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International Council for the
Exploration of the Sea

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REPORT OF THE BLUE WHITING PLANNING GROUP

Charlottenlund, 23-24 November 1977

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REPORT OF THE BLUE WHITING PLANNING GROUP

1. Introduction

The Blue Whiting Planning Group met at Charlottenlund during 23-24 November 1977. The terms of reference were set by the Council's resolution passed at its 65th Statutory Meeting (C.Res.1977/2:10):

"It was decided that

in view of the increased effort allocated to Blue Whiting research by member countries and in view of the need to coordinate this work effectively, a Planning Group of representatives from interested member countries should be established. This Group should meet at Charlottenlund, 23 - 24 November 1977 in order to draw up a coordinated ICES research programme on Blue Whiting including programmes on joint surveys, sampling work and abundance estimates. Plans for working up and presenting data resulting from these research programmes should also be dealt with during the meeting of the Planning Group, which shall be convened by Mr J. Jakobsson."

Those participating in the meeting were :

Dr R.S. Bailey	Marine Laboratory, P.O. Box 101, Victoria Road, Aberdeen AB9 8DB Scotland
Dr N. Daan	Netherlands Institute for Fishery Investigations, Haringkade 1, Postbus 68 IJmuiden 1620, Netherlands
Mr J. Jakobsson (Chairman)	Institute of Marine Research, P.O. Box 390 Skúlagata 4, Reykjavik, Iceland
Mr S.H. Jákupsstovu	Fiskirannsóknarstovan Debessartrod, 3800 Tórshavn Faroe Islands
M A. Maucorps	ISTPM, 150, Quai Gambetta 62200 Boulogne-sur-Mer, France
Mr A. Paciorkowski	Sea Fisheries Institute, Aleja Zjednoczenia 1, 81-345 Gdynia, Poland
Dr M. G. Pawson	Fisheries Laboratory, Lowestoft Suffolk NR33 OHT, England
Prof. D. Sahrhage	Institut für Seefischerei, Palmaille 9 2 Hamburg 50, F.R.G.
Mr Ø. Ulltang	Institute of Marine Research, P.O. Box 1870-72, 5011 Bergen-Nordnes, Norway

It was considered unfortunate that several countries known to fish for blue whiting and to carry out survey work were not represented at the meeting. It was agreed that the Convener should contact the laboratories concerned in order to obtain and circulate as much information as possible on the survey plans of these countries.

2. Coordinated Survey Programme for 1978

2.1 Cruise Plans

Proposed cruises for 1978 with their cruise dates, main objectives and areas are given in Table I. Figures 1-6 show the expected distribution of research effort in two-month periods in 1978.

- 2.1.1 January-February: The southward migration of adult blue whiting to the spawning grounds to the west of Britain will be investigated by "SCOTIA", "ANTON DOHRN", "RYBAK MORSKI", "AMAREL" and G.D.R. and Faroese vessels in the region around Faroe and south to St Kilda. "JOHAN HJORT" will survey the northern North Sea at this time.
- 2.1.2 March-April: "HAVDRON", AMAREL, "GEN. ARCISZEWSKI", "SCOTIA", "J.C. SVABO" and a G.D.R. vessel will survey the main spawning aggregation to the west of Scotland, whilst "CIROLANA" will investigate young fish distribution south into Biscay. The Group requests that "SCOTIA" and "CIROLANA" should attempt to make an acoustic abundance estimate of the spawning stock in early April. The probable spawning to the west and south of Iceland will be investigated by an Icelandic vessel, and "G.O. SARS" will extend the coverage north from the Shetlands to Bear Island, along the Norway coast.
- 2.1.3 May-June: "SCOTIA", "GEN. ARCISZEWSKI" and "AMAREL" will monitor the northerly movement of spent fish around Faroe, and also look for late spawning to the north and east, and an Icelandic research vessel will cover the adjacent area of south-east Iceland. A survey by "G.O. SARS" from Lofoten - Jan Mayen to Bear Island will investigate the presence of adult fish outside the area covered by other vessels.
- 2.1.4 July-August: The distribution of adult blue whiting in oceanic areas between 55°N and Spitzbergen may hopefully be covered by a trawler to be chartered by F.R.G. in June-July. Exploratory fishing will be carried out by an Icelandic vessel to the east and west of Iceland, and the "THALASSA" will also survey the former area. At this time a special lookout should be made for 0-group fish. "G.O. SARS" and "JOHAN HJORT" will continue the coverage of the northern North Sea and Lofoten - Jan Mayen - Bear Island respectively.
- 2.1.5 September-October: At this time the blue whiting is most widely distributed and it is difficult to predict where concentrations may occur. "AMAREL" or "GEN. ARCISZEWSKI" will be working in the Lofoten - Jan Mayen - Spitzbergen area, whilst samples may be obtained from the northern North Sea by "CIROLANA".
- 2.1.6 November-December: Information on the early part of the southerly migration of blue whiting to the West-Britain spawning grounds may be obtained by "RYBAK MORSKI" in 1977 and a G.D.R. vessel in 1978 in the Faroe, south-east Iceland region. A G.D.R. vessel will also survey at Bear Island, and "JOHAN HJORT" and "G.O. SARS" will be in the northern North Sea.

2.1.7 It is noted that the research effort in 1978 is mainly concentrated in the period January-August.

2.2 Survey Procedure and Recommendations

2.2.1 Final cruise plans should be sent to all members of the Group as soon as they become available.

2.2.2 Close contacts should be maintained throughout the cruises between the participating vessels. For this purpose, vessels should make radio contact at 0930 GMT on 2056 KHz each day to exchange information.

2.2.3 Cruise reports including track charts for all cruises up to the end of June should be sent to the Convener in July for incorporation into a report to ICES.

3. Research Objectives

3.1 Spawning distribution

The main spawning area of blue whiting is to the west of the British Isles. There may, however, be significant amounts of spawning in other areas. The Group considered the information from other areas inadequate to draw definite conclusions about their importance and recommends that the problem be investigated in 1978 and 1979, if necessary as a subsidiary of other main objectives. In particular, evidence of spawning concentrations should be looked for in three areas :

- a) Southwest of Iceland;
- b) Along the continental shelf to the north of the Wyville Thompson Ridge;
- c) From the Bay of Biscay north to Porcupine Bank.

3.2 Larval drift and 0-group distribution

According to present information, almost nothing is known about the distribution of juvenile blue whiting from June of their first year of life to the middle of the next year. Incidental observations in the summer indicate that during this period they are distributed in oceanic waters very close to the sea surface and that they may as a result be difficult to detect by a conventional echosounder; there is consequently a need to develop methods of detection and sampling.

The Group recommends that as a first step observations be made in 1978 on the 0-group and 1-group distribution in the course of other investigations with a view to formulating a more intensive programme of research in 1979.

In 1978, at least the following investigations are proposed :

- a) The 0-group survey of Faroe plateau in June will be extended to areas outside the limits of the continental shelf;
- b) English and Scottish investigations will be made west of the British Isles in April to determine the likely direction of drift of blue whiting eggs and larvae;
- c) A survey will be made in the Bay of Biscay and western approaches to the Channel in April for 1-group blue whiting.
- d) Federal Republic of Germany investigations in oceanic areas using a chartered trawler in June-July will include 0-group observations.

All observations of 0- and 1-group distribution should be conveyed to the ICES Statutory Meeting in October 1978.

3.3 Adult migration

There is now a considerable amount of knowledge available on the distribution of adult blue whiting at selected times of the year. The exact course of the migration to and from the spawning area is, however, not well documented. Consequently, considerable priority will be given in 1978 to charting the migration.

- a) Several cruises will be carried out in January-February between the area north of Faroe and the spawning area.
- b) A number of cruises will be carried out in May-June again between the spawning area and the area east of Iceland.

These surveys will include both exploratory fishing surveys designed to chart the existence of commercial concentrations, and acoustic surveys to estimate abundance.

3.4 Stock separation and stock identification

Although there is evidence of discrete spawning areas in blue whiting, it is not at present known whether the whole population can be divided into separate spawning stocks. Samples have been taken since 1974 for analysis of meristic characters and, in addition, blood samples and eye lens samples have been taken for serological work. The Group recommends that the results of these investigations should be presented at the Statutory Meeting in 1978.

3.5 Population dynamics

Since the blue whiting is a very lightly exploited stock, the Group recognises the unique opportunity to establish population parameters before the stock is altered by exploitation. Therefore, considerable effort should be devoted to estimating growth, mortality and recruitment parameters.

The investigation of blue whiting population dynamics is, however, critically dependent on the establishment of a consistent and accurate method of age determination.

3.5.1 Age determination

The problem of age determination in blue whiting can be divided into the following components :

- a) whether a winter ring is established in the first winter of life;
- b) whether more than one ring per annum is laid down from the second winter of life until the fish reach maturity;
- c) separation of the closely spaced rings in the fish older than about 10 years of age.

It is proposed to tackle this problem by an otolith exchange programme, to be followed by a future meeting of experts. In the first instance, each laboratory is asked to send before the end of 1977 a description of their technique of age determination to Mr H. Jakupsstovu, who has also agreed to act as coordinator of the otolith exchange programme.

It was considered that this aspect should be given high priority, since all subsequent discussions of population dynamics depend on it.

3.5.2 Sampling

The Group considered it important that each country with a fishery should institute an adequate sampling programme designed to provide information on the catch in numbers at each age. In addition, all research vessel catches should be sampled.

No fixed procedure for sampling was recommended because the degree of variability is not known. However, it was suggested that a random sample from all research vessel catches should be examined for length distribution (by sex whenever possible) and that samples (either random or stratified) should be examined for sex, maturation and age.

In the absence of final plans for research vessel cruises, a definitive sampling programme was not fixed. However, it is possible that duplication of sampling effort may in future years be avoided if sampling is allocated around all vessels participating.

As a rough guide, the Group advocated that age-length keys be obtained for 5° rectangles of latitude and longitude, to be amended according to the distribution of concentrations of fish, for each month.

It was also suggested that a uniform definition of maturation stages be adopted and as a first step, national laboratories engaged in blue whiting research should send a description of their blue whiting maturity classification to Dr M.G. Pawson as soon as possible and not later than the end of February 1978.

3.5.3 Population parameters

The Group agreed that it would be important at a future meeting to establish a method for combining data to make estimates of biological parameters - growth rate, natural mortality rate and age of recruitment. It is hoped that preliminary ideas on this subject will be discussed during the 1978 Statutory Meeting.

3.6 Abundance estimation

Although no plans had been made for estimation of spawning stock size in 1978, the Group recommends that the English and Scottish research vessels spend a few days in early April to carry out an acoustic survey in the area west of the British Isles.

The Group recognised the need for more reliable target strength measurements, which are essential for quantification of the results of these surveys and recommends that priority be given to these measurements. So far, acoustic abundance estimates have been mainly confined to the spawning area west of the British Isles, but in future it is recommended that these be extended to other areas in order to assess the proportions of the stock in different areas at different times.

3.7 Historical data

The Group felt that any existing data in the national institutes should be examined to provide a more reliable description of the geographical distribution, life history and historical changes of the stock. In particular, it is recommended that reviews of the development of national blue whiting fisheries over the past decade be presented at the 1978 Statutory Meeting.

4. Evaluation and Presentation of Results

To evaluate the results of the 1978 surveys, the Group recommends that a meeting should be held early in 1979. In the meantime, it was recommended that reports on all surveys up to the end of June 1978, and information on national fisheries in the same period be sent to the Convener during July for incorporation in a brief report to be submitted to the 1978 Statutory Meeting.

5. Plans for 1979

Since several national institutes formulate annual programmes for their research vessels several months beforehand, it was considered essential that proposals for international cooperation in 1979 be considered not later than at the 1978 Statutory Meeting. It was therefore agreed that such proposals and preliminary information on national survey programmes should be sent to the Convener in good time for this meeting.

At the present meeting, the Group identified the need for internationally coordinated surveys to investigate the distribution and abundance of the O-Group.

Table 1. Blue whiting research cruises, 1978.

Date	Ship	Nationality	Area	Main objective
<u>1978</u>				
Dec '77 - Feb '78	RYBAK MORSKI	Poland	Faroe, SE Iceland	Acoustic survey & exploratory fishing
Jan - Mar	AMAREL	Poland	Faroe, W Britain	"
Jan	Research vessel	German Dem.Rep.	Faroe	"
* 5 Jan - 3 Feb	JOHAN HJORT	Norway	North Sea	Multispecies acoustic abundance survey
10 Jan - 27 Jan	ANTON DOHRN	Germany, Fed.Rep. of	Faroe, Shetland	Acoustic & fishing survey processing
Jan - Feb	Chartered trawler	Netherlands	W Scotland	Exploratory fishing
Jan or Feb	SCOTIA	Scotland	Faroe - W Scotland	Acoustic abundance survey
1 Feb - 1 Apr	Chartered trawler	Faroe	Faroe, Porcupine Bank	Exploratory fishing
28 Mar - 8 May	HAVDRÓN	Norway	St Kilda	Experimental fishing
* 29 Mar - 12 May	G.O. SARS	Norway	N North Sea - Barents Sea	Multispecies acoustic abundance survey
29 Mar - 29 Apr	CIROLANA	England	St Kilda - Biscay	Acoustic abundance survey & hydrography (mackerel & blue whiting)
18 Mar - 1 Jun	J.C. SVABO	Faroe	Faroe	Acoustic survey
Apr - Jun	GEN. ARCISZEWSKI	Poland	W Scotland, Faroe	Exploratory fishing & acoustic survey
* 4 Apr - 26 Apr	SCOTIA	Scotland	Rockall Channel	Hydrobiological survey
Apr	BJARNI SAMUNDSSON	Iceland	SW Iceland	Acoustic survey & exploratory fishing
Apr - May	Research vessel	German Dem.Rep.	Faroe	"
30 May - 21 Jun	SCOTIA	Scotland	W Scotland, Faroe, Shetland	Acoustic abundance survey
Jun	Research vessel	Iceland	SE Iceland	Acoustic abundance survey
* 11 Jun - 20 Jul	G.O. SARS	Norway	Norwegian Sea, Barents Sea	Multispecies acoustic abundance survey
* Jun - Jul	ANTON DOHRN	Germany, Fed.Rep. of	Norwegian Sea - Spitzbergen	Bottom trawl survey
Jun - Jul	Chartered trawler	Germany, Fed.Rep. of	55°N - Spitzbergen	Exploratory fishing & acoustic & 0-group
* 10 Jul - 5 Aug	JOHAN HJORT	Norway	North Sea	Multispecies acoustic survey

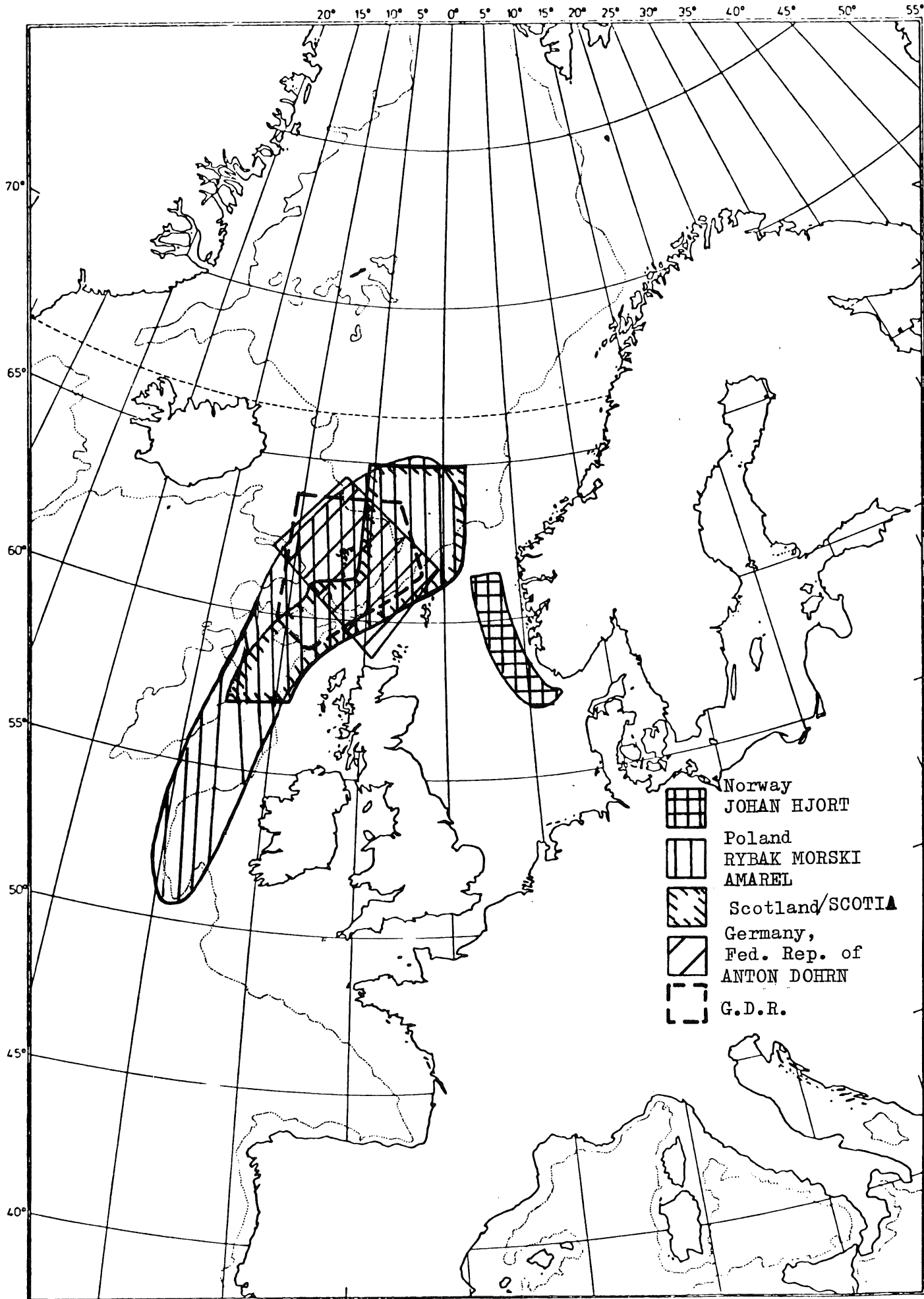
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* Cruises with blue whiting as subsidiary aim.

Table 1 (Continued)

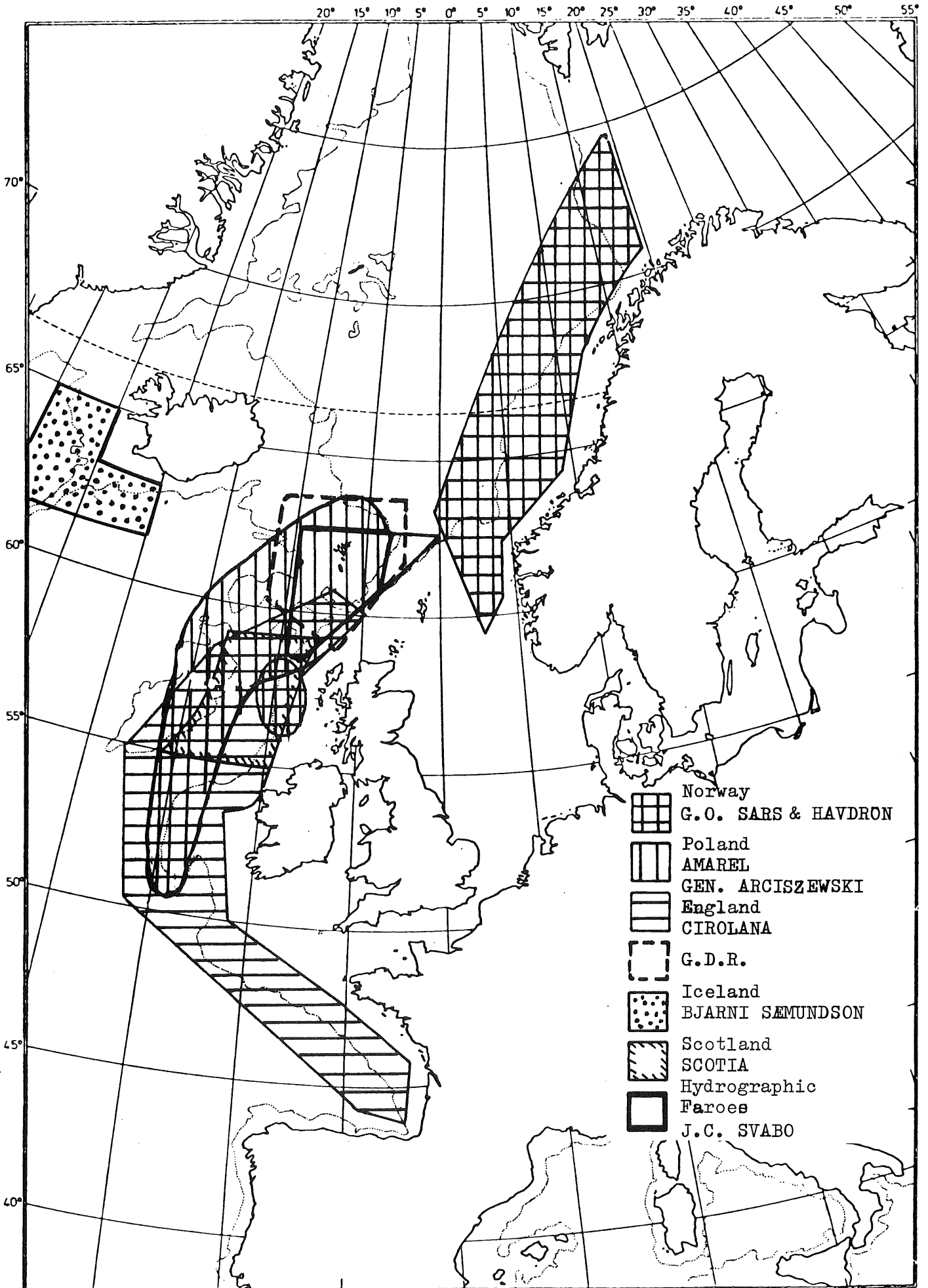
Date	Ship	Nationality	Area	Main objective
<u>1978</u>				
*23 Jul - 11 Aug	G.O. SARS	Norway	North Sea	Multispecies acoustic survey
Jul	THALASSA	France	E Iceland - Faroe	Acoustic abundance survey & exploratory fishing, fish processing
* Aug	CIROLANA	England	N North Sea	Bottom trawl survey
7 Aug - 27 Aug	JOHAN HJORT	Norway	Norwegian Sea	Herring/Blue whiting acoustic abundance survey
Aug - Oct	AMAREL or RYBAK MORSKI	Poland	Jan Mayen - Spitzbergen	Exploratory fishing and acoustic survey
*20 Sep - 6 Oct	CIROLANA	England	N North Sea	Bottom trawl survey
* 9 Oct - 15 Dec	JOHAN HJORT	Norway	North Sea	Multispecies acoustic abundance survey
* 6 Nov - 15 Dec	G.O. SARS	Norway	North Sea	"
Nov	Research vessel	German Dem.Rep.	Bear Island	Exploratory fishing & acoustic survey
Dec	Research vessel	German Dem.Rep.	Faroe	"

* Cruises with blue whiting as subsidiary aim.



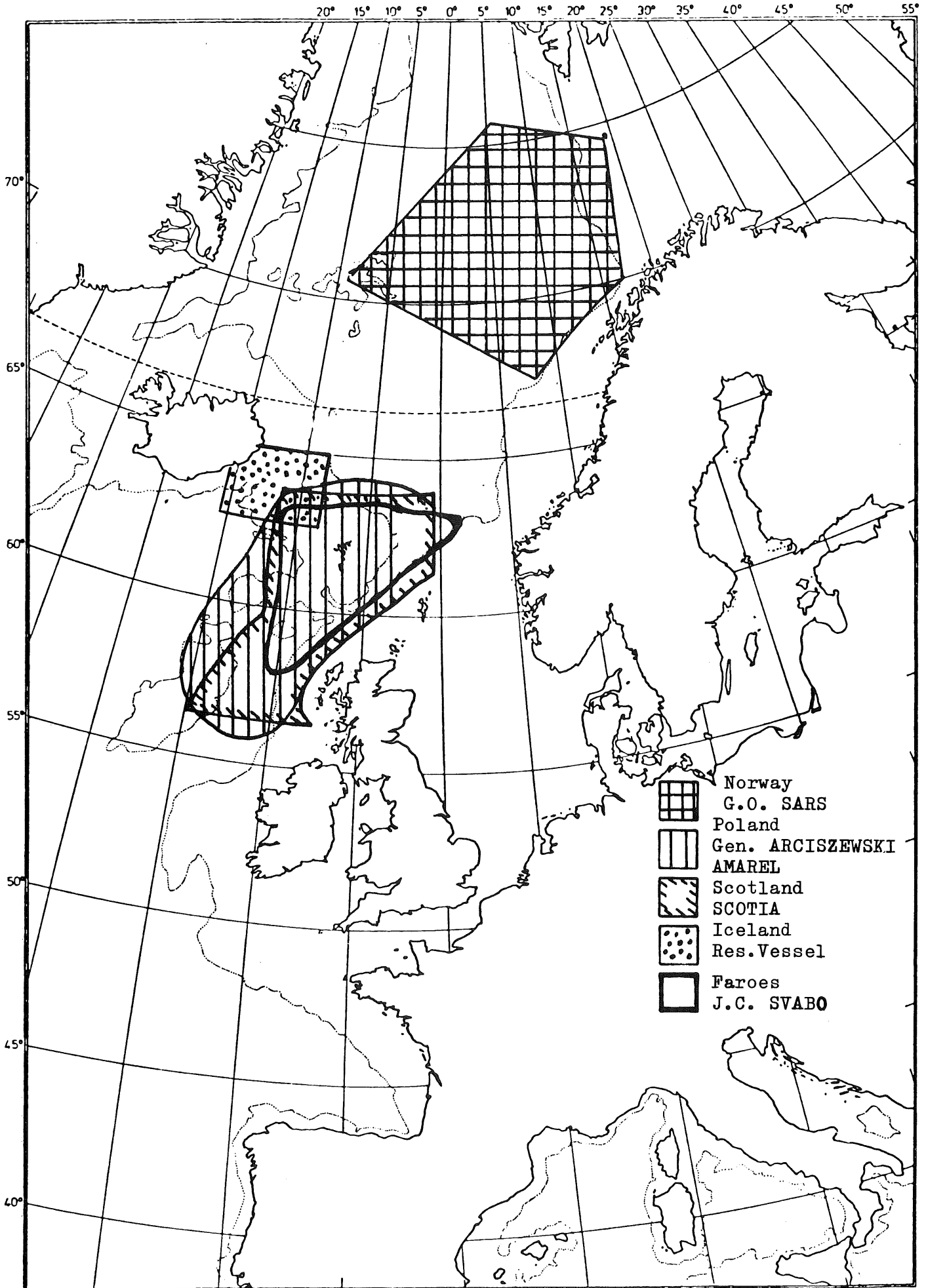
JANUARY-FEBRUARY

Figure 1



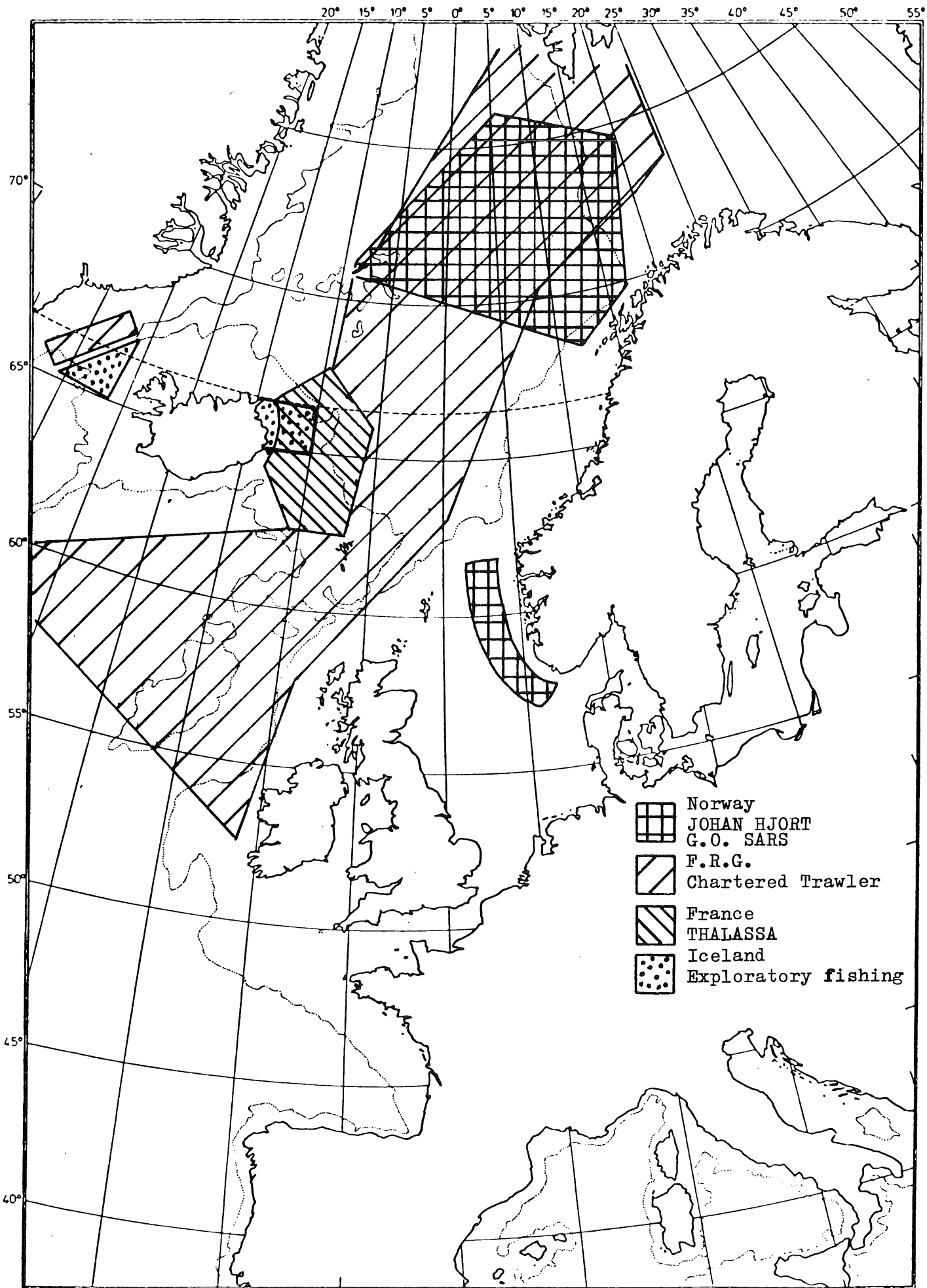
MARCH-APRIL

Figure 2



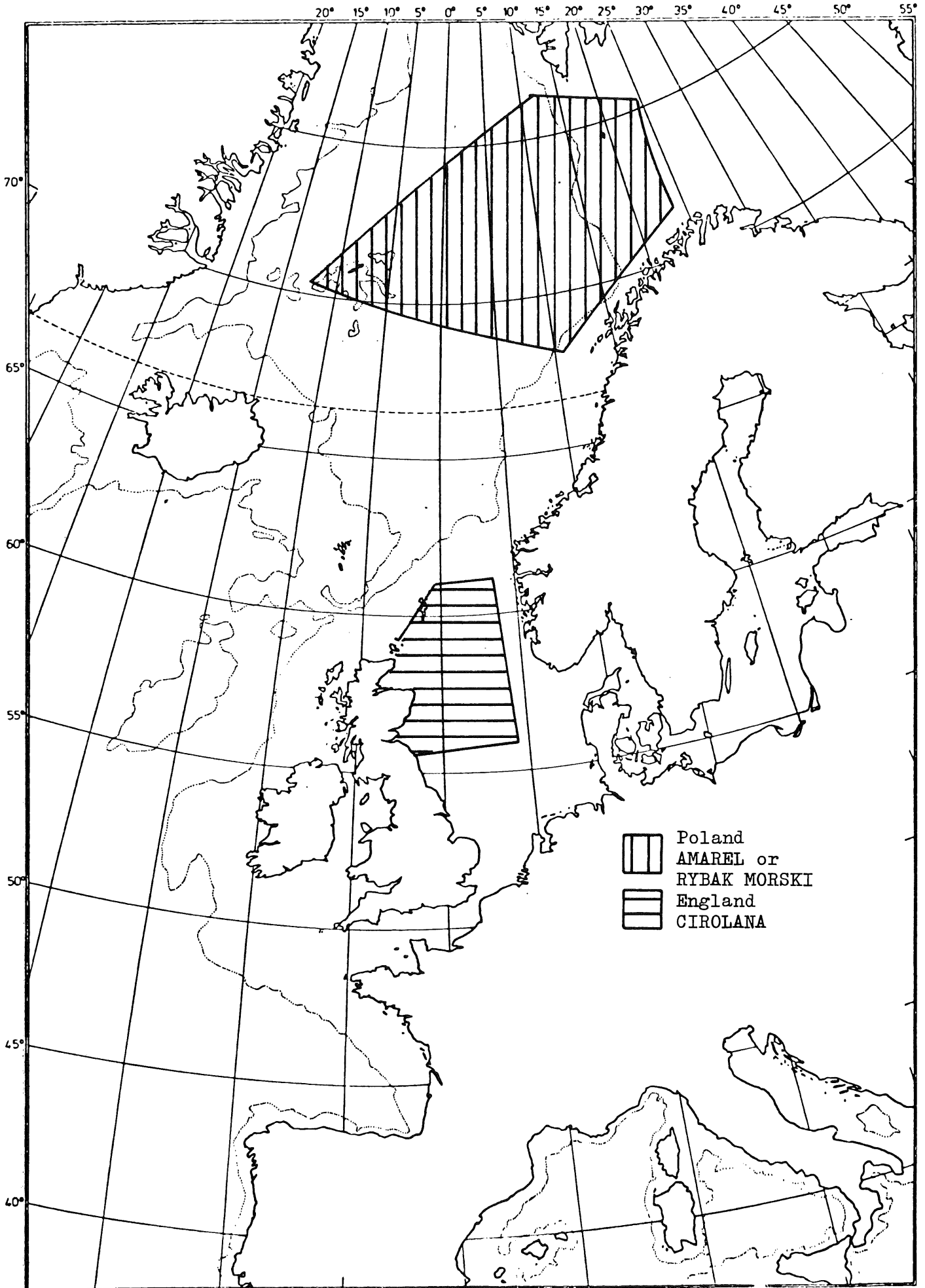
MAY- JUNE

Figure 3.



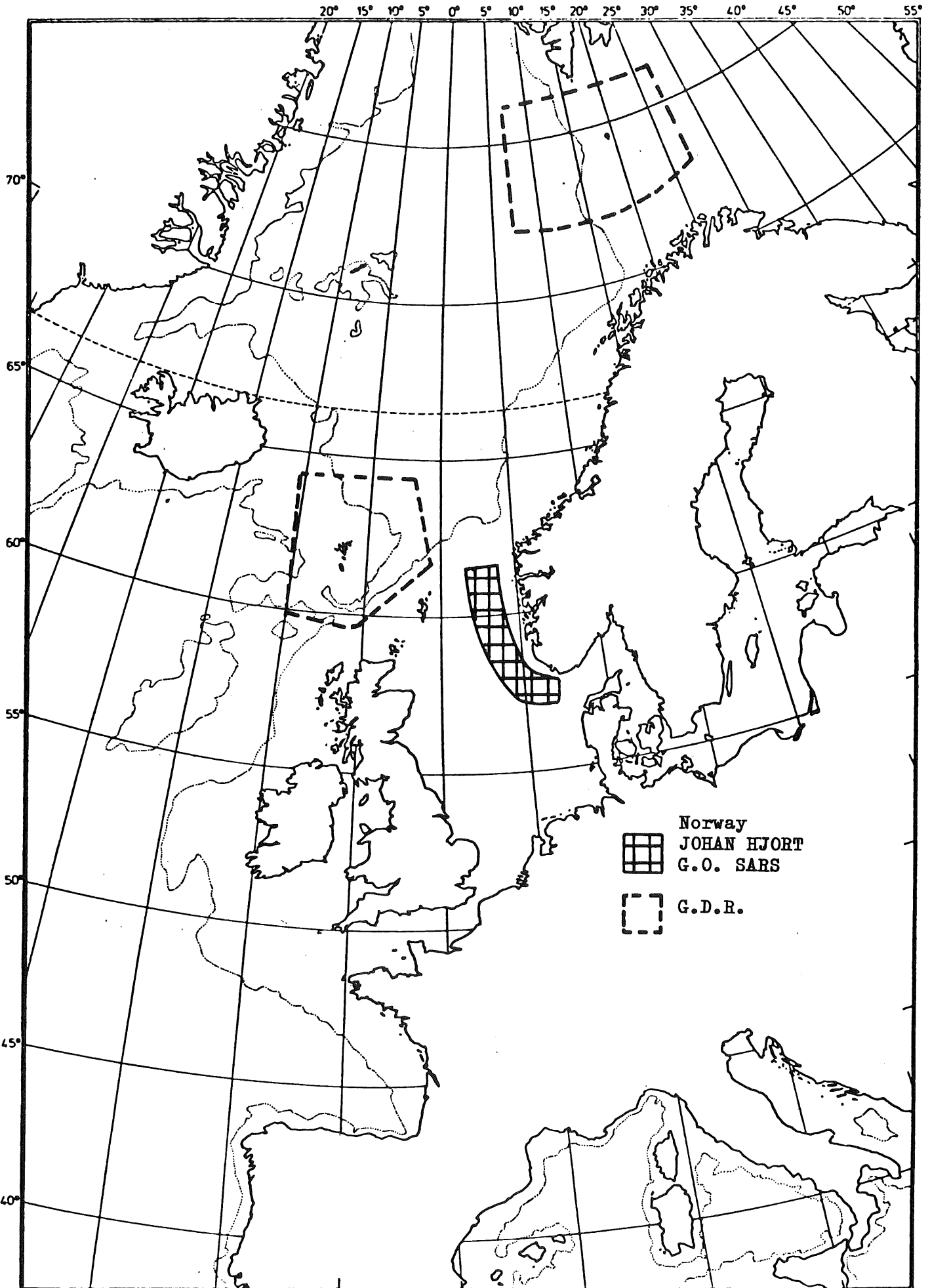
JULY - AUGUST

Figure 4.



SEPTEMBER - OCTOBER

Figure 5.



NOVEMBER - DECEMBER

Figure 6.