object at these banks is cod besides ~~Norway haddock~~ redfish, haddock and some ~~coal fish~~ pollock.

Cape Breton, up to the Artimon Bank

At the slope of the shelf East of Cape Breton and more to the South, down to the Artimon Bank, larger quantities of cod are caught in winter time which is part of the St. Lawrence Gulf stock, travelling South in winter time. (Kobler, 1965).

The average lengths of the fishes decreased during the last (few) years considerably as a consequence of the increased fishing activity of Canadian and European vessels. The average

size of the fishes is from 40 to 50 centimeters (16" to 20").

Banquereau Bank

The cod of the Banquereau Bank represents a stock of its own, being larger in the average than the cod East of Cape Breton. However, the quantities which we landed during our trips were lower than those of the fishing areas further North. Similar to the conditions existing at most of the banks of the South Newfoundland Shelf and of the Nova Scotia Shelf, the cod usually is found to stay during the winter months at the slopes of the of the banks underneath the cold water layers. Accordingly, the "Herwig" obtained, in 1965, in the Banquereau Gully, catches of 100 to 150 baskets/haour whereby the cod measured about 60 centimeters (24") (Messtorf, 1965).

Besides cod, ~~Norway haddock~~ redfish occurs also at the Banquereau Bank. However, its size measures up to about 30 centimeters (12"). Our optimum catches of ~~Norway haddock~~ redfish at the Bank were around 50 baskets/trawling hour.

Translator's note:

Shelf: Continental Shelf

100 fathoms : 182.9 meters or roughly 183 meters

1 ton (t) : 1,000 Kilograms : 2,204.6 lbs

1 Basket : 60 Kilograms : 134.4 lbs

Since the various dictionaries don't agree in respect of fish species, the translator used the special list of fish terms of the Translation Bureau, for the translation.

FFS "Eisenach" means Fishery Research Ship "Eisenach".

The translator was unable to locate an explanation for the meaning of the letter "n" as frequently used in the graphs. Fig. 14 could possibly give a clue.

The translation was completed on April 5, 1967.

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