

E. A. W.

CRUISE REPORT OF F.R.V. "SCOTIA" - JULY, 1949.

NARRATIVE.

After the installation of various new items of equipment, the "Scotia" left Greenock on 9th July and proceeded to carry out tests in the Firth of Clyde. The Cheraikoff log, the Revometer and the Echometer worked satisfactorily but tests with the S.F. were not so encouraging. In the late afternoon the technical experts and Captain Bruce (on leave) were landed at Courock and the "Scotia" proceeded under the command of Mr. Finlayson. Later the ship anchored at Millport where some scientific gear, landed at the end of the previous cruise for safe custody, was picked up the following morning. Thereafter, the vessel continued down the Firth and, on rounding Kintyre, a course was set for Rockall Bank. Hydrographical and biological observations were made on each meridian along this line and, with fine weather prevailing, rapid progress was made.

Trawling was carried out on Rockall Bank where four Fleetwood trawlers were observed at work. From this point hydrographical and planktonic observations were continued northwards over George Bligh Bank to Lousy Bank. Hitherto the echometer had worked perfectly, but at this point a fault developed and, although sounding continued satisfactorily in shallow water, some difficulty was experienced at greater depths and records henceforth are not continuous. On Lousy Bank the depth at the first position proved too great for trawling and although the shallow patch at about 100 fathoms was located very accurately, it was found that an Aberdeen liner had just shot lines over it. It was, therefore, considered inadvisable to trawl there and the programme was continued by proceeding to Bill Bailey's Bank where two hauls were carried out in addition to other observations. With the weather remaining fine excellent progress was made and trawling was carried out at three positions on Faroe Bank, where a number of fishing vessels were seen at work. With two deep water stations to the southern tip of the Faroes the first section of the programme was completed and the "Scotia" came to anchor at Vaag late in the evening of 15th July.

During the weekend in Vaag a visit was paid to the LORAN station in the vicinity. A number of Peterhead drifter liners fishing at the Hook Rock spent the weekend in Vaag.

Up to this point the old 20' Otter trawl had been used in trawling with the new 7' x 3 1/2' boards. This had been decided upon in view of the unknown nature of the sea floor on the banks. Results, however, were disappointing and arrangements were then made for bringing the new 28' net (Rind specification - Frison manufacture) into use with the larger boards. This was done in Vaag and measurements were made on the cod-end, square and wings while still dry.

The "Scotia" left Vaag on 16th July and commenced the trawling survey of Faroese grounds. Some difficulty was experienced with the trawl at first and, although several very successful hauls followed, further trouble was encountered. This occurred mainly in shooting the trawl - immediately the boards were lowered into the water and towing commenced. Frequently the boards fouled one another and the gear had to be hauled immediately and disentangled before being shot again. Work was finally brought to a standstill by damage to both boards which necessitated repairs. The vessel was then brought to anchor at Westmannhavn where one whole day was spent repairing the damage. This work, which in many cases would have been considered a "shore job", was undertaken willingly

willingly and efficiently by the engineers and deck crew under the supervision of Mr. Craig.

Scientific work was resumed at sea on the morning of 21st July with a trawl off Nyggenæs and continued along the north coast. Operations on this occasion were more successful, although caution was still required in shooting the gear. Although delayed by the fouling of the gear, the work of the cruise as a whole was well ahead of schedule at this point and, accordingly, it was decided to work the I.C.R.S. line of hydrobiological stations northwards, from Anaberg into the deep water at 63° 30' N. This was completed successfully and the ship returned south to enter Klaksvig, where further alterations to the angle iron of the after otter board were undertaken by Mr. Thomson the relieving second engineer. This done, the "Scotia" proceeded to sea on Sunday morning and carried out general investigations on the Fuglo, Svino, Nolso grounds before work was curtailed by the presence of dense fog. With some difficulty the vessel made Thorshavn on 25th July. Coal and water were taken on board the following day but the resumption of work was delayed by persistent fog until 29th July. The remaining stations at Faroe were quickly worked and the final line from Monk Rock to Sule Skerry was completed on the evening of 31st July. Entering the Moray Firth, two additional trawl stations were undertaken before docking at Aberdeen at 7 p.m. on 1st August. In addition to completing the entire programme, a number of extra stations including trawl and hydrobiological observations were worked throughout the cruise.

Trawling:

Thirty-four trawl hauls were carried out during the cruise with results varying from a completely blank haul to about eight baskets of fish. During the survey of the banks the small 20 foot trawl was in use but results on this section of the programme were disappointing. As was expected, some difficulty was experienced in getting the trawl on the bottom and this was accomplished only by allowing four or five times the depth in warp out aft. In the majority of cases this entailed paying out almost the full length of warp on the winch. This restricted trawling to the shallowest parts on the banks. On Rockall bank no species of fish was abundant but haddock and megrim were the commonest species with small lemon soles, Solea variegata (1), Gadus Pentasscu, G. minutus, Angler, Sebastes, Skate (R. fullonica and R. maculata) and Red Gurnards also represented. Aurelia and various common Echinoderms formed the bulk of the invertebrate catch.

Trawling on Bill Bailey's and Faroe Banks also gave poor catches. As at Rockall the commonest species were haddock and megrim with certain Echinoderms representing the invertebrate fauna. The meagre results obtained on these three offshore banks indicates a similarity in the fish and invertebrate populations.

Trawl catches round the Faroes varied considerably. This may have been due partly to the manner in which the gear was fishing but the chief reason was undoubtedly the fact that fish were being caught during the hours of darkness whereas daylight fishing was so unprofitable as to cause trawlers to be idle during the day. A large fleet of trawlers mainly from Aberdeen and Grimsby was at work in the region. These were concentrated chiefly in two areas (a) from Nyggenæs to Skuo on the west side and (b) from Fuglo to off Nolso on the east side. Good fishing was

/being

being experienced by these vessels during the night - their catch being composed chiefly of haddock, including a good proportion of large fish, cod and lemon soles. During the daytime, however, round fish disappeared from the catches and the few vessels which continued to fish were being rewarded with only a few baskets of fish - mostly flats.

As far as possible trawling with the "Scotia" was carried out during the night in order to obtain the best representative samples but this was not possible in every case. The principal species caught were cod, haddock and lemon sole. Although round fish generally were poorly represented in daylight hauls the best catch of cod (27 fish) strangely enough was taken on board during the day E. of Myggnesen.

Haddock of marketable size were very scarce. In a total of 699 fish taken round the islands 79 were 0 group (1949 brood), 555 were 1+ (1948 brood) while only 65 fish over 25 cm. belonged to older broods. Of these marketable haddock a number were large fish of over 50 cm. The figures for the 1948 brood confirm the "Explorer" records of May of this year which showed this brood as the most numerous year class at Faroe. On this occasion the best catches of 1948 haddock were 101 off Sandø, 73 on the Huse ground off Nolsoe and off Sine, 72 and 66 off Nolsoe - all for one hour's fishing. ^{from personal experience} these records suggest a better recruitment for the 1948 brood at Faroe than in Scottish waters and that in comparison with other years, the recruitment to the stocks is at least of average strength and may possibly be higher. Forty-six of the 79 baby haddock (1949) were taken off Fuglo but small numbers were caught elsewhere on both sides of the islands. These fish ranged from 5 to 10 cm. in length.

Lemon soles were taken in most hauls and very good results were obtained in the Nolsoe area. Other flats were scarce except for long rough dabs which were numerous and widely distributed. One big catch of small *Sebastes* was taken on board W. of Sydø where eleven specimens of *Chimaera monstrosa* were also caught. These were preserved.

Some heavy hauls of bottom fauna were experienced. These included several big collections of one species as for example two baskets of *Pecten opercularis* at Esbjerg and on the Huse ground and 1½ baskets off Nolsoe but a wide variety of forms was found on most grounds. *Polychaeta*, represented chiefly by *Echinoids* (*Echinus esculentus*, *E. acutus*, *Spatangus* sp.) and *Asteroids* (*Asterias*, *Hippasterias*, *Astropecten*, *Henricia*, *Solaster*) predominated throughout the area. Crustacea were represented chiefly by *Pandalus* (3 jars preserved), *Munida*, *Galathea*, *Nyas*, *Supagurus* and *Balanus hameri* and Mollusca by *Modiolus*, *Cardium*, *Perna*, *Buccinum* in addition to various species of *Pecten*. *Polychaeta* worms and hydroids were also common. *Urella aurita* was also numerous in both tow-nets and trawl. The presence of this jellyfish in large numbers, together with the cessation of the daylight fishery, usually brings the Faroe summer trawl fishery to a close. The early appearance of both these features seems to suggest a considerably shorter season than usual.

On reaching home waters three hauls were made from the edge of the shelf to the Sule, two of which were on new positions. These hauls were interesting and should be repeated. Of the 45 haddock taken at these positions none was younger than 2 year old and most would appear to belong to the 1945 brood.

Two additional hauls in the Moray Firth gave good mixed catches with

a fair proportion of lemon soles and plaice. At the second of these positions (off Rockall) four specimens of O- haddock and twelve O- whiting were taken along with over 200 specimens of O- *Gadus esarkii*.

Trawling Gear:

No mesh measurements were taken on the 20' trawl as this was an old net and much repaired. Complete measurements, however, were made on the new 28' net (made at H.M. Prison of manilla twine) before use and after 7 hauls. The average measurements were as follows:-

80 mm. Cod-end	Dry before use.	Wet after 7 hauls.	Shrinkage.
bottom	76.3	70.5	= 6.0 mm.
middle	78.6	70.5	= 8.1 mm.
top	77.9	69.8	= 8.1 mm.
4" (101.6 mm.) square	100.6	90.5	= 10.3 mm.
" fore wing	96.5	85.3	= 11.2 mm.
" after wing	96.3	87.7	= 8.6 mm.

The cod-end was measured again after a further 15 hauls but no appreciable difference in the size of mesh was found.

At the end of the cruise the 30' trawl was used for 3 hauls. This net had been in use prior to the July cruise for a few hauls. Measurements were taken on this occasion before use.

Of the 3 nets tried out the 28' would appear to be the most useful gear for the "Scotia" as it has an advantage over the 20' net from the point of view of size and is more easily handled than the 30' net. It is desirable, however, to persevere with the 30' net during the following cruise in order to accustom the crew to handling it and to give it a fair trial before deciding whether to discard it in favour of the 28' net or not. Another good reason for reverting to the 28' net lies in the strength of the warps. These are scarcely strong enough for towing the heavier boards and net particularly if the gear should come fast.

In view of the unknown nature of the sea bottom at many trawling positions surprisingly little damage was sustained by the nets. The new boards, however, received some rough treatment and, although repairs were carried out on board, Mr. Craig has suggested some alterations with a view to improving their efficiency.

Plankton:

On the line outward from Kintyre, jellyfish (*Aurelia* and *Cyanea*) were found to be very common as far as the 9th meridian. At the 8th and 9th meridians, Copepoda were very abundant while *Flourobachia*, *Limacina*, Siphonophora, small medusoids and young fish were also recognized in the plankton catches. Westwards towards Rockall the ordinary tow-net hauls were less remarkable but copepoda, *Limacina* and medusoids continued to appear in the catches. Oblique deep water hauls with the metre silk with 1000 ft. wire out at the 10th and 12th meridians yielded good varied catches including deep water fishes, Crustacea (including copepods, euphausiids and amphipods) cephalopods and medusoids.

Northwards over Rockall Bank and beyond to Bligh Bank no great concentration of plankton was experienced. Small medusoids, siphonophores, amphipods, copepods and a few *Aurelia* were identified. North of Bligh Bank

Bank (at 59°19'N - 13°14'W.) a good collection was taken from the lowest tow-net (250 m.). This included Sagitta, Diphyes, Amphipoda, young fish (including scopelids) and one leptocephalus of Anquilla vulgaris. At the following station, rectangle XY 13^a, an oblique deep haul yielded a good varied collection which included deep water fishes, Clione, deep water Crustacea and medusoids.

Diatoms were prominent on Lousy Bank, where tow-net catches revealed the presence of a varied plankton including siphonophores, larval Decapoda, Amphipoda, Clione, Isopods, Sagitta, Berce, Aglantha and other medusoids. Similar forms were also found at two deep water stations between Lousy Bank and Bill Bailey's Bank and on the latter Clione was recognized in addition to those forms already named.

On Faroe Bank the plankton resembled that of water to the westward with the possible addition of salps and young Onos (at the surface). Another concentration of diatoms was encountered at the last station. At the two deep water positions between Faroe Bank and the Faroes, Calanus was found in very dense concentration together with siphonophores (Physophora) Aurelia, Aglantha and other medusoids, Sagitta, salps and amphipods.

On the Faroe plateau, Calanus was again found in concentration N. of N. Sydaro, at three positions northwards from Kniberg to 63°30'N. and off Nolso. At most of these positions, the Calanus was located below 100 m. while hauls in the upper layers were remarkably poor. On western grounds Aurelia and young fish were common and salps, Staurophora, Aglantha and other medusoids were also recognized. Anomalocera was identified N. of Kniberg at 63°30'N. On the east side of the islands, plankton catches were poor at Fugle and Svino, although Aurelia continued to be abundant. Berce, Staurophora, larval Decapoda and young fish were also noted on these grounds. Diatoms, however, were well represented in the standard net on these grounds and also on the Baga ground but not at the Nolso position where Calanus was common. Anomalocera was again identified in this area. While in Thorshavn, Aurelia and Berce were observed in the water in great concentration.

On the final section, from S. Faroe to the Lule, Aurelia was again present and Calanus was located once more in concentration in XY 19^a. Good collections were obtained in XY 19^a in which Megalocystiphanes was recognized for the first time during the cruise along with other euphausiids. Sagitta, Physophora, Amphipoda, Cephalopoda and young fish were also recognized. Special tow-net hauls were made at this station to obtain material for Dr. Kon of Reading. These were preserved in absolute alcohol.

Although conditions were perfect and good look-out was kept for southern plankton forms such as Physalia and Velella, none was seen.

Hydrography:

As may be expected on a cruise covering such a wide area and depth range, temperatures varied considerably from place to place. The highest surface temperatures of the cruise were recorded on the Mintyre-Rockall line, between the 8th and 13th lines of longitude, where the range was from 14.20°C to 15.86°C. Near the bottom in this area readings fell from 10.41°C at 8°W. to 3.48°C at 11°W. where the deepest sounding of the cruise was obtained - 2296 m. Bottom temperatures at the stations on either side of this position also gave low readings. A marked thermocline represented by a drop of over 3°C. was located between the 8th and 10th meridians at depths of 10 to 20 m. deepening to 30 to 50 m.

On Rockall Bank temperatures were rather lower at the surface (12.64° to 13.51°C.) while bottom readings were from 8.82° to 9.34°C. Thereafter, as the /ship

ship worked northwards and then eastwards towards Faroe, surface temperatures fell slowly to 11.00° to 11.50°C . Bottom temperatures on the various banks covered remained generally between 8° and 9°C , while in the deep water separating the shallows lower readings were obtained. The first Arctic water was encountered east of Faroe Bank where minus 0.50°C . was recorded at a depth of 900 m.

Surface readings on the fishing grounds round the Faroes ranged from 9.00°C . at the Monk Rock to 11.15°C . west of Myggenaes but most of the temperatures lay between 9.40° and 9.64°C . Bottom temperatures in the same area were uniformly from 8.20° to 9.11°C .

On the hydrobiological line N. from Haniberg surface temperatures were slightly higher than those round the islands - varying from 10.36° to 11.28°C . In this area, Arctic water was located at four stations three of which gave readings below zero from a depth of 600 m. to a maximum depth of 1520 m. at the most northerly station on the line.

On the Monk Rock - Sule Skerry line, surface temperatures rose steadily reaching a maximum of 14.40°C . at the second last station. Arctic water was found in YY 19^a at a depth of 558 m. where the reading was 0.20°C . At the following station however, YY 19^d the temperature at the bottom, 604 m. was as high as 6.57°C .

A total of 140 drift bottles was liberated during the cruise. Hydrographic gear on the whole worked satisfactorily. On one occasion, the deepest station of the cruise, the midships winch failed to haul the load of 4 reversible water bottles. The chief engineer succeeded in rectifying the fault but it is understood that the winch will require attention ashore. Four brass messengers were lost during the cruise - some of these losses were due to carelessness but in at least one case the spring was faulty.

Echometer:

The new Hughes M. 21 echometer worked very well over the Kintyre-Rockall line and a complete trace was preserved. This included the deepest soundings of the trip. Sounding was continued northwards over George Bligh Bank to Lousy Bank but a fault developed at this point and sounding in deep water became possible only by phasing down on the high speed usually employed in shallower waters. Later the fault disappeared and better results were obtained on the Monk Rock - Sule Skerry section. During the cruise some interesting traces were obtained of grounds seldom or never before visited by a Scottish research vessel.

The positioning of the vessel throughout was good although it is understood that the D.F. has not proved so useful in this connection as it might be.

During the cruise, traces were examined for evidence of fish shoals but nothing was observed which could be attributed to this cause. A test was carried out with the P.N. water bottle from the midships winch and the progress of the bottle up and down through the water was clearly followed on the trace.

General:

A number of grey seals were observed on the rocks at the Mull of Kintyre. /Whales

Whales were noted on Bill Bailey's Bank and W. of Myggenæs. While in Vaag a school of whales was sighted and preparations were made for a whale hunt by the local population. Unfortunately the school escaped to seawards. On the following Saturday evening, however, the alarm was again given while "Scotia" was in Klaksvig. On this occasion the complete hunt was witnessed and 40 whales and 4 dolphins were killed in the eve. Three days later while "Scotia" was coaling in Thorshavn another alarm was raised and the hunt was observed from the bridge of the ship. On this occasion 81 whales were killed in the inner harbour - the water being turned red with blood in the process. Great excitement prevails during these hunts and all shops close down and work stops (this included coaling of the "Scotia").

The complete whale hunt, and the disposal of the meat and carcasses form an interesting feature of life in the Faroes. The whales on this occasion were all coaling whales and the dolphins the white sided species.

While in Thorshavn, H.M.S. "Wave" returning from fishery patrol at Iceland called and, on the invitation of the Commanding Officer, a visit was paid to the ship. The following morning Commander Bull and two of his officers visited "Scotia".

BENNET B. RAE
12th August, 1949.

Bennet B. Rae

Circulate:

- Mr. London.
- Dr. Lucas.
- Dr. Rae.
- Mr. Fyefinch.
- 2 Spare.

Other organisms collected in this area, including sponges and medusoids. At several points the water was very turbid and the visibility was poor. The water was generally from that point onwards. The water was turbid and the visibility was poor. The water was generally from that point onwards. The water was turbid and the visibility was poor. The water was generally from that point onwards.

Observations made the water was very turbid and the visibility was poor. The water was generally from that point onwards. The water was turbid and the visibility was poor. The water was generally from that point onwards.

2000-2500 m of fish were taken at a number of points - east of Faroe

SUMMARY OF REPORT ON JULY CRUISE BY "SCOTIA".

The July cruise of the "SCOTIA" covered a wide area from the Clyde to Rockall, George Bligh, Lousy, Bill Bailey's and Faroe Banks. Thereafter the Faroese fishing grounds were examined mainly from the fish stocks viewpoint and the return to Scottish waters was made by way of S. Faroe and Sule Skerry.

The first section of the programme was mainly hydro-biological in nature but trawling was carried out on three of the five banks visited. Trawl catches were very poor, indicating a scarcity of fish, but too much importance should not be attached to this, having regard to the limitations of the "SCOTIA'S" gear for deep water fishing. Haddock and megrim were the commonest species taken. The survey indicated a close similarity between the fish and invertebrate populations of all the banks examined.

Interesting hydrographic and planktonic results were obtained. The highest surface temperatures of the cruise were recorded on the Kintyre Rockall line between the 8th and 13th meridians, where readings of 14.20°C to 15.86°C were obtained. At the bottom in this area, readings fell to 3.48°C at the deepest station of the cruise - 2296 m. Surface temperatures on Rockall Bank were slightly lower, 12.64°C to 13.51°C, and at the bottom 8.82°C to 9.34°C. Thereafter, as the ship worked northwards and eastwards, surface readings fell still lower to 11°C to 11.5°C. The first Arctic water was found east of Faroe Bank, at a depth of 900 m., where minus 0.50°C was recorded.

Jellyfish, Aurelia and Cyanea, were numerous on the outward journey to Rockall as far as the 9th meridian. At this point and at the previous meridian, copepods were found in considerable concentration. Other organisms included Pleurobrachia, Limacina, siphonophores and medusoids. At Rockall, catches were poorer but rich and varied collections were obtained approaching Lousy Bank and generally from that point eastwards to the Faroes. Forms recognised included Sagitta, Diphyes, Physophora, Cloino, Tomopteris, Beroe, Aglantha, Staurophora, Scopelids and at least one leptocephalus (Anguilla). Several deep water hauls with the one metre silk net gave interesting collections including many deep water fishes, crustacea and cephalopods.

Observations round the Faroes showed that over wide areas, daylight fishing was unprofitable for commercial vessels chiefly due to the disappearance of round fish from the catches. Good fishing was being experienced during the hours of darkness, however, when haddock, cod and lemon soles were the commonest species taken. Haddock, however, were comparatively scarce and of those taken by the "SCOTIA", the majority belonged to the 1948 brood. The records of this brood confirm the "EXPLORER'S" records, in May of this year, and appear to indicate somewhat better recruitment at Faroe than in Scottish Waters. Lemon soles were well represented on the Nolso grounds and catches generally gave evidence of a rich invertebrate fauna particularly of echinoderms and certain molluscs such as Pecten opercularis.

Rich hauls of Calanus were taken at a number of points - east of
/Faroe

Faroe Bank, N.W. of Sydero, at a number of stations N. of Enniberg and off Nolso. Aurelia aurita was also common on almost all grounds. Other organisms included Beroe, salps, staurophora, Aglantha, Anomalocera, larval Decapoda and larval fish. On the homeward section from S. Faroe to Sule Skerry, Calanus was again found in dense concentration in mid-channel. Meganykyphanes and other euphausiids were also identified in the same area.

Temperatures round the Faroes were fairly uniform. On the section N. from Enniberg to 63°30'N. Arctic water was found at the four most northerly stations at a depth of 600 m. to the deepest sounding at 1520 m. Arctic water was found at one other point on the section from S. Faroe to Sule Skerry - in mid-channel at the bottom in 558 m. depth. From this point to the coast of Orkney, surface temperatures showed a marked rise to over 14°C.

Sounding by echometer was carried out continuously over the first section of the programme until curtailed by a temporary failure of the apparatus. Later this work was resumed and some interesting traces were obtained of grounds seldom or never before visited by a Scottish research vessel.

BENNET B. RAE.

10th August, 1949.

Circulate:

Mr. London.	Dr. Jespersen.	Mr. Rae.
Captain Champness.	Dr. Blegvad.	Dr. B.B. Rae.
Mr. Graham.	Dr. Lucas.	Mr. R.W. Ellis.
Dr. Taning.	Dr. Carruthers.	Mr. R.E. Craig.
Dr. Devold.	Dr. Tait.	Mr. R. Currie.
Mr. Wimpenny.	Captain Bruce.	
Mr. E. Ford.	(Spare 5).	