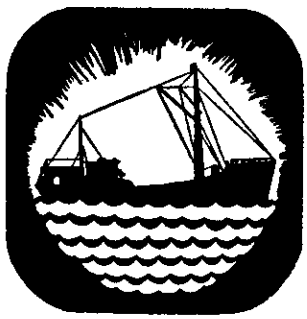
INTERNATIONAL COMMISSION

FOR THE

NORTHWEST ATLANTIC FISHERIES



ANNUAL PROCEEDINGS

Vol. 21

for the year

1970-71

Issued from the Headquarters of the Commission

Dartmouth, N. S., Canada

1971

Letter of Transmittal

The Chairman of the International Commission for the Northwest Atlantic Fisheries presents his compliments to the Governments signatory of the International Convention for the Northwest Atlantic Fisheries signed at Washington under date of 8 February 1949, and to the Commissioners and Observers representing those Governments and has the honour to transmit herewith annual proceedings of the International Commission for the Northwest Atlantic Fisheries for the year 1970-71.

This is the 21st annual report of proceedings of the Commission and is an authoritative record of its activities and achievements from 1 July 1970 to 30 June 1971. The report contains an account of the activities of the Commission's Secretariat; an account of the 21st Annual Meeting; summaries of research carried out in each of the five Convention subareas; and a list of scientists and laboratories engaged in Commission work.

This report is prepared and transmitted in conformity with the requirements of Article VI (1) (f) of the International Convention for the Northwest Atlantic Fisheries and Rules 3.2 (g) and 9.1 of the Rules of Procedure of the Commission.

A. W. H. Needler,
Chairman,
International Commission for the
Northwest Atlantic Fisheries.

Contents

PART 1

Administrative Report for the Year Ending 30 June 1971

1. Japan Becomes a Member of the Commission

The Government of Japan notified the Depositary Government on 1 July 1970 of her adherence to the International Convention for the Northwest Atlantic Fisheries. Thus, on that date, Japan became the 15th member of the International Commission for the Northwest Atlantic Fisheries. Japanese fishing vessels have been operating in the Convention Area, particularly Subarea 5, since 1962. Data on catch and fishing effort have been submitted annually for publication in the Statistical Bulletin and List of Vessels. Observers from the Government of Japan have participated in the Annual Meetings of the Commission since 1964.

The Executive Secretary extended a warm welcome to the new Member Government on behalf of the Commission and offered the full cooperation of the Secretariat in furthering the work of the Commission.

2. The Commission's Officers

Chairman of Commission – Dr A. W. H. Needler (Canada)

Vice-Chairman of Commission – Mr K. Løkkegaard (Denmark)

Chairman of Panel 1 – Mr K. Løkkegaard (Denmark)

Chairman of Panel 2 – Captain T. de Almeida (Portugal)

Chairman of Panel 3 – Mr A. Volkov (USSR)

Chairman of Panel 4 – Mr R. Lagarde (France)

Chairman of Panel 5 – Prof F. Chrzan (Poland)

Chairman of Panel A (Seals) – Mr O. Lund (Norway)

These officers, with three exceptions, were elected at the 1969 Annual Meeting to serve for a period of 2 years. At the 1970 Annual Meeting, Mr O. Lund was elected Chairman of Panel A to serve for a period of 2 years, and Captain Tavares de Almeida and Prof F. Chrzan were elected Chairmen of Panel 2 and Panel 5 respectively, to serve for a period of 1 year.

Chairman of Standing Committee on Research and Statistics – Dr A. S. Bogdanov (USSR)

Chairman of Standing Committee on Finance and Administration – Mr R. W. Green (USA)

Chairman of Standing Committee on Regulatory Measures – Mr J. Graham (UK)

The Chairman of the Standing Committee on Research and Statistics was elected at the 1970 Annual Meeting to serve for a period of 1 year; the Chairman of the Standing Committee on Finance and Administration was unanimously re-elected to serve for a period of one year. The Chairman of the Standing Committee on Regulatory Measures was elected at the first meeting of the Committee, 30 January 1968.

3. Panel Memberships for 1970-71

Panel	1	2	3	4	5	A	Total
Canada		+	+	+	+	+	5
Denmark	+		+			+	3
France	+	+	+	+			4
Germany, Fed. Rep.	+	+		+			3
Iceland	+						1
Italy			+	+			2
Japan							–
Norway	+	+	+			+	4
Poland	+	+	+	+	+		5
Portugal	+	+	+	+			4
Romania		+	+		+		3
Spain	+	+	+	+			4
USSR	+	+	+	+	+		5
UK	+	+	+				3
USA			+	+	+		3
Total	10	10	12	9	5	3	49

4. The Commission's Office Accommodation

The office of the Commission has, since 1 August 1963, been located in the Bedford Institute under a lease arrangement with the Canadian Department of Energy, Mines and Resources (now Canadian Department of the Environment). The present lease arrangement has been extended to 1 August 1973.

5. The Commission's Secretariat

Executive Secretary	– L. R. Day
Assistant Executive Secretary	– (vacant)
Administrative Assistant	– W. H. Champion
Senior Secretary	– (Miss) Jean Maclellan (to 31 March 1971)
	– (Mrs) Vivian Kerr (from 8 March 1971)
Clerk Stenographer	– (Miss) Gertrude Schrader (to 31 March 1971)
	(Mrs) Elizabeth Cornford (from 26 April 1971)
Clerk	– G. M. Moulton

Additional help was provided by:

(Mrs) Valerie Caton (Redbook Pts. II and III, ICNAF Special Publication No. 7, Pt. IV – 1 July - 30 November 1970)

(Miss) Maureen Day (Statistical Bulletin Vol. 19 – 1 September 1970 - 19 February 1971)

Mr J. S. Beckett, Fisheries Research Board of Canada, St. Andrews, N.B. (preparations for 1971 Annual Meeting – 5 April - 18 June 1971)

(Miss) Jean Maclellan (preparations for 1971 Annual Meeting – 1 April - 12 May 1971)

Following the 1970 Annual Meeting in St. John's, Newfoundland, the Executive Secretary discussed with Depositary Government the presentation to Member Governments of the 1970 Commission proposals for international regulation of the fisheries (1) for Atlantic salmon in the Convention Area, (2) for yellowtail flounder by catch quota in Subarea 5, (3) for yellowtail flounder by mesh size in Subarea 5, (4) for cod, haddock, redfish, witch, American plaice and Greenland halibut in Subarea 2, (5) for cod, haddock, redfish, halibut, witch, yellowtail flounder, American plaice, Greenland halibut, pollock, and white hake in Subarea 3, (6) for harp and hooded seals in the "Gulf" and "Front" areas of the Convention Area, and amendments regarding renumbering of Article XVII to Article XVIII and insertion of a new Article XVII to the Convention (25 June 1970, Washington); attended a Symposium on Stock and Recruitment organized by ICES/FAO/ICNAF (7-10 July 1970, Aarhus, Denmark); discussed ICNAF statistical problems with the Fisheries Research Board of Canada, St. Andrews, N.B. (24-25 August 1970); attended ICES Special Meeting on Methods for Measurement of Fishing Effort (25-26 September 1970, Copenhagen); attended Working Party on International Salmon Tagging Scheme (26 September 1970, Charlottenlund); attended 58th Statutory Meeting of ICES (28 September-2 October 1970, Copenhagen); attended Working Party to organize ICES/ICNAF/IBP Symposium on Seal Biology (30 September 1970, Copenhagen); attended Third Meeting of Joint ICES/ICNAF/IOC Coordinating Group for the North Atlantic (1 October 1970, Copenhagen); visited the Ministry of Agriculture, Fisheries and Food and NEAFC (6 October 1970, London); attended meetings of ICNAF Working Group on Coordinated Groundfish Surveys (21-23 January 1971, Charlottenlund); attended mid-year meeting of Assessments Subcommittee (25-30 January 1971, Charlottenlund); held discussions on ICNAF problems with International Fisheries Service of Canadian Department of Fisheries and Forestry (3 March 1971, Ottawa); attended meeting of Working Party on International Salmon Tagging Scheme (26-27 March 1971, Pitlochry, Scotland); attended meeting of ICES/ICNAF Joint Working Party on North Atlantic Salmon (29 March-1 April 1971, Pitlochry).

6. The Commission's Publications

Since June 1970, the Secretariat has issued 1,713 pages of printed material in eight publications.

The *1970 Meeting Proceedings* (118 p.) was distributed in August 1970. It contains the reports of the meetings of the Plenary and of the Panels, the Standing Committee on Finance and Administration and Special Committee on the Protocol relating to new procedures for amendments to the Convention.

The *Redbook 1970* was issued in three parts. Part I (84 p.) contains the proceedings of the 1970 meetings of the Standing Committee on Research and Statistics and its subcommittees. It was distributed in October 1970. Part II (160 p.) contains the reports by member countries on research conducted in the Convention Area in 1969. It was distributed in December 1970. Part III (202 p.) contains selected scientific papers presented to the 1970 meeting. It was distributed in April 1971.

The *Statistical Bulletin* Vol. 19 for the year 1969 (119 p.) will be distributed in July 1971. It presents statistical data on the commercial fisheries and the harp and hood seal hunt in the Convention and Statistical Areas of ICNAF.

The *Annual Proceedings* Vol. 20 for 1969-70 (48 p.) was distributed in December 1970. It contains the Administrative Report with audited financial statements for the year ending 30 June 1970, the Report of the 20th Annual Meeting, 1970, and Summaries of Research carried out in each subarea of the Convention Area in 1969.

The *Research Bulletin of ICNAF* No. 7 (68 p.), containing 9 scientific contributions, was distributed in January 1971.

The *Research Bulletin of ICNAF* No. 8 is in preparation with 9 scientific contributions. It will be distributed in September 1971.

The *Sampling Yearbook* Vol. 13 (Part I) for the year 1968 (305 p.) was distributed in July 1970. It contained length and age data for the groundfish and flounder species sampled by the research agencies of the member countries in the ICNAF divisions in 1968. *Sampling Yearbook* Vol. 13 (Part II) (264 p.) was distributed in February 1971. It contained age and length data for herring from 1961-68.

Special Publication No. 7 (ICNAF Environmental Survey: NORWESTLANT 1-3, 1963) (Part IV, Biological Data Record) (345 p.) will be distributed in July 1971.

The *ICES Cooperative Research Report, Series A*, containing the "Third Report of the ICES/ICNAF Joint Working Party on North Atlantic Salmon, February 1970",was distributed in June 1971. ICNAF shared the cost of publication equally with ICES.

7. Cooperation with Other International Organizations

Close collaboration and cooperation was maintained with other international organizations with related objectives, particularly FAO Department of Fisheries, ICES, NEAFC, IOC, and OECD.

In the field of fishery statistics, the Secretariat continues to work closely with Mr L. P. D. Gertenbach of FAO in his role as Secretary of the FAO/ICES/ICNAF Coordinating Working Party on Atlantic Fishery Statistics (CWP).

Plans are being drawn up by the ICES/ICNAF Joint Working Party on North Atlantic Salmon for an international salmon tagging experiment off West Greenland in 1972. Plans will be presented for approval of ICES and ICNAF at their 1971 Annual Meetings.

Through the ICES/ICNAF/IOC Coordination Group for the North Atlantic (3rd Meeting, Copenhagen, 1 October 1970), oceanographic activities of the three participating bodies are continuing to be coordinated at the Secretariat level.

Cooperation with ICES and FAO has resulted in a successful symposium on the important stock and recruitment problem at Aarhus, Denmark, from 7-10 July 1970. A substantial contribution is being made by ICNAF to the cost of publication in a special volume of the ICES Rapports et Proces-Verbaux series.

Plans are being laid for a joint ICES/ICNAF/IBP Symposium on Seal Biology to be held at the University of Guelph, Guelph, Canada, from 12 to 16 August 1972. Dr A. W. Mansfield (Canada) is the Commission's representative on the planning body.

Practical aspects of the application of the ICNAF Joint Enforcement Scheme in the Northwest Atlantic are being developed with a view to standardizing procedures with those adopted for the NEAFC Joint Enforcement Scheme in the Northeast Atlantic.

8. Cooperation with Non-Member Countries

The Government of Cuba continues to show interest in the fisheries and the work of the Commission in the

Northwest Atlantic. Publications and reports are forwarded to them regularly. Invitations have again been extended to the Cuban Government to send observers to the 1971 Annual Meeting.

Invitations to be represented by observers at the 1971 Annual Meeting were also extended to the Governments of Belgium, Ireland, Netherlands, and Sweden which, because of their fishing in the Northeast Atlantic and membership in NEAFC, are vitally interested in the effect of management practices in the Northwest Atlantic on the fisheries in the Northeast Atlantic.

9. Programs and Reports of Research

Reports on Research carried out in 1969 by 11 of the 14 member countries were reviewed at the 1970 Annual Meeting of the Standing Committee on Research and Statistics and were subsequently published in ICNAF Redbook 1970, Part II, which was distributed in December 1970.

Programs of research to be carried out in 1971 in the Convention Area were received from most member countries and distributed widely early in 1971.

10. Mid-Year Meetings

The third meeting of the Joint ICES/ICNAF/IOC Coordinating Group for the North Atlantic was held in Copenhagen on 1 October 1970 at the time of the 58th Statutory Meeting of ICES. ICNAF was represented by Dr H. W. Graham (USA) and the Executive Secretary. Exchange of plans and programs was agreed.

The ICNAF Working Group on Coordinated Groundfish Surveys met in Charlottenlund from 21 to 23 January 1971 under the chairmanship of Dr M. D. Grosslein (USA) to investigate problems related to the organization and conduct of coordinated groundfish surveys which have as their principal objective providing reliable measures of relative abundance and structure of major groundfish stocks on an annual and seasonal basis. Plans were presented to further the development of a coordinated survey program in the ICNAF Area.

The Subcommittee on Assessments met at ICES headquarters, Charlottenlund, Denmark, 25-30 January 1971, under the chairmanship of Mr R. Hennemuth (USA). Detailed studies on cod, haddock, herring, yellowtail flounder, and seals were evaluated and concise information and advice prepared for consideration of the Standing Committee on Research and Statistics and the Commission.

The ICES/ICNAF Joint Working Party on North Atlantic Salmon met at the Freshwater Fisheries Laboratory, Pitlochry, Scotland, 29 March-1 April 1971, under the chairmanship of Mr B. B. Parrish (UK). New information was presented which allowed further assessments of the effects of the West Greenland and Norwegian Sea fisheries on total and home-waters salmon stocks and yields. This meeting was preceded by that of a Planning Group, under the chairmanship of Dr A. W. May (Canada) on 26 and 27 March 1971, which detailed proposals for a large-scale international salmon tagging experiment at West Greenland in 1972.

11. Statistics and Sampling

Work on statistics and sampling in the Secretariat was somewhat limited due to the vacancy in the position of Assistant Executive Secretary. Statistical submissions for Statistical Bulletin for the year 1969 were processed and published as a major effort by a biology graduate between early September 1970 and mid-February 1971. The Bulletin for 1969 has been altered slightly in format to provide a better presentation. The data are presented in three parts: Part I contains summaries of fish and seal catches over the period 1952-1969; Part II contains the five required tables of statistics on the fisheries for 1969; while Part III contains the sealing statistics for 1969.

A major task of preparing and presenting herring sampling data covering the years 1961 to 1968 as Part II of Sampling Yearbook Volume 13 was completed and distributed in March of 1971 due to the efforts of Miss Gertrude Schrader. Volume 14 of the Sampling Yearbook has been readied for the printer. It contains data on sampling of groundfish, flounders and herring for the year 1969.

The Secretariat is deeply indebted to the Fisheries Research Board of Canada and to Mr J. Beckett of the Board's staff at St. Andrews, N.B. Mr Beckett joined the Commission Secretariat on 5 April 1971 to help with statistics and sampling items for the 1971 research document series. His services have been invaluable in meeting the Secretariat's commitments for documents on fishing effort, 1969 and 1970; discards, 1969; tabulation of estimated fishing effort, 1969; trawl material and mesh size sampling, 1969 and 1970; Annual

Returns of Infringements, 1970; and Tables 1, 1a, 3 and 3a of the 1970 volume of the Statistical Bulletin.

Again the Secretariat must thank the national statistical offices for their cooperation in timely and accurate reporting. The Secretary of CWP, Mr L. P. D. Gertenbach, of the Department of Fisheries of FAO, has continued invaluable assistance and advice on statistical matters.

12. Changes in the Convention

The 1969 Protocol which proposes changes in paragraphs 2 of Articles IV and VII of the Convention to establish a more appropriate basis for the determination of representation on the Panels and to provide for greater flexibility in the types of fisheries regulatory measures which may be proposed by the Commission, respectively still requires adherence by the Federal Republic of Germany, Italy, Poland, and Portugal.

Proposed changes in which Article XVII of the Convention is renumbered Article XVIII and a new Article XVII is added were adopted by the Commission on 6 June 1970 to establish quicker and smoother working procedures for amending the Convention and were forwarded to Depositary Government on 24 June 1970. The Draft Protocol was signed 6 October 1970. Ratification, approval or adherence is still required by 11 of the 15 member countries.

13. International Regulation of Fisheries

In accordance with 1969 Commission proposals which entered into force on 1 January 1970 establishing a closed season, closed areas and annual catch quotas for haddock in Subarea 5 and Div. 4X of Subarea 4 for 1970, 1971, and 1972, reports of haddock catches against these quotas were distributed bi-weekly by the Executive Secretary to Contracting Governments for the period 1 January 1970 to 31 December 1970. Contracting Governments were informed by cable on 13 October 1970 that the accumulative landings of haddock in Subarea 5 in 1970 equalled 80% (9,600 tons) of the allowable landings (12,000 tons). Landings of haddock were prohibited by the fleets of Contracting Governments on 23 October 1970, 10 days following receipt of the cabled notification. Total accumulative landings of haddock in Subarea 5 reached 11,659.8 tons, just 340.2 tons under the catch quota allocation. Total accumulative catches in Div. 4X of Subarea 4 only reached 11,576.8 tons, 6,423 tons less than the catch quota allocation. Reports of haddock catches against the 1971 quota allocation in Subarea 5 and Div. 4X of Subarea 4 are being compiled and distributed bi-weekly to Contracting Governments.

Proposals, adopted by the Commission on 6 June 1970, establishing (1) catch quotas for yellowtail flounder on fishing grounds east of 69°W (16,000 tons) and west of 69°W (13,000 tons) and (2) a mesh size of 114 mm for trawl gear taking yellowtail flounder in Subarea 5 came into effect 7 January 1971. As required, the Executive Secretary has reported yellowtail flounder catches for the two regulated portions of Subarea 5 bi-weekly to Contracting Governments.

Proposals, adopted by the Commission on 5 June 1970, increasing the mesh size in trawl gear to 130 mm for regulated species in Subareas 2 and 3 came into effect in Subarea 2 on 7 January 1971 for all Contracting Governments and in Subarea 3 on 15 April 1971 for all Contracting Governments, except Canada, Poland, Portugal, and Spain. The proposal for Subarea 3 will come into effect for Poland on 1 January 1972.

Proposals, adopted by the Commission on 4 June 1970, to limit the annual catch of harp seals in the 'Gulf' and 'Front' areas in 1971 to 245,000 seals including an allowance of 45,000 for the indigenous, non-mobile fisheries, came into force on 7 January 1971.

Proposals, adopted by the Commission on 6 June 1970, that countries limit the aggregate tonnage of vessels fishing for salmon outside territorial waters or their catch to the 1969 level, prohibit fishing outside national fishery limits before 31 July and after 30 November and prohibit the use of trawl nets, monofilament net or troll outside territorial waters, came into effect for all Contracting Governments except USSR on 8 March 1971.

Proposals, adopted by the Commission on 5 June 1970, for a scheme of Joint International Enforcement in the Convention Area came into effect on 7 January 1971.

14. Financial Matters

To improve the revenue to the Commission from deposits (Working Capital Fund) in the Bank of Nova Scotia, Dartmouth, the Executive Secretary on the advice of the Manager of the Bank subscribed to

Certificates of Deposit (2 certificates of $10,000 each) on 3 July 1970. These bear interest at 7¾% as against the 4½% rate on the Commission's Savings Account in the 1969-70 fiscal year.

On 27 October 1970, the Acting Secretary of the International Fisheries Commissions Pension Society wrote advising that a number of improvements in the pension plans of the International Fisheries Commissions were proposed as follows:

a) Adjust pension credits for service prior to 1 October 1966 to the salary base on that date (previously it had been 1 October 1960);

b) continue these adjustments each year in the future with the objective of reaching a position where, on retirement, the pension credits would be adjusted to provide a pension based on the average salary base for the best 6 years;

c) explore the possibility of introducing a provision for widow's annuity benefits in the case of death of a member before retiring from the service of the Commission.

Regarding a) and b) above, the single premium cost to the Commission to adjust pension credits for services prior to 1 October 1966 would be $1,136.05. An item has been placed on the agenda for the meetings of the Standing Committee on Finance and Administration under which this matter can be considered for approval.

Costs to the Commission of implementing proposal c) above are still being developed by the Sun Life of Canada for the International Fisheries Commissions Pensions Society.

The Executive Secretary was also advised by the Acting Secretary of the International Fisheries Commission Pension Society on 26 January 1971 of a premium reduction effective from 1 October 1970. This reduces the Commission's cost by an estimated $475 in the current year.

15. Financial Statements for the Fiscal Year Ending 30 June 1971

The accounts of the Commission for the year ending 30 June 1971 show that Can. $124,500 was appropriated by the Commission for ordinary expenditures.

Obligations incurred during the fiscal year totalled Can. $102,754 which was Can. $21,746 less than the total of Can. $124,500 appropriated by the Commission.

An audit of the Commission's finances was completed in August 1971 by the Office of the Auditor General of Canada, in accordance with the Financial Regulations.

The report of the Auditor General reads, in part, as follows:

EXHIBIT I

Statement of Budget Appropriations, Obligations Incurred, and Balances of Appropriations for the year ended 30 June 1971

(Expressed in Canadian Dollars)

Purposes of Appropriation	Appropriated by Commission	Obligations Incurred	Surplus or Deficit (–) Balances of Appropriations
Personal services –			
Salaries	$ 69,200	$ 52,252	$ 16,948
Superannuation and Canada Pension Plan	2,500	1,403	1,097
Additional help	4,000	3,048	952
Group medical and insurance plans	500	389	111
Salary contingencies	2,500	–	2,500
Forecast increase	1,500	–	1,500
Travel	6,500	5,972	528
Transportation	500	683	–183
Communications	4,000	4,447	–447
Publications	18,300	17,857	443
Other contractual services	5,000	6,249	–1,249
Materials and supplies	4,000	4,605	–605
Equipment	1,000	424	576
Annual meeting	5,000	5,425	–425
Totals – ordinary budget	$ 124,500	$ 102,754	$ 21,746
Transfer from Working Capital Fund –			
Stock Recruitment Symposium	5,000	5,000	–
	$ 129,500	$ 107,754	$ 21,746

EXHIBIT II – GENERAL FUND

Statement of Income and Expenditure
for the year ended 30 June 1971
(with comparative figures for the year ended 30 June 1970)

(Expressed in Canadian dollars)

	1971		1970	
Income (and Source of Funds):				
Members' contributions assessed –				
Canada	$ 10,285		$ 10,966	
Denmark	6,382		6,790	
France	8,333		8,878	
Germany, Federal Republic	6,382		6,790	
Iceland	2,479		2,616	
Italy	4,430		4,702	
Norway	8,333		6,790	
Poland	10,285		10,966	
Portugal	8,333		8,878	
Romania	6,382		2,616	
Spain	8,333		8,878	
Union of Soviet Socialist Republics	10,285		10,966	
United Kingdom	6,382		6,790	
United States of America	6,382		6,790	
		$ 103,006		$ 103,416
Transferred from Miscellaneous Fund		21,494		12,884
		124,500		116,300
Obligations incurred (Exhibit I)		102,754		113,977
Amount carried to Working Capital Fund (Appendix 2)		$ 21,746		$ 2,323

EXHIBIT III

Statement of Assets and Liabilities as at 30 June 1971
(with comparative figures as at 30 June 1970)

(Expressed in Canadian dollars)

Assets			Liabilities		
	1971	1970		1971	1970
GENERAL FUND					
Cash on hand and in bank (Appendix 1)	$ 2,484	$ 1,391	Unliquidated obligations	$ 6,859	$ 2,474
Accounts receivable	1,322	1,464	Credits due to Member Governments	596	381
Due from a member country	3,649	–		$ 7,455	$ 2,855
	$ 7,455	$ 2,855			
WORKING CAPITAL FUND					
Cash on deposit	$ 12,392	$ 22,025			
Certificates of deposit	20,000	–			
Accounts receivable	2,633	2,320	Principal of Fund (Appendix 2)	$ 35,025	$ 24,345
	$ 35,025	$ 24,345		$ 35,025	$ 24,345
MISCELLANEOUS FUND					
Cash on deposit	$ 30,201	$ 21,494	Principal of Fund (Appendix 2)	$ 30,201	$ 21,494

APPENDIX 1

General Fund Cash Flow for the year ended 30 June 1971

Cash on hand and in bank, 30 June 1970				$ 1,391
Add: Member Government contributions –				
Assessments 1970-71			$ 103,006	
Advance payments for 1971-72			596	
			103,602	
Less: Advance payments for 1970-71		$ 381		
Due from a member country		3,649	4,030	
			99,572	
Decrease in accounts receivable			142	99,714
Funds from Miscellaneous Fund for 1970-71 appropriations				21,494
				122,599
Deduct: Obligations liquidated –				
Unliquidated obligations, 30 June 1970		$ 2,474		
Obligations incurred 1970-71		102,754		
		105,228		
Less: Unliquidated obligations, 30 June 1971		6,859	98,369	
Balances of 1970-71 appropriations transferred to Working Capital Fund			21,746	120,115
Cash on hand and in bank, 30 June 1971				$ 2,484

APPENDIX 2

WORKING CAPITAL FUND

Balance 30 June 1970			$ 24,345
Add:	Balances of 1970-71 appropriations	$ 21,746	
	New member contribution – Japan	1,000	
	Sales of publications	2,560	
	Refund prior year sales tax	279	
	Bank interest	2,935	
	Interest on certificates of deposit	1,537	
	Refund prior years superannuation	623	30,680
			55,025
Deduct:	Appropriation to Stock Recruitment Symposium	5,000	
	Transfer to Miscellaneous Fund	15,000	20,000
Balance, 30 June 1971			$ 35,025

MISCELLANEOUS FUND

Balance 30 June 1970			$ 21,494
Appropriated for 1970-71 obligations			21,494
Add:	Staff assessments 1970-71	$ 9,883	
	New member contribution – Japan	2,478	
	Ex gratia grant – 1969 provincial income taxes	2,840	
	Transfer from Working Capital Fund	15,000	30,201
Balance, 30 June 1971			$ 30,201

PART 2

Report of 21st Annual Meeting of the International Commission for the Northwest Atlantic Fisheries Halifax, Nova Scotia, 27 May - 4 June 1971

BY THE CHAIRMAN, DR A. W. H. NEEDLER

1. Introduction

Under the terms of a Convention signed in 1949, the International Commission for the Northwest Atlantic Fisheries (ICNAF) is responsible for the investigation, protection, and conservation of the fisheries of the Northwest Atlantic in order to make possible the maintenance of a maximum sustained catch from these fisheries. Based on the results of scientific investigations promoted and coordinated by the Commission, measures to ensure wise use of the stocks of commercial fish are recommended to member governments.

The Commission has six panels, five of which review the fisheries and recommend conservation measures in geographic subareas of the Convention Area (Subarea 1, off West Greenland; Subarea 2, off Labrador; Subarea 3, off south and east Newfoundland; Subarea 4, the Gulf of St. Lawrence and Nova Scotia Banks; and Subarea 5, the Gulf of Maine). The sixth panel has jurisdiction respecting harp and hooded seals in the Convention Area.

The Commission has Standing Committees on Research and Statistics (STACRES), on Finance and Administration (STACFAD), and on Regulatory Measures (STACREM).

2. Time and Place of Meeting

The 21st Annual Meeting of ICNAF was convened at the Lord Nelson Hotel, Halifax, Nova Scotia, from 27 May to 4 June 1971, under the chairmanship of Dr A. W. H. Needler (Canada).

The Commission's Standing Committee on Research and Statistics (STACRES) met in the Bedford Institute, Dartmouth, Nova Scotia, from Thursday 20 May to Tuesday 25 May, and in Halifax on Thursday and Friday, 3 and 4 June, under the chairmanship of Dr A. S. Bogdanov (USSR). The Assessments Subcommittee met 20-24 May under Mr R. Hennemuth (USA); the Environmental Subcommittee on 20 May under Dr N. J. Campbell (Canada); the Statistics and Sampling Subcommittee on 22 May under Dr A. W. May (Canada); and an *ad hoc* Working Group on Coordinated ICNAF Groundfish Surveys on 20 May under Dr M. D. Grosslein (USA).

The Commission sponsored a highly successful Symposium on Environmental Conditions in the Northwest Atlantic 1960-69, which was convened by Dr N. J. Campbell (Canada), Chairman of the STACRES Environmental Subcommittee, on 18 and 19 May at the Bedford Institute.

STACRES met daily to allocate items of business and to consider reports and recommendations of its subcommittees and working groups and to prepare its report to the Commission on the state of the exploited fish stocks and the effect of fishing and the environment on these stocks.

Scientific Advisers to Panels 1 to 5 and A (Seals) met on 25 and 26 May.

Delegates from 12 of the 15 member countries attended sessions of an *ad hoc* Working Group on ICNAF Fisheries on 24-26 May and dealt with concrete problems of catch quota allocation.

From 27 May to 4 June some major Commission agenda items were considered in Plenary Session, while others were assigned to committees and panels for study and reporting. Reports and recommendations from the three Standing Committees and the six Panels were received at four Plenary Sessions for consideration and approval.

3. Participants (Appendix I)

Commissioners with their Advisers and Experts were present from all 15 member countries. Observers attended from the Food and Agriculture Organization of the United Nations (FAO), the European Economic Community (EEC), the International Society for the Protection of Animals (ISPA), the Scientific Committee on Oceanic Research of the International Council of Scientific Unions (SCOR), the International North Pacific Fisheries Commission (INPFC), the International Council for the Exploration of the Sea (ICES), and the Government of Cuba.

Commission guests included Professor P. Finkle of the Department of Political Science, Memorial University of Newfoundland, St. John's, Newfoundland and Dr J. M. Colebrook, Institute for Marine Environmental Research, Oceanographic Laboratory, Edinburgh, Scotland.

Meeting participants are recorded at Appendix I. The organization and officers of the Commission for the year 1971-72 are recorded on the inside front cover of these Proceedings.

4. Opening of the Meeting (Agenda Item 1)

The Opening Session of the 21st Annual Meeting of the Commission was convened in the Regency Ball Room of the Lord Nelson Hotel at 1000 hrs on 27 May 1971. The Chairman of the Commission, Dr A. W. H. Needler, Special Adviser to the Minister of Fisheries and Forestry for Canada, welcomed the Commissioners and the Advisers present from thirteen of the 15 member countries, as well as the Observers from other international agencies, and the Commission's guests. He expressed pleasure to have the opportunity to introduce representatives from the County of Halifax, Warden I. Settle; from the City of Dartmouth, Alderman F. Barber; from the City of Halifax, Dupty Mayor H. G. Ivany; and from the Province of Nova Scotia, Honourable G. Mitchell. He thanked them for demonstrating by their presence their interest in the work of the Commission.

The Chairman then introduced the Honourable Jack Davis, Minister of Fisheries and Forestry for Canada, who addressed the meeting on behalf of the Government of Canada as follows:

"Mr Chairman, Distinguished Delegates, Ladies and Gentlemen: Welcome to Canada. Welcome to Nova Scotia. Welcome to Halifax. Welcome to a port, to a province and to a country which owes its earliest beginnings to fishing and where fishing still flourishes in the Twentieth Century.

"Soyez les bienvenus au Canada, en Nouvelle-Ecosse, à Halifax, dans un port, une province et un pays dont la pêche a assuré les premiers pas et où la pêche est encore florissante au XXè siècle.

"Last year you met in St. John's, Newfoundland. This year you are holding your annual meeting in Halifax. It gives me great pleasure to welcome you back to Canada again. It gives me great pleasure, not only because I have an opportunity to meet with you personally, but also because the International Commission for the Northwest Atlantic Fisheries has done a great job.

"ICNAF has done a first class job in bringing order out of chaos. It has done a great job, not only for Canada and Canadian fishermen, but also for the fishermen of all the countries which are represented here today.

"Twenty years have passed since ICNAF held its first annual meeting. It held its first annual meeting in Washington. A great deal has happened since then. ICNAF's membership has grown to fifteen. Also there have been great changes in the fishery. Our catching ability is now beginning to outstrip our resources. There are no longer enough fish to go round. There is a very real danger of overfishing in the Northwest Atlantic in the 1970's.

"In the early 1950's there were a few warning signals, it is true. The stocks of haddock on Georges Bank were already being depleted. But the consensus among our experts was that the regulations of a qualitative kind would do. They thought that the declaration of minimum mesh sizes for nets would be sufficient to deal with this problem.

"How wrong they were! What started as a problem with haddock on Georges Bank has become much more widespread. Other species are threatened. Many species are being threatened with overfishing in more areas in the North Atlantic. Rarely is an increase in fishing effort rewarded by anything like a comparable increase in catch. The law of diminishing returns is setting in with a

vengeance and we, collectively, have to do something about it.

"The history of ICNAF is interesting. At first it was largely a research and data gathering body. But more and more of this knowledge and this data is being used to programme the operations of our fisheries. It is being used to frame regulations which apply to us all. It is being used to develop estimates of sustainable yield. It is being used to project costs. It is being used to raise average incomes in an industry which has been plagued with uncertainty and poor prices in the past.

"Demand, broadly speaking, is no longer a problem. The markets are there and prices are tending to increase. But firmness in the marketplace is also due, more and more, to an underlying worry about supply. It is supply more than demand which will govern the shape of our fisheries in the future. It is the adequacy of fish stocks and the way in which our Northwest Atlantic fishery is managed, which will determine how well things develop for us in the 1970's and 1980's.

"ICNAF is now 20 years old. Like most 20 year olds it is facing increased responsibility. Technologically speaking our fishing fleets have come of age. Their catching capacity has increased many fold. They are mechanized to the nth degree. They are using the latest electronic devices to find fish. They are using the latest harvesting techniques. They are processing catches on board and they are tailoring their product to the market as never before.

"But nature, it seems, cannot keep up with us. The regeneration of fish stocks is not sufficient to withstand this attack from outside. We have now, or will soon have, too many fishing vessels chasing too few fish. We are now, or will soon be, overequipped. The Northwest Atlantic fishery is overmanned today. With even better boats and even better gear it will have too much fishing capacity by 1975 if we aren't careful.

"ICNAF, I know, is on top of the situation. It sees that conditions are changing and changing drastically. It has already acted to meet this challenge. It has asked the member countries which it represents to give it new powers. It has asked for changes in the convention under which it operates. It has streamlined its procedures and it has added teeth to its regulations with a view to managing the fish stocks in the Northwest Atlantic in a more enlightened way.

"Your Commission now believes that it is necessary to regulate, not only fishing methods and fishing gear but also the intensity of our fishing effort. It recognizes that each country's catch, itself, is also important.

"Two years ago ICNAF took an historic decision. It recommended quotas for the first time. It recommended quotas in the important haddock fishery on Georges Bank. These regulations were put into effect in 1970. They'll continue in 1971. With modifications we'll need them throughout the 70's. We'll need them, in view of our greatly increased fishing capacity, for all time to come.

"We need more quotas. We need more overall quotas in other areas of the Northwest Atlantic. We need more overall quotas per species other than haddock. We'll soon need them for cod, redfish and flounders as well.

"Your Commission hasn't stopped with quotas. It realized that overall quotas, alone, could lead to a mad scramble by our fishermen for a larger individual share of a limited amount of fish. So the division of the quota, among nations, has now moved to the centre of the stage. The Commission is now asking for authority to set up national quotas. And with national quotas each country will be in a position to plan its own fishing operations in a rational way.

"Most member countries have already approved this new recommendation by ICNAF. I hope that the hold outs will also approve the idea of national quotas in the near future. Then we, jointly and separately, can practice conservation in an enlightened way. We can tailor the size of our fleets to match our national quotas. Also we will have a strong financial incentive to see to it that we get the largest sustainable yield from the Northwest Atlantic fishery with a minimum of effort on our part.

"Canada is a strong believer in conservation. We are opposed to overfishing. We are opposed to greedy practices which result in an overcapitalization of the fishing industry in the short run and idle vessels and empty nets in the long run.

"We believe, instead, in a scientifically based and scientifically managed fishery. In the Northwest Atlantic we also believe in an international fishery. An international fishery need not be chaotic. It too can be organized in such a way as to maintain stocks and increase the productivity of the individual fisherman.

"But this calls for new disciplines. It calls for new regulations. It calls for leadership by your Commission. It calls for joint leadership by all 15 members of ICNAF.

And it calls for a sharing in the decision making process.

"No discipline should be introduced without debate. Any idea which is worthwhile can stand up to thorough discussion. ICNAF has provided us with a forum for sharing our views. It has also helped us to hammer out differences and to arrive at common goals. Speaking for the fisheries of Canada I hope that this will continue, always, to be the case.

"As a country we have special views of our own. For example, we shall continue to press for a ban on the fishing for Atlantic salmon on the high seas. We believe that these salmon should only be caught in or near the rivers in which they spawn. Otherwise there will be little or no incentive to preserve these rivers from pollution on the one hand and the construction of hydro electric dams on the other.

"As Canadians we are very concerned about the groundfish stocks out over our Continental Shelf. We are doubly concerned because we have large numbers of inshore fishermen as well as large trawlers operating many miles from our shores. We have hundreds of small, isolated communities which depend exclusively on fishing for threatened species like cod. Their catch, per fisherman, has been cut roughly in half since the early 1950's. This is a trend which, if it continues, means real hardship for tens of thousands of Canadians living in Newfoundland and the Maritime Provinces. Many of them live at the poverty level already. Continued overfishing offshore will therefore become an offence, not only against Nature in the shape of our fish stocks but also against Mankind as well.

"We are concerned about the sudden expansion of our herring fishery. As is the case with Atlantic salmon we have set strict limits on the amount of gear which can be used to take these fish in the future. We are concerned about the decline in seal populations and we want to make certain that our seal fishery, too, will be operated with an eye to the long-term future.

"We will be presenting papers at this Conference and our representatives will be discussing these matters during the course of your meeting. I need not elaborate on them further. However, before I sit down, I would like to make one final point. The Northwest Atlantic fishery is an international fishery and its prosperity is vital to us all.

"The problem of overfishing is not a new one. It has been encountered in many other parts of the world. But we are able to deal with it at an earlier stage in the Northwest Atlantic. We can deal with it quickly if we get together. We can deal with it more effectively if we cooperate. And we can deal with it without suffering some of the serious setbacks to fish stocks and to people which have often been the case elsewhere.

"ICNAF, in other words, can do a pioneering job. It can do on a smaller scale what the United Nations may be able to do eventually on a global scale. It can move in a great area of the Atlantic before it is too late. And it can move intelligently and productively towards a better regime for our international fishery in the 70's.

"To the delegates and scientific advisors which come from all the member countries of ICNAF I say "good luck". To all of you I say "bonne chance". I wish you all the best in your deliberations here in Halifax. I know that they will be productive. I know that you will continue to show us the way. We look to you, now for guidance. We are looking to you to make the Northwest Atlantic the most productive part of the high seas to fish in, not only in the 1970's but for all time to come!

"Thank you very much Mr. Chairman".

The Chairman thanked the Minister for his warm welcome and encouraging remarks. He introduced Mr K. Løkkegaard (Denmark), Vice-Chairman of the Commission, and Mr L. R. Day, Executive Secretary of the Commission. He then declared the 21st Annual Meeting of the Commission recessed to 1130 hrs.

Following the opening ceremonies, the First Plenary Session was convened by the Chairman. Second, Third, and Fourth Plenary Sessions were convened on 2, 3, and 4 June. During the period 27 May to 4 June, the following business of the Commission was concluded.

5. **Agenda** (Appendix II)

In accordance with Commission Rules of Procedure 4.2 (b), the provisional agenda for the Annual Commission Meeting was transmitted to all Contracting Governments and Commissioners not less than 60 days in advance of the meeting. The agenda was adopted without changes at the First Plenary Session.

6. **Publicity** (Item 3)

The Commission agreed that the Chairman and Vice-Chairman of the Commission with the Chairman of STACFAD and the Executive Secretary would

constitute a committee to determine policy regarding publicity.

7. Report of STACFAD (Item 27)

STACFAD considered items on its agenda along with financial and administrative items (Items 4 to 9 and 31) assigned to it from the Plenary agenda, at its meeting on 3 June. The report and recommendations of STACFAD were presented to the Fourth Plenary Session on 4 June 1971.

a) Panel memberships

As required by Article IV (2) of the Convention, panel memberships were reviewed. Applications by Japan for membership in Panels 3, 4, and 5, and by the Federal Republic of Germany for membership in Panel 5 were approved by the respective Panels and STACFAD and adopted by the Commission. Panel memberships for the year 1971-72 then total 53 and are distributed among the 15 member countries as shown in the accompanying table.

Panel	1	2	3	4	5	A	Total
Canada		+	+	+	+	+	5
Denmark	+		+			+	3
France	+	+	+	+			4
Germany, Fed. Rep.	+	+		+	+		4
Iceland	+						1
Italy			+	+			2
Japan			+	+	+		3
Norway	+	+	+			+	4
Poland	+	+	+	+	+		5
Portugal	+	+	+	+			4
Romania		+	+		+		3
Spain	+	+	+	+			4
USSR	+	+	+	+	+		5
UK	+	+	+				3
USA			+	+	+		3
TOTAL	10	10	13	10	7	3	53

b) Reports by the Secretariat

The Executive Secretary submitted the following reports on administrative and financial matters:

i) Auditor's Report for the fiscal year ending 30 June 1970 (1970 Annu. Proc. Vol. 20, p. 9-13);

ii) Administrative and Financial Report for the fiscal year ending 30 June 1971 (estimated from 30 April 1971) (Comm. Doc. 71/4);

iii) Budget estimate for the fiscal year ending 30 June 1972 (Appendix I to the 1971 Agenda for STACFAD);

iv) Budget forecast for the fiscal year ending 30 June 1973 (Appendix II to the 1971 Agenda for STACFAD).

c) Recommendations on finance and administration

The Commission adopted the following recommendations:

i) that the Auditor's Report showing appropriations of Can $116,300 and obligations incurred of Can. $113, 977 for the fiscal year ending 30 June 1970 be adopted;

ii) that the provisional Administrative Report with the financial statements for the fiscal year ending 30 June 1971 (estimated from 30 April 1971) be adopted;

iii) that the Executive Secretary accelerate his efforts to fill the position of Assistant Executive Secretary;

iv) that the Commission retain the 8½″ × 14″ paper size for documents;

v) that, for convenience and economy, further consideration be given to greater selectivity in the circulation of scientific documents at present included in the Research Document series;

vi) that the travel and accommodation of the participants from the ICNAF member countries to the proposed Joint ICES/ICNAF Working Group on North Atlantic Cod Stocks be at national expenses;

vii) that an amount of Can $1,136.05 be included in the budget estimate for the fiscal year ending 30 June 1972 to adjust pension credits for services by personnel of the

Commission Secretariat prior to 1 October 1966;

viii) that Can $15,000 be declared in excess of present and anticipated needs in the Working Capital Fund and that it be transferred to the Miscellaneous Fund immediately in accordance with Financial Regulation 4.7;

ix) that the Commission appropriate a sum of Can $136,000 from Contracting Governments and from the Miscellaneous Fund to meet ordinary expenditures and Can $5,000 from the Working Capital Fund to support the 1971 ICNAF Symposium on Environmental Conditions in the Northwest Atlantic, 1960-69, for the fiscal year ending 30 June 1972, the appropriations to be used for the following purposes:

1.	Personal Services	
	a) Salaries	$ 71,000
	b) Superannuation	4,000
	c) Additional help	4,000
	d) Group medical and insurance plans	500
	e) Contingencies	5,000
	f) Forecast increase	4,000
2.	Travel	6,500
3.	Transportation	500
4.	Communications	4,500
5.	Publications	18,000
6.	Other Contractual Services	6,000
7.	Materials and Supplies	4,000
8.	Equipment	1,000
9.	Annual Meeting	6,000
10.	Contingencies	1,000
	Total Ordinary Expenditures	$136,000
	Special appropriation from Working Capital Fund	
	i) 1971 Environmental Symposium	5,000
	ii) Transfer to Miscellaneous Fund	15,000

x) that the Contracting Governments be billed by the Commission for payments due, under the 1971-72 administrative budget, in accordance with Article XI of the Convention, on 16 August 1971;

xi) that the amount of the main annual contribution of each Contracting Government, which, in accordance with Article XI (3c) is the Canadian equivalent of 500 United States dollars, be changed from a fixed amount of $526.66 Canadian dollars, as established by the 1952 Annual Meeting of the Commission, to one based on the current rate of exchange;

xii) that the Contracting Governments give consideration at the 1972 Annual Meeting to authorizing appropriations of Can $139,000 for the ordinary expenses of the Commission and Can $5,000 from the Working Capital Fund for expenses in connection with the ICES/ICNAF/IBP Symposium on the Biology of the Seal, August 1972, for the fiscal year ending 30 June 1973, the appropriations to be used for the following purposes:

1.	Personal Services	
	a) Salaries	$ 73,500
	b) Superannuation	2,500
	c) Additional help	2,000
	d) Group medical and insurance plans	500
	e) Contingencies	6,500
	f) Forecast increases	4,000
2.	Travel	6,500
3.	Transportation	500
4.	Communications	4,500
5.	Publications	18,000
6.	Other Contractual Services	6,000
7.	Materials and Supplies	4,000
8.	Equipment	1,000
9.	Annual Meeting	6,000
10.	Contingencies	3,500
	Total Ordinary Expenditures	$139,000
	Special appropriating Working Capital Fund	
	i) Seal Symposium	5,000

xiii) that the proposed expenditure of £ 20,000 (about Can $48,000) for the Atlantic salmon tagging experiment at West Greenland in 1972 be adopted as a Special Projects Budget under Article XI of the Convention

and that Contracting Governments contribute to this Budget in adequate amounts as each may consider, it being understood that (a) expenditures may not be undertaken under this Budget in excess of contributions received, (b) funds contributed will remain available for the experiment until actually expended or no longer needed, and (c) some funds will be contributed to the expenditures by non-Contracting Governments which are members of ICES, through other channels;

xiv) that the 1972 Annual Meeting be held in the State Department, Washington, D.C., USA, between 25 May and 2 June inclusive, with associated scientific meetings to be held from 18 to 24 May at the same location; that the 1973 Annual Meeting be held in Copenhagen, Denmark, at a date and location to be agreed later; and that the 1974 Annual Meeting be held at Commission headquarters at a date to be agreed later, if no other invitation is extended;

xv) that the Commission note the unanimous election of Mr Wm. L. Sullivan, Jr (USA) as Chairman of STACFAD for the year ending 30 June 1972.

8. Status of Commission Proposals (Item 10)

The Commission reviewed the status of proposals for changes in the Convention and for international regulation of the fisheries.

a) Changes in the Convention

The Commission **noted** that the 1969 Protocol, which proposes changes in paragraphs 2 of Articles IV and VII of the Convention in order to establish a more appropriate basis for determining representation on the Panels and to provide for greater flexibility in the types of fisheries regulatory measures which may be proposed by the Commission, respectively, had not yet been ratified by the Governments of Federal Republic of Germany, Italy, Poland, and Portugal. Also, the 1970 Protocol, which proposes that Article XVII of the Convention be renumbered Article XVIII and a new Article XVII be added in order to establish quicker and smoother working procedures for amending the Convention, required ratification by the Governments of Canada, Federal Republic of Germany, Italy, Japan, Poland, Portugal, Romania, Spain, USSR, UK, and USA before it could enter into force.

b) International regulation of the fisheries

The Commission **noted** that the closed season, closed areas and annual total catch quotas for haddock in Subarea 5 and Division 4X of Subarea 4 for 1970, 1971, and 1972, proposed in 1969, become effective 1 January 1970 and that haddock catches against these quotas were reported bi-weekly from the Secretariat for the calendar year 1970. Accumulative catches of haddock in Subarea 5 reached 80% of the allowable landings (12,000 metric tons) on 13 October 1970. Further haddock landings, except incidental catch, were prohibited from 23 October 1970. Total accumulative landings in Subarea 5 in 1970 reached 12,831 metric tons. Total accumulative landings in Div. 4X of Subarea 4, which had a catch quota of 18,000 metric tons, reached 18,125 metric tons in 1970.

The Commission also **noted** that 1970 proposals (a) for catch quota (29,000 metric tons) and trawl mesh size (114 mm) for yellowtail flounder in Subarea 5, (b) for mesh size increase (to 130 mm) in Subarea 2, (c) for catch limitation (245,000) for harp seals in the 'Gulf' and 'Front' areas of the Northwest Atlantic, and (d) for a scheme of joint international inspection in the Convention Area, subject to reservations for USSR, Poland, and Romania, came into effect on 7 January 1971. The 1970 proposal for mesh-size change (to 130 mm) in Subarea 3 came into effect for all Contracting Governments, except Canada, Portugal, and Spain, on 15 April 1971, while for Poland it would become effective on 1 January 1972. Proposals, adopted in 1970, limiting aggregate tonnage of high-seas salmon fishing vessels or their catch to the 1969 level, prohibiting high-seas fishing before 31 July and after 30 November and prohibiting the use on the high-seas of trawl nets, monofilament net or troll, came into effect for all Contracting Governments, except USSR, on 8 March 1971.

9. Other Matters Concerning Commission Trawl Regulations (Items 11, 12, and 13)

The Commission reviewed and **adopted** reports of inspections, infringements and actions taken by each Contracting Government relating to mesh size in use, obstruction of mesh openings, landings in excess of legal

limits, and closed area violations for the calendar year 1970.

The Commission **noted** that a revised Simplified Guide to ICNAF Trawl Regulations would be available later in the year to replace the 1969 version in the ICNAF Handbook.

The Commission, as in 1970, could not agree to any departure from the authorized mesh-size differentials for nets made of different twine materials since any change would not result in simpler or easier mesh regulations than the Commission already has. The item was set aside for review at a later meeting.

10. International Enforcement
(Items 14 and 15)

The Commission **noted** that the ICNAF scheme of joint international enforcement adopted at the 1970 Annual Meeting had come into effect on 7 January 1971 for all Contracting Governments, subject to reservations for USSR, Poland, and Romania, and that application of the scheme was to start from 1 July 1971. Following reports on the state of preparedness from each member country, the Commission heard the report of a Working Party on International Inspection set up under Captain Cardoso (Portugal) to review the progress of the mechanics of application of the scheme including details of the ICNAF inspection pennant, the inspectors' identification card, inspection reporting form and the multi-language questionnaire. The Commission **adopted** the report of the Working Party and its recommendation that the Working Party be upgraded into a Standing Committee on International Inspection (STACTIC). The Commission also **agreed**, as proposed by the STACFAD, that the Chairman of the Working Party and the Chairman of STACFAD, or their nominees, with the Executive Secretary should draft the terms of reference for STACTIC for approval of the Commission at the 1972 Annual Meeting.

The Commission **agreed** (i) that each Contracting Government should advise the Secretariat officially when its national legislation approving the ICNAF Scheme of Joint Enforcement is in effect, (ii) when it is prepared to inspect and accept inspection, subject to the conditions of the Scheme, and (iii) that such information be circulated immediately to all Contracting Governments from the Secretariat.

11. Report of the Standing Committee on Research and Statistics (STACRES)
(Item 26)

The Standing Committee met, under the chairmanship of Dr A. S. Bogdanov (USSR) with Mr D. J. Garrod (UK) and Dr A. W. May (Canada) as rapporteurs, at the Commission's headquarters in the Bedford Institute, Dartmouth, Nova Scotia, from 20 to 25 May 1971 and in the Lord Nelson Hotel, Halifax, Nova Scotia, on 3 and 4 June 1971. The Assessments Subcommittee held a mid-term meeting at ICES headquarters, Charlottenlund Slot, Charlottenlund, Denmark, from 25 to 30 January 1971, preceded by a meeting of the Coordinated Groundfish Survey Working Group, 21-23 January 1971. The ICES/ICNAF Joint Working Party on North Atlantic Salmon met at the Freshwater Fisheries Laboratory, Pitlochry, Scotland, 29 March-1 April 1971.

The Report of STACRES with subcommittee and working group reports as appendices is published separately as ICNAF Redbook 1971, Part I. The Report with appendices was adopted by the Commission in Plenary Session on 4 June 1971. Major items dealt with at these meetings are summarized below:

a) Assessments

The Assessments Subcommittee reported

i) that the nominal catch of all species in the Convention Area decreased by about 13% from 1969 to 1970, continuing the decline from the highest recorded catch in 1968. Declines occurred in all major species – cod, haddock, redfish, flounders, and herring – due, in part, to reduced fishing effort and to unfavourable environmental conditions but due mainly to heavy exploitation which has, in many cases, exceeded the point of maximum sustained yield.

ii) that, for the major species, reasonably accurate assessments are available for only a few stocks – cod in Subareas 1 and 2, haddock and yellowtail flounder in Subarea 5, and seals. Less complete assessments are available for most of the remaining haddock and cod stocks and two flounder stocks in Subarea 3, while assessment of the herring stocks is only now past the initial stages. Thus, although the rate of progress of

assessment of fisheries is increasing, the status of the stocks now producing over half the catch is unknown, or inadequately known, and the rate of increase of fishing intensity has far exceeded the rate of scientific studies to determine the effects of it.

iii) that the yield of harp seal pups has decreased from about 400,000 in 1960 to 300,000 in 1970. The present population size is less than that giving maximum production. Estimates indicate the present yield is well in excess of the sustainable yield.

iv) that, for cod, recent reductions in fishing effort have reduced landings in Subarea 1 and to a lesser extent in Subareas 2 and 3. At best, increased effort over the long run would probably result in a total catch of 1,300,000 metric tons (compared with about 1,100,000 in 1970) being taken from the Convention Area. However, depending on the stock recruitment relation, increased effort might decrease long-term total catch. Immediate action to limit catches on all cod stocks would, as reported in 1970, be most propitious.

v) that haddock stocks in Subareas 4 and 5 are very low and, although fisheries in Subarea 5 and Div. 4X now have catch limits, due to poor recent recruitment, stocks will probably continue to decline unless very drastic measures are taken to reduce catch.

vi) that the nominal catch of herring decreased to about 810,000 metric tons from the peak 1968 figures of 951,000 metric tons. All stocks have decreased in size in the last year with stocks in Div. 5Z and Subarea 6 extremely low – from 75 to 95% below the unfished abundance in 1960. Catches should be reduced to prevent further immediate decreases in stock size and, in the long-term, to rebuild stocks to attain greater sustained yields.

vii) that yellowtail flounder assessments in Subarea 5 have shown that more severe restrictions in 1972 than are now in effect (catch quota of 29,000 metric tons and 4½-inch mesh size) are required to bring fishing intensity more in line with that producing the sustainable yield. Assessments of yellowtail flounder and plaice stocks indicate full exploitation.

viii) that groundfish surveys provide a valuable adjunct to commercial fishery statistics for assessment purposes, especially with regard to the provision of advice to the Commission concerning catch quotas and a coordinated multi-nation survey of groundfish resources should be organized for the whole ICNAF Area.

b) Statistics and sampling

The Subcommittee reported

i) that the list of ICNAF species will be amended to bring it into conformity with scientific names adopted recently by the American Fisheries Society;

ii) that the measure of fishing effort "days on grounds" will be deleted from Tables 4 and 5 of the ICNAF Statistical Bulletin;

iii) that publication of an ICNAF list of conversion factors will be discontinued and be replaced by reference in the ICNAF Statistical Bulletins to FAO Bulletin of Fisheries Statistics Vol. 25 "Conversion Factors: North Atlantic Species 1970" and subsequent revisions;

iv) that the International Commission for the Conservation of Atlantic Tunas (ICCAT) would be welcomed as a participant in future activities of the FAO/ICES/ICNAF Coordinating Working Party on Atlantic Fishery Statistics (CWP);

v) that the Seventh Session of the CWP will meet at FAO, Rome, 10-16 November 1971, preceded by meetings of an *ad hoc* Working Group on Automatic Data Processing, 8-9 November 1971;

vi) that the ICNAF Secretariat will request from the national offices information on the feasibility of their reporting of catches (and effort) of major groundfish species and herring by smaller statistical areas than those

now in use and that scientists from countries fishing in the ICNAF area and now using smaller statistical areas, provide maps of such area breakdowns for consideration at the 1972 Meeting.

c) Environmental studies

The Committee noted that a continued decrease in temperature and salinity in the upper layers at West Greenland (Subarea 1) and cooling of the offshore deeper water also has reversed the trend of earlier years. The fishery at West Greenland was adversely affected by ice conditions for the third successive year. Summer temperatures in the inshore western branch of the Labrador Current were also cooler but in the deeper offshore branch, temperature and salinity were at or above average. Water temperature conditions in Subareas 4 and 5 were more variable.

The Committee **recommended**

i) that the papers and discussion presented to the ICNAF Symposium on Environmental Conditions in the Northwest Atlantic, 1960-69 at Dartmouth, 18-19 May 1971, be published in the ICNAF Special Publication Series with a target date of December 1971;

ii) that the Executive Secretary join with the Secretaries of ICES and IOC at the time of the 1971 ICES meeting in Helsinki, to give further study to the Intergovernmental Oceanographic Commission (IOC) proposal concerning a Polar Ice Research Project and follow it up at the IOC meeting.

The Committee further noted that the descriptions of a new temperature profiling device developed in the Fisheries Institute in Hamburg would be presented at the 1972 meeting; that an investigation would be held into the location and numbering of "standard" hydrographic sections in the ICNAF area; and that the systematic investigations beginning in Canada and USA on the distribution of heavy metals, pesticides, oil, and other pollutants in marine organisms and materials over much of the southern half of the ICNAF area, were important from the point of possible effects of marine pollution on larval survival and year-class abundance.

d) Gear and selectivity

The Committee noted that, in relation to the construction of topside chafers, experiments showed no significant difference between the selection properties of "extra strong" and "normal" polyamide codends; that experiments in the same series concerning the selectivity of codends made from netting yarn differing only in their elongation characteristics were inconclusive, reaffirming the need for further experiments to define the properties of netting yarn which are most important in determining its selectivity; and that a polyamide netting material appeared to be most likely to fulfill the requirements for a new standard netting yarn to replace manila as the selectivity standard.

e) Ageing techniques

The Committee noted that there had been progress in the validation of redfish ageing techniques; that otoliths provide the most satisfactory material for estimating the age of herring and that an expanded ICNAF program of study of herring ageing is being coordinated by Canada.

f) ICES/ICNAF Joint Working Party on North Atlantic Salmon

The Committee reviewed the report of the meeting of the Working Party held in Pitlochry, Scotland, 29 March-1 April 1971 and noted particularly the latest information on the salmon fishery off West Greenland and in home-waters and the further assessments of the effects of the West Greenland fishery on total and home-water catches including the proposed international salmon tagging experiments at West Greenland in 1972.

The Committee noted that the total catch in the West Greenland fishery in 1970 (2,100 tons) was approximately the same as in 1969. Further results of tagging smolts in North America and a number of European countries indicated that salmon of European origin in the West Greenland stock come from rivers between lat 63°N and 44°N with the major part of it originating from rivers in Canada and the UK. Preliminary Canadian studies of biochemical characters of salmon at West Greenland and the Labrador Sea suggest that salmon of North American-European origin were present in this area in approximately equal proportions. The distribution of 24 recaptures in home waters of West Greenland taggings from 1965 to 1970 also suggest equal proportions. Based on further assessments, the immediate direct losses in catch to all home-waters fisheries combined, for a West Greenland catch of 2,000 tons, was estimated to lie in the range of 500-1,900 tons, which is reasonably close to estimates from previous assessments. In 1970 total home-water catch was higher than in 1969 in Canada, England and Wales, Ireland and

Northern Ireland, but substantially lower in Scotland and Norway.

The Committee considered preliminary plans prepared by an *ad hoc* Tagging Planning Group of the Joint Salmon Working Party for an international salmon tagging experiment to be conducted off West Greenland in August-October of 1972 which aims to release 3,000 tagged salmon widely distributed throughout the fishing area with the following principal objectives:

i) to provide information on home-water areas to which salmon present at West Greenland would subsequently return, including estimates of the proportions returning to each area;

ii) to estimate the fishing mortality and rate of exploitation in the West Greenland fishery;

iii) to estimate the size of the population exploited at West Greenland;

iv) to estimate the natural mortality during return migration of salmon from West Greenland fishery to their home-waters;

v) to study the movements of salmon within the West Greenland area; the opportunity would be taken to gather further information on the occurrence of salmon outside the area of the West Greenland fishery and to collect material relevant to studies on the origin of salmon at West Greenland.

and **recommended**

i) that countries intending to participate in the International Salmon Tagging Experiment at West Greenland indicate the form of their participation as soon as possible;

ii) that the ICES/ICNAF Joint Working Party on North Atlantic Salmon hold its next meeting during the week beginning 21 March 1972 in Dublin, Ireland.

g) Special Meetings on Herring

The Committee met in special session on 3 June to consider a request from the meeting of Joint Panels 4 and 5 (see Section 13 (h)) for advice on allowable levels of herring catch in the northern part of the Convention Area, and prepared preliminary estimates for 1972 quotas. However, it was agreed that more complete research and statistical data for 1970 and 1971 would give better estimates. Therefore, the Committee met on 4 June and specified a program of research which would, insofar as possible, provide by the time of the Special Commission Meeting on Herring, January 1972, the information necessary to formulate a scheme of rational management of the herring stocks in Subareas 4, 5, and 6 (ICNAF Redbook 1971, Part I, p. 16-18).

h) Other matters

The Committee **recommended**

i) that the Commission accept the invitation of ICES to convene a meeting of a joint ICES/ICNAF Working Group on Cod Stocks in the North Atlantic: and

ii) that the Executive Secretary and the Chairman of the Assessments Subcommittee consult with the Chairman of the ICES Liaison Committee concerning the composition of the Working Group so that appropriate experts are invited to meet at the time of the mid-term meeting of the Assessments Subcommittee in January 1972;

iii) that the Commission support with ICES and FAO, a Symposium on Acoustic Methods to be held in 1973 and that an amount of $5,000 be allocated to help defray the cost of publication of papers and proceedings;

iv) that advice to the ICNAF Secretariat concerning the implementation of a new closure procedure for catch quotas to more precisely achieve the target quota, be provided by the Chairman of the Assessments Subcommittee and such other experts as the Executive Secretary and the Assessments Subcommittee Chairman consider appropriate.

The Committee extended its thanks to Dr J. M. Colebrook of the Oceanographic Laboratory, Edinburgh, Scotland for a report on the development of an undulating plankton recorder.

12. Report of the Standing Committee on Regulatory Measures (STACREM)

(Items 16 and 28)

The Standing Committee met, under the chairmanship of Mr J. Graham (UK), following a recommendation of the *ad hoc* Working Group on ICNAF Fisheries (see Section 13 (i)) that the 'sliding scale' concept of preferential allocation of national quotas noted by the mid-term meeting of STACREM in January 1970 (Annu. Proc. Vol. 20, p. 25-26) should be discussed further by STACREM. STACREM reviewed the basic concepts or guidelines for the negotiation of catch limitation schemes developed at its 1969 mid-term meeting (Annu. Proc. Vol. 19, p. 24) in which it envisaged that, in determining each country's share under a scheme of catch allocation, a small proportion of the total should be set aside to provide for new entrants and non-members, and the remainder allocated between countries participating in the fisheries. The shares should be based mainly on historical performance but should also take account of other factors, such as provision for states with developing fisheries, coastal states, and states with fleets which are incapable of being diverted to other fisheries. The STACREM had before it a joint US-UK memorandum on provision for factors other than historical performance which proposed that the percentage shares of different countries would not necessarily remain the same at all levels of total catch, but that there should be a 'sliding scale', by which the lower the level of the total allowable catch, the greater might be the degree of preference to those countries having special needs, i.e., factors other than historical performance. Finally, STACREM agreed to alter the US-UK memorandum to include the following recommendation which was **adopted** by the Commission in plenary session on 3 June 1971,

> "that the 'sliding scale' concept be included in the guidelines for the negotiation of catch limitation schemes."

13. Reports of Meetings of Panels

(Items 17, 18, 19, 20, 21, 22, 23, and 29)

At its First Plenary Session, the Commission assigned item 17 on conservation of Atlantic Salmon, item 21 on conservation of herring, item 23 on maximum utilization of regulated species, and an item on a standard logbook for scientific and management purposes to a Joint Meeting of Panels 1-5; item 18 on conservation of haddock in Div. 4W and 4X of Subarea 4 to Panel 4; items 18, 19, and 20 on conservation of haddock, silver and red hakes, and yellowtail flounder in Subarea 5 to Panel 5; item 22 on conservation of seals to Panel A (Seals). Consideration of item 18 on Subarea 4 and 5 haddock and item 21 on herring was continued in a Joint Meeting of Panels 4 and 5. Reports of meetings of Panels 1-5 and of Panel A (Seals) and of joint meetings of Panels 4 and 5, and Panels 1-5 were received by the Commission.

a) **Panel 1.** The Panel, under the chairmanship of Mr K. Løkkegaard (Denmark), noted the further decrease of about 45% in cod catch in Subarea 1 in 1970, due again to severe ice conditions and poor recruitment. However, no further conservation action was recommended. The Panel supported the recommendations of STACRES that ICNAF should join with ICES in a working group on cod stocks in the North Atlantic and that additional coordinated groundfish surveys should be carried out in Subarea 1. The Panel also **recommended**

> "that the reports on subarea fisheries and research prepared by the Chairman of the Scientific Advisers to the Panels be published in the ICNAF Meeting Proceedings as appendices to the Reports of the Panel Meetings, and that each Chairman review a condensed version of his report before it is published in Part 3 of the Annual Proceedings."

The Panel unanimously elected Mr G. Möcklinghoff (Fed. Rep. Germany) Chairman for 1971-72 and 1972-73.

b) **Panel 2.** The Panel, under the chairmanship of Capt. Tavares de Almeida (Portugal), **recommended**

> "that the request of Poland, Portugal, and Spain for a delay from 1 July 1971 for the full implementation of the new mesh size of 130 mm in Subarea 2 by these countries be granted."

The Panel noted the need for more comprehensive and coordinated groundfish surveys in order to improve future assessments and the urgent need for examining tagging and meristic data bearing on stock definition

problems in Subarea 2 and the northern parts of Subarea 3.

The Panel unanimously elected Capt. Tavares de Almeida (Portugal) Chairman for 1971-72 and 1972-73.

c) **Panel 3.** The Panel, under the chairmanship of Mr A. Volkov (USSR), **approved** the application of Japan for membership in the Panel. The Panel, in noting the further decline from a peak in 1968 in total catch, **agreed** that the use of the new 130-mm mesh would be important for the conservation of, particularly, the strong 1968 year-class of cod in Div. 3NO, and **hoped** that the several Contracting Governments having reservations to the new 130-mm mesh-size proposal would seriously reconsider their positions with a view to withdrawing such reservations if at all possible. The Panel noted that necessary preliminary assessments had been given on yellowtail flounder and American plaice in Div. 3LN and that recent herring tagging showed that stocks fished off the southwest coast of Newfoundland (Div. 3P) migrate into the Gulf of St. Lawrence (Div. 4T).

The Panel unanimously elected Mr A. Volkov (USSR) Chairman for 1971-72 and 1972-73.

d) **Panel 4.** The Panel, under the chairmanship of Mr R. Lagarde (France), **approved** the application of Japan for membership in the Panel. The Panel noted that further consideration of the problem in defining inshore and offshore components of the cod stocks in Div. 4X was necessary before proposals for needed conservation of the offshore cod stock could be made.

The Panel reviewed Canadian proposals for considerable reduction in the catch quota, established in 1970, for haddock in Div. 4X and for the introduction of a catch quota for haddock in Div. 4W of Subarea 4, based on the reports of the STACRES and the Scientific Advisers to the Panel. Because conservation measures adopted for haddock in Subarea 4 could seriously influence the haddock fishery in Subarea 5, the Panel **agreed** that conservation measures for the Subarea 4 and Subarea 5 haddock stocks should be considered in a Joint Meeting of Panels 4 and 5.

The Panel reviewed a joint Canadian-US memorandum on herring conservation insofar as it concerned Subarea 4 herring stocks and noted the recent decline in catch in Div. 4X and 4V and that, in the best judgment of the Scientific Advisers, a reduction in catch is needed. The Panel **agreed** that the proposals for herring conservation should be referred to a Joint Meeting of Panels 4 and 5.

The Panel unanimously elected Capt. J. Cardoso (Portugal) Chairman for 1971-72 and 1972-73.

e) **Panel 5.** The Panel, under the chairmanship of Prof. Dr F. Chrzan (Poland), **approved** the applications of the Fed. Rep. Germany and Japan for membership in the Panel.

The Panel discussed the need for conservation measures to protect the scallop stocks on Georges Bank and noted that Canada and USA – the two countries harvesting scallops in Subarea 5 – would examine further what regulatory proposals might be developed for consideration at the 1972 Annual Meeting.

The Panel noted that recent catches of cod in the Subarea at or above maximum sustained yield levels provided cause for concern but **agreed** to postpone action until the implications of a catch quota proposed by Canada for other fisheries could be examined further.

The Panel took note of scientific reports that the existing catch quota of 12,000 metric tons for haddock in Subarea 5 was inadequate to arrest the decline in the severely depleted haddock resource and a US proposal to ban haddock fishing except for incidental catches of 5,000 pounds or 10% by weight of all fish on board caught in the Subarea. Because of the close relation of haddock regulatory regimes in Subarea 4 and 5, the Panel **agreed** that haddock proposals for both Subareas should be considered in a Joint Meeting of Panels 4 and 5 which would

also be considering conservation proposals for herring stocks in the two Subareas.

The Panel **recommended**

> "that the regulatory program for silver and red hakes in force since 1 January 1970 continue unchanged pending further assessments before the regulations expire at the end of 1972."

The Panel considered a USA proposal to increase the mesh size and to modify the catch quota including more flexible procedures for closing the open fishing seasons for yellowtail flounder in Subarea 5. After lengthy discussion, the Panel **recommended**

> "that the yellowtail flounder quota regulation for Subarea 5 adopted at the 20th Annual Meeting (Annu. Proc. Vol. 20, 1969-70, p. 27) and entered into force on 7 January 1971 be replaced by the following:

"1. That the Contracting Governments take appropriate action to regulate the catch of yellowtail flounder, *Limanda ferruginea* (Storer), by persons under their jurisdiction fishing in Subarea 5 so that the aggregate annual catch of yellowtail flounder per annum shall not exceed:
   a) 16,000 metric tons from fishing grounds east of 69°W;
   b) 10,000 metric tons from fishing grounds west of 69°W.

"2. That Competent Authorities of each Contracting Government shall report bi-weekly yellowtail flounder catches by persons under their jurisdiction taken in each of the areas referred to in paragraph 1 to the Executive Secretary of the Commission not later than 7 days after the end of a 2-week reporting period. Information of yellowtail flounder by-catch taken by the vessels which do not conduct specialized fishing for yellowtail flounder shall be reported to the Executive Secretary of the Commission in 700-ton increments. The Executive Secretary shall notify each Contracting Government of the dates on which accumulative catch and estimated catch of yellowtail flounder from each of the areas referred to in paragraph 1, the quantity estimated to be taken before closure could be introduced, and the likely incidental catch for the remainder of the year equal 100% of the allowable catch for the area in question. Within 10 days of receipt of such notification from the Executive Secretary, each Contracting Government shall prohibit catches of yellowtail flounder by persons under their jurisdiction from the area or areas referred to in the notification from the Executive Secretary, except as provided in paragraph 4.

"3. That the Executive Secretary may, if, on the basis of further information, he finds that the catch for the year in either of the areas referred to in paragraph 1 will equal less than 100% of the allowable catch for the area in question after the closure provided in paragraph 2, inform Contracting Governments that fishing for yellowtail flounder in such area may be permitted for a further period of a stated number of days, such period to begin 10 days after the date of notification.

"4. That in order to avoid impairment of fisheries conducted primarily for other species and which take small quantities of yellowtail flounder incidentally, the Contracting Governments may permit persons under their jurisdiction to have in possession on board a vessel fishing primarily for other species subsequent to a closure referred to in paragraph 2, yellowtail flounder caught within such a closed area in amounts not exceeding 5,000 lb. or 2,268 kg, or 10% by weight, of all other fish on board caught in the closed area.

"5. That the Commission shall review the allowable catches provided in paragraph 1 at each Annual Meeting, and shall propose such changes as are

necessary from time to time, taking into account such factors as fishing and natural variations in abundance."

and further **recommended**

"that paragraph 1 of the trawl regulations in force for cod and haddock in Subarea 5 be replaced by the following:

"1. That the Contracting Governments take appropriate action to prohibit (except as provided in paragraph 2) the taking of cod, *Gadus morhua* L.; haddock, *Melanogrammus aeglefinus* (L.); and yellowtail flounder, *Limanda ferruginea* (Storer) in Subarea 5, by persons under their jurisdiction with trawl nets having in any part of the net meshes of dimensions less than 114 mm or $4\frac{1}{2}$ inches in fisheries for cod, *Gadus morhua*, and haddock, *Melanogrammus aeglefinus*, and 130 mm or $5\frac{1}{8}$ inches for yellowtail flounder, *Limanda ferruginea*, as measured by the ICNAF gauge specified below. These mesh sizes relate to manila twine netting when measured wet after use or the equivalent thereof when measured dry before use. The Commission may, on the basis of scientific advice as to selectivity equivalents, determine the appropriate mesh sizes when trawl nets made of materials other than manila are used or when seine nets are used."

a) Mesh sizes are measured by a flat wedge-shaped gauge having a taper of 2 cm in 8 cm and a thickness of 2.3 mm, inserted into the meshes under a pressure or pull of 5 kg. The mesh size of a net shall be taken to be the average of the measurements of any series of 20 consecutive meshes, at least 10 meshes from the lacings, and when measured in the codend of the net beginning at the after end and running parallel to the long axis."

The Panel **agreed** that an increase in mesh size to 147 mm for yellowtail flounder would be discussed on its scientific merits at the next Annual Meeting of the Commission.

The Panel unanimously elected Mr F. Suzuki (Japan) Chairman for 1971-72 and 1972-73.

f) **Panel A (Seals).** The Panel, under the chairmanship of Mr O. Lund (Norway), heard reports on inspection procedures used during the 1971 seal hunt. It noted that Norway had two inspectors aboard its sealing vessels to ensure that the hunt was conducted humanely and in conformity with established provisions. All seal weapons were inspected by Norwegian Government officials and crews were instructed in the proper use of the weapons and in the anatomy of the seal skull and were provided with an instruction booklet. No incidents were reported in the 1971 hunt. Canada had one, and, in many cases, two inspectors aboard each sealing vessel and no infractions were reported.

The Panel noted the scientific advice and **agreed** that the catch of harp seals should be substantially lower than the quota of 200,000 seals, in effect for sealing vessels in 1971, if further decline in the stock is to be prevented. The Panel, however, wished to examine the long-term effects on the seal population of reducing the catch quota to the level of the sustainable yield in more than one step before recommending an exact quota. Members of the Panel **agreed** to consider this matter in the autumn of 1971, with the expectation that a quota for the 1972 catch by vessels could be established by agreement between the countries concerned. The Panel **recommended**

"that the 1971 seal regulations, other than quota, remain in force for 1972 without alternations."

The Panel noted that the Commission is contributing financial and secretarial assistance to the ICES/ICNAF/IBP Symposium on the Biology of Seals to be held at the University of Guelph, Guelph, Canada, 13-17 August 1972.

g) **Joint Meeting of Panels 1-5.** A Joint Meeting of Panels 1-5 was convened, under the chairmanship of Dr A. W. H. Needler

(Canada), to continue consideration, begun in meetings of Panel 4 and Panel 5, of the need for **conservation of herring stocks** in the Convention Area. The joint Panels took note of revised Canada-USA proposals for catch quota in portions of Subareas 4, 5 and 6 and of national actions being taken by both Canada and USA for the conservation of heavily exploited herring stocks. Following lengthy discussion with no consensus having been reached, the joint Panels **agreed** that the problem be left for further consideration at a later meeting (see Joint Meeting of Panels 4 and 5).

The joint Panels, with delegates from all 15 member countries participating, then considered the item on **conservation of Atlantic salmon** referred from the First Plenary Session. The 1969 Commission proposal to ban fishing for Atlantic salmon on the high seas, effective for all Contracting Governments except Denmark, Norway, and the Federal Republic of Germany, and the 1970 proposal mainly limiting catch or effort to the 1969 level effective for all Contracting Governments except USSR were reviewed. Following full discussion, a Canadian proposal mainly limiting catch and vessel tonnage to 80% of the 1969 level was defeated, 3 votes for (Canada, USA, and Spain), 5 votes against (USSR, Norway, Portugal, Iceland, and Denmark), and 7 abstentions (France, Federal Republic of Germany, Poland, Italy, Romania, UK, and Japan). The following Danish counter-proposal was then accepted by the joint Panels by a vote of 11 votes for (Canada, Denmark, France, Norway, Portugal, Italy, Federal Republic of Germany, Romania, Poland, UK, and Japan), 3 votes against (Iceland, USSR, and USA), and one abstention (Spain) and **adopted** by the Commission on 4 June 1971 for transmittal to Contracting Governments by Depositary Government:

> "**Recognizing** that since the measures for the conservation of Atlantic salmon proposed in 1970 did not take effect until 1971 their effect cannot yet be assessed; but
>
> **Noting** with satisfaction that nevertheless the escalation of the catch of salmon in the Convention Area did not continue in 1970; and
>
> **Taking** into consideration that the important data which are expected to result from the large-scale tagging experiment which is before the Commission for approval will not be available until after the 1972 meeting of the Commission;
>
> The Commission **proposes** that the measures set out in numbered paragraphs 1, 2, and 3 of the 1970 proposal be continued in force for the years 1972 and 1973; subject to review within that period in the event of substantial changes in the catches of Atlantic salmon in the Convention Area or in home waters or in the fish stocks, or in the event of the entry into the fishery of states not at present participating."

The joint Panels considered a joint USA-UK-USSR proposal regarding the **use of alternative mesh measuring gauges** and the following recommendation was **adopted** by the Commission on 4 June 1971 for transmittal to Depositary Government for joint action by the Contracting Governments:

> "that the following sentence be deleted from paragraph 1 of the international trawl regulations for each of the Subareas 1 to 5:
>
> The Commission may also, on the basis of scientific advice, approve not more than two alternative gauges, by defining the gauges, together with approved methods for their use and with accepted scales of equivalent mesh dimensions."

The joint Panels considered a USSR proposal to introduce **a mesh size of 130 mm for regulated species in the whole Convention Area,** i.e., to extend the mesh-size regulation already introduced in Subarea 1, 2, and 3 to Subareas 4 and 5. No consensus could be reached and the joint Panels **agreed** to give further consideration to the proposal at the 1972 Annual Meeting.

A Canadian proposal concerning **utilization of catches of regulated species** was regarded by a number of the delegations to be of considerable importance and the joint Panels **recommended** that the problem of maximum use of catches of regulated species be given serious consideration at the 1972 Annual Meeting.

The joint Panels, **noting** that STACRES has developed a proposed format for an international logbook as part of an effective statistical scheme, an international inspection scheme and the application of a catch quota, and **agreeing** that it was important and urgent to adopt a standard logbook, **recommended**

i) that comments on the suitability of the logbook format developed by STACRES be forwarded to the ICNAF Secretariat by 15 November 1971; and

ii) that the comments be studied by the Working Party on International Inspection under Captain Cardoso (Portugal) and recommendations be made to the Commission at its 1972 Annual Meeting.

h) Joint Meeting of Panels 4 and 5. A Joint Meeting of Panels 4 and 5 was convened under the chairmanship of Mr R. Lagarde (France) to further consider Canadian and US proposals for amendment to the conservation measures for haddock currently in effect in Div. 4X of Subarea 4 and in Subarea 5, for additional conservation measures for haddock in Div. 4W of Subarea 4, as well as for conservation measures for herring in Subareas 4 and 5.

Following discussion of the Canadian and USA **haddock proposals** as amended by scientific working groups, the Commission, on 4 June 1971, **adopted** for transmittal to Depositary Government for joint action by Contracting Governments the following **recommendation from Panel 5:**

"that the haddock quota regulation for Subarea 5 adopted at the 19th Annual Meeting of the Commission (Annu. Proc. Vol. 19, 1968-69, p. 27-28) be replaced by the following:

"1. That the Contracting Governments take appropriate action to regulate the catch of haddock, *Melanogrammus aeglefinus* (L.), by persons under their jurisdiction fishing in Subarea 5 so that the aggregate annual catch of haddock by vessels taking haddock in Subarea 5 shall not exceed 6,000 metric tons per annum.

"2. That Competent Authorities of each Contracting Government shall report bi-weekly haddock catches taken in Subarea 5 by persons under their jurisdiction to the Executive Secretary of the Commission not later than 7 days after the end of a 2-week reporting period. Information of haddock by-catch taken by the vessels which do not conduct specialized fishing for haddock shall be reported to the Executive Secretary of the Commission in 700-ton increments. The Executive Secretary shall notify each Contracting Government of the date on which accumulative catch and estimated catch of haddock in Subarea 5, the quantity estimated to be taken before closure could be introduced, and the likely incidental catch for the remainder of the year equal 100% of the allowable catch stated in paragraph 1. Within 10 days of receipt of such notification from the Executive Secretary each Contracting Government shall prohibit the catching of haddock caught in Subarea 5 by persons under its jurisdiction, except as provided in paragraph 4.

"3. That the Executive Secretary may, if, on the basis of further information, he finds that the catch for the year will equal less than 100% of the allowable catch stated in paragraph 1 after the closure provided in paragraph 2, inform Contracting Governments that fishing for such haddock may be permitted for a further period of a stated number of days, such period to

begin 10 days after the date of notification.

"4. That in order to avoid impairment of fisheries conducted primarily for other species and which take small quantities of haddock incidentally, the Contracting Governments may permit persons under their jurisdiction to have in possession on board a vessel fishing primarily for other species subsequent to the closure referred to in paragraph 2, haddock caught in Subarea 5 in amounts not exceeding 5,000 lb. or 2,268 kg, or 10% by weight, of all other fish on board caught in Subarea 5.

"5. That the Contracting Governments take appropriate action to prohibit persons under their jurisdiction from using fishing gear in a manner capable of catching demersal species during March, April and May of each year in areas of Subarea 5 bounded by straight lines connecting the following coordinates in the order listed:

a) 69°55′W, 42°10′N
69°10′W, 41°10′N
68°30′W, 41°35′N
69°00′W, 42°10′N

b) 67°00′W, 42°20′N
67°00′W, 41°15′N
65°40′W, 41°15′N
65°40′W, 42°00′N
66°00′W, 42°20′N

The provisions of this paragraph shall not apply to vessels that fish with hooks having a gape of not less than 3 cm.

"6. That the Commission shall review the allowable catch provided in paragraph 1, and the area and dates provided in paragraph 5, at each Annual Meeting, and shall propose such changes as are necessary from time to time, taking into account such factors as fishing, natural variations in abundance, and natural variations in spawning."

and the following **recommendations from Panel 4:**

i) that the haddock quota regulation for Division 4X of Subarea 4 adopted at the 19th Annual Meeting of the Commission (Annu. Proc., Vol. 19, 1968-69, p. 26-27) be replaced by the following:

"1. That the Contracting Governments take appropriate action to regulate the catch of haddock, *Melanogrammus aeglefinus* (L.), by persons under their jurisdiction fishing in Division 4X of Subarea 4 so that the aggregate annual landings of haddock by vessels taking haddock in Division 4X of Subarea 4 in the year 1972 shall not exceed 9,000 metric tons.

"2. That Competent Authorities of each Contracting Government shall report bi-weekly haddock catches taken in Division 4X of Subarea 4 by persons under their jurisdiction to the Executive Secretary of the Commission not later than 7 days after the end of a 2-week reporting period. Information of haddock by-catch taken by the vessels which do not conduct specialized fishing for haddock shall be reported to the Executive Secretary of the Commission in 700-ton increments. The Executive Secretary shall notify each Contracting Government of the date on which accumulative catch and estimated catch of haddock in Division 4X of Subarea 4, the quantity estimated to be taken before closure could be introduced, and the likely incidental catch for the remainder of the year equal 100% of the allowable catch stated in paragraph 1. Within 10 days of receipt of such notification from the Executive Secretary each Contracting Government shall prohibit the catching of haddock

caught in Division 4X of Subarea 4 by persons under its jurisdiction, except as provided in paragraph 4.

"3. That the Executive Secretary may, if, on the basis of further information, he finds that the catch for the year will equal less than 100% of the allowable catch stated in paragraph 1 after the closure provided in paragraph 2, inform Contracting Governments that fishing for such haddock may be permitted for a further period of a stated number of days, such period to begin 10 days after the date of notification.

"4. That in order to avoid impairment of fisheries conducted primarily for other species and which take small quantities of haddock incidentally, the Contracting Governments may permit persons under their jurisdiction to have in possession on board a vessel fishing primarily for other species subsequent to the closure referred to in paragraph 2, haddock caught in Division 4X of Subarea 4 in amounts not exceeding 5,000 lb. or 2,268 kg, or 10% by weight, of all other fish on board caught in Division 4X of Subarea 4.

"5. That the Contracting Governments take appropriate action to prohibit persons under their jurisdiction from using fishing gear in a manner capable of catching demersal species during March, April and May of 1972 in that part of Division 4X of Subarea 4 bounded by straight lines connecting the following coordinates in the order listed:

65°44′W, 42°04′N
64°30′W, 42°40′N
64°30′W, 43°00′N
66°32′W, 43°00′N
66°32′W, 42°20′N
66°00′W, 42°20′N

ii) "1. That the Contracting Governments take appropriate action to regulate the catch of haddock, *Melanogrammus aeglefinus* (L.), by persons under their jurisdiction fishing in Division 4W of Subarea 4 so that the aggregate annual landings of haddock by vessels taking haddock in Division 4W of Subarea 4 in the year 1972 shall not exceed 4,000 metric tons.

"2. That Competent Authorities of each Contracting Government shall report bi-weekly haddock catches taken in Division 4W of Subarea 4 by persons under their jurisdiction to the Executive Secretary of the Commission not later than 7 days after the end of a 2-week reporting period. Information of haddock by-catch taken by the vessels which do not conduct specialized fishing for haddock shall be reported to the Executive Secretary of the Commission in 700-ton increments. The Executive Secretary shall notify each Contracting Government of the date on which accumulative catch and estimated catch of haddock in Division 4W of Subarea 4, the quantity estimated to be taken before closure could be introduced, and the likely incidental catch for the remainder of the year equal 100% of the allowable catch stated in paragraph 1. Within 10 days of receipt of such notification from the Executive Secretary each Contracting Government shall prohibit the catching of haddock caught in Division 4W of Subarea 4 by persons under its jurisdiction, except as provided in paragraph 4.

"3. That the Executive Secretary may, if, on the basis of further information, he finds that the catch for the year will equal less than 100% of the allowable catch stated in paragraph 1 after the closure provided in paragraph 2, inform Contracting Governments that fishing for such haddock may be permitted for a further period of a stated number of days, such period to begin 10 days after the date of notification.

"4. That in order to avoid impairment of fisheries conducted primarily for other species and which take small quantities of haddock incidentally, the Contracting Governments may permit persons under their jurisdiction to have in possession on board a vessel fishing primarily for other species subsequent to the closure referred to in paragraph 2, haddock caught in Division 4W of Subarea 4 in amounts not exceeding 5,000 lb. or 2,268 kg, or 10% by weight, of all other fish on board caught in Division 4W of Subarea 4."

The joint Panels, noting that no agreement could be reached on herring conservation by catch quotas following revision of a Canadian-USA proposal, a special meeting of STACRES and an informal meeting of delegates particularly interested in herring problems, **recommended** the following actions which were **adopted** by the Commission on 4 June 1971:

i) that a special meeting of the Commission to consider herring conservation measures be convened on 31 January 1972, possibly in Rome, by courtesy of FAO;

ii) that herring scientists meet immediately to plan an extraordinary effort to supply the information required to formulate sound conservation measures;

iii) that herring scientists meet again on 24 and 25 January 1972, just prior to the special meeting of the Commission to analyze the most recent information and advise the Commission;

iv) that herring scientists address themselves particularly to the following three questions:
   a) What are the maximum sustainable yields from the stocks?
   b) What are reliable estimates of sustainable yields in 1972 and in as many subsequent years as it is possible to give advice?
   c) What levels of catch would result in restoration of the stocks, giving a number of options on the speed of recovery?

i) **Report of *ad hoc* Working Group on ICNAF Fisheries.** The Working Group, an approved expansion of the 1970 *ad hoc* Working Group on Subarea 5 Fisheries, was convened from 24 to 26 May 1971 under the chairmanship of Mr E. B. Young (Canada), to examine a Canada-USA study "Canada-US Notes on Quota Allocation Procedures" using computer facilities, of how certain concepts of quota allocation might apply to a broad range of stocks in various parts of the Convention Area. With regard to the relation of STACREM to the *ad hoc* Working Group, it was generally agreed that, while the former body might be the appropriate forum for examining general principles, more concrete problems of quota allocation could be dealt with in bodies such as the *ad hoc* Working Group. The Working Group took note of the practical examples of how certain fisheries might be affected by quota allocations based on historical performance and special factors – basic concepts discussed previously by STACREM.

Noting the varying circumstances of participants in the different fisheries, attention was drawn to the 'sliding scale' concept of preferential allocations noted during the STACREM talks in January 1970 (Annu. Proc. Vol. 20, 1969-70, p. 25-26). The Working Group **recommended**

"that the 'sliding scale' concept of preferential allocation of catch quota be

reviewed by STACREM at the present Annual Meeting of the Commission if time permitted,"

and called attention to a meeting proposed for 29 May 1971 of member countries interested in allocation of catch quota for haddock in Subarea 5.

j) **Report of the *ad hoc* Meeting on Haddock Quota Allocation in Subarea 5.** As a result of the request of the 1970 meeting of the *ad hoc* Working Group on Subarea 5 Fisheries (Annu. Proc. Vol. 20, 1969-70, p. 29), an *ad hoc* meeting was convened, under the chairmanship of Mr R. Lagarde (France), to examine a US informal proposal for allocation of a haddock quota in Subarea 5 when the resource has recovered to former levels of abundance. Representatives of all member countries except Italy and Romania were present. Using the basic concepts discussed in STACREM, the USA presented a theoretical allocation in Subarea 5 for a recovered potential haddock yield of 50,000 metric tons. The portion of the proposed national allocation based on historical performance was derived by eliminating the years of over-fishing from the calculation and then weighing short-term 3-year averages and long-term 10-year averages, 20 and 80% respectively. The years of over-fishing were eliminated because it seemed inequitable to allow such activity to increase any participant's quota share. The proposed allocation of the remaining portion of the quota on the basis of special factors included consideration for coastal countries, for offsetting incidental catches by non-member countries and by member countries without quotas and for member countries with small quotas.

The Commission received the report at its Final Plenary Session and noted that early, informal attention to quota allocation would avoid lengthy delays in implementing such schemes when the Commission acquired the authority, with the anticipated entry into force in the near future of the 1969 Protocol, to allocate national quotas.

14. Election of Chairman and Vice-Chairman (Item 30)

The Commission unanimously elected Mr K. Løkkegaard (Denmark) to succeed Dr A. W. H. Needler (Canada) as Chairman of the Commission and Mr R. Lagarde (France) was unanimously elected Vice-Chairman of the Commission for the 1971-72 and 1972-73 sessions.

15. Acknowledgements and Adjournment (Item 34)

The Chairman acknowledged the observers from FAO, EEC, ISPA, SCOR, INPFC, ICES, and Cuba who expressed their appreciation for the invitation to attend the meeting. Mr J. Aglen (UK) paid tribute to the long and invaluable service to Canadian and international fisheries by Dr A. W. H. Needler, recently retired as Chairman of the Commission and as Canadian Deputy Minister of Fisheries and Forestry. The new Chairman, Mr K. Løkkegaard, in expressing his appreciation of the high honour accorded him, paid tribute to Mr J. Aglen, Fisheries Secretary for Scotland, and Dr G. Meseck, Director of Fisheries for the Federal Republic of Germany, both of whom would be retiring from service within the year. Mr O. Lund (Norway) complimented the Secretariat for the efficient running of the meeting.

There being no other business, the Chairman thanked the Delegates and their Advisers for their good efforts to further the work of the Commission and declared the 21st Annual Meeting of the Commission adjourned at 1745 hrs, 4 June 1971.

APPENDIX I

List of Participants

(Chairman of Delegation in **bold**)

CANADA

Commissioners:

Mr K. Henriksen, H. B. Nickerson & Sons Ltd., P.O. Box 130, North Sydney, Nova Scotia.
Dr A. W. H. Needler, Department of Fisheries & Forestry, Ottawa 8, Ontario.

Advisers:

Mr H. R. Bennett, Department of Fisheries & Forestry, P.O. Box 5667, St. John's, Newfoundland.
Mr W. M. Carter, Int. Atlantic Salmon Foundation, P.O. Box 429, St. Andrews, New Brunswick.
Mr R. S. Collie, Department of Fisheries & Forestry, P.O. Box 550, Halifax, Nova Scotia.
Mr B. J. Comeau, Comeau Sea Foods, Saulnierville, Digby Co., Nova Scotia.
Dr L. M. Dickie, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia.
Mr A. A. Etchegary, Fishery Products Ltd., 85 Elizabeth Ave., St. John's, Newfoundland.
Mr J. Fenety, Miramichi Salmon Assoc., P.O. Box 217, Fredericton, New Brunswick.
Dr. H. D. Fisher, Department of Zoology, University of B.C., Vancouver 8, British Columbia.
Mr T. B. Fraser, Atlantic Salmon Assoc., 1255 University St., Suite 705, Montreal 2, P.Q.
Mr R. N. Gordon, Department of Fisheries & Forestry, P.O. Box 550, Halifax, Nova Scotia.
Mr E. M. Gorman, Department of Fisheries, P.O. Box 2000, Charlottetown, Prince Edward Island.
Dr R. G. Halliday, Fisheries Research Board Biological Station, St. Andrews, New Brunswick.
Dr V. M. Hodder, Fisheries Research Board Biological Station, St.John's, Newfoundland.
Mr D. Iles, Fisheries Research Board Biological Station, St. Andrews, New Brunswick.
Mr K. Karlsen, Karlsen Shipping, P.O. Box 1044, Halifax, Nova Scotia.
Dr C. J. Kerswill, Fisheries Research Board, Ottawa 8, Ontario.
Dr A. C. Kohler, Fisheries Research Board Biological Station, St. Andrews, New Brunswick.
Mr J. E. H. Legaré, Department of Fisheries, Centennial Bldg., Fredericton, New Brunswick.
Mr C. R. Levelton, Department of Fisheries & Forestry, Ottawa 8, Ontario.
Dr A. W. May, Fisheries Research Board Biological Station, St. John's, Newfoundland.
Dr F. D. McCracken, Fisheries Research Board Biological Station, St. Andrews, New Brunswick.
Mr A. T. Pinhorn, Fisheries Research Board Biological Station, St. John's, Newfoundland.
Mr D. H. Pyke, National Sea Products Ltd., P.O. Box 867, Lunenburg, Nova Scotia.
Dr K. Ronald, College of Biological Science, University of Guelph, Guelph, Ontario.
Dr D. E. Sergeant, Fisheries Research Board, P.O. Box 400, Ste. Anne de Bellevue, Quebec.
Dr G. F. M. Smith, Department of Fisheries & Forestry, Ottawa 8, Ontario.
Dr W. Templeman, Fisheries Research Board Biological Station, St. John's, Newfoundland.
Mr C. R. Thomas, National Sea Products Ltd., P.O. Box 2130, Halifax, Nova Scotia.
Mr. E. B. Young, Department of Fisheries & Forestry, Ottawa 8, Ontario.

(Note: Department of Fisheries & Forestry is now Department of the Environment)

DENMARK

Commissioners:

Mr E. Hesselbjerg, Ministry for Greenland, Hausergade 3, 1128 Copenhagen K.
Mr K. Løkkegaard, Ministry of Fisheries, Borgergade 16, 1300 Copenhagen K.
Mr E. Nolsøe, Tinganes, Torshavn, Faroe Islands.

Advisers:

Mr J. Adamsen, Ministry of Foreign Affairs, Copenhagen.
Mr C. Djurhuus, Tinganes, Torshavn, Faroe Islands.
Mr Sv. Aa. Horsted, Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, 2920 Charlottenlund.
Mr J. Kronborg, Landsradets Secretariat, DK-3900 Godthaab, Greenland, via Denmark.
Dr E. Smidt, Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, 2920 Charlottenlund.

FRANCE

Commissioners:

Mr M. Labrousse, Secrétariat Général de la Marine Marchande, 3 Place de Fontenoy, Paris.
Mr R. A. Lagarde, Secrétariat Général de la Marine Marchande, 3 Place de Fontenoy, Paris.
Mr M. R. H. Letaconnoux, Institut Scientifique et Technique des Pêches Maritimes, B.P. 1049, 44 Nantes.

Advisers:

Mr A. G. Coudray, Institut Scientifique et Technique des Pêches Maritimes, B.P. 26, St. Pierre et Miquelon.
Dr C. Maurin, Institut Scientifique et Technique des Pêches Maritimes, B.P. 1049, 44 Nantes.
Mr J. Morice, Institut Scientifique et Technique des Pêches Maritimes, B.P. 26, St. Pierre et Miquelon.

FEDERAL REPUBLIC OF GERMANY

Commissioners:

Dr D. Booss, Bundesministerium für Ernährung, Landwirtschaft und Forsten, 53 Bonn.
Dr G. Meseck, Bundesministerium für Ernährung, Landwirtschaft und Forsten, 53 Bonn.

Advisers:

Dr H. Bohl, Bundesforschungsanstalt für Fischerei, Palmaille 9, 2 Hamburg 50.
Dr J. Genschow, Assoc. of German Trawler Owners, 285 Bremerhaven, Preussenstr. 3.
Dr A. Meyer, Institut für Seefischerei, Palmaille 9, 2 Hamburg 50.
Dr A. Schumacher, Institut für Seefischerei, Palmaille 9, 2 Hamburg 50.

ICELAND

Commissioner:

Dr J. Jonsson, Marine Research Institute, Skulagata 4, Reykjavik.

ITALY

Commissioner:

Mr B. Uguccione, Italian Embassy, Ottawa, Canada.

Adviser:

Mr E. Capodilupo, Ministero Marina Mercantile, Rome.

JAPAN

Commissioners:

Dr O. Kibezaki, Far Seas Fisheries Research Laboratories, Fisheries Agency, 1000 Orido, Shimizu, Shizuoka, Japan.
Mr S. Okuchi, Nippon Suisan Kaisha Ltd., 6-2, Otemachi, 2 Chome, Chiyoda-Ku, Tokyo.
Mr F. Suzuki, Ministry of Foreign Affairs, Tokyo.

Advisers:

Mr K. Iino, Ministry of Foreign Affairs, Tokyo.
Mr Y. Odaka, Ministry of Foreign Affairs, Tokyo.
Dr F. Nagasaki, Far Seas Fisheries Research Laboratories, Fisheries Agency, Kasumigaseki, Chiyoda-Ku, Tokyo.
Mr T. Saito, First Ocean Division, Fisheries Agency, 1-2 Kasumigaseki, Tokyo.
Mr S. Sasaki, Embassy of Japan, 1005 Fuller Bldg., 75 Albert St., Ottawa 4, Canada.

NORWAY

Commissioners:

Mr O. Lund, Directorate of Fisheries, Bergen.
Mr E. Kvammen, Ministry of Fisheries, Oslo.
Mr G. Saetersdal, Institute of Marine Research, P.O. Box 2906, Bergen.

Advisers:

Mr T. Øritsland, Institute of Marine Research, P.O. Box 2906, Bergen.
Mr T. Storli, P.O. Box 248, Tromsøe.
Mr. E. Aas, Ministry of Fisheries, Oslo.

POLAND

Commissioners:

Mr M. Fila, Ministry of Shipping, 12 Swietokrzyska Street, Warsaw.
Prof. Dr F. Chrzan, Morski Instytut Rybacki, al. Zjednoczenia 1, Gdynia.

PORTUGAL

Commissioners:

Capt. A. A. Tavares de Almeida, Rua do Ferragial de Baixo 48, 3° Lisbon.
Capt. J. C. Esteves-Cardoso, Rua 9 de Abril 40, S. Pedro do Estoril.

Adviser:

Dr R. Monteiro, Instituto de Biologia Maritima, Cais do Sodré, Lisbon 2.

ROMANIA

Commissioner:

Mr D. Dinescu, Romanian Commercial Office, 485 McGill Street, Montreal, Canada.

SPAIN

Commissioners:

Dr M. G. Larrañeta, Instituto Investigaciones Pesqueras, Orillamar 47, Vigo.
Mr V. Bermejo, Direccion General de Pesca Maritima, Ruiz de Alarcon 1, Madrid 10.

Advisers:

Capt. J. Arambarri, 10 Topsail Blvd., St. John's, Newfoundland, Canada.
Mr J. Rucabado, Instituto Investigaciones Pesqueras, Orillamar 47, Vigo.

UNION OF SOVIET SOCIALIST REPUBLICS

Commissioners:

Dr A. S. Bogdanov, All-Union Research Institute of Marine Fisheries & Oceanography, (VNIRO), V. Krasnoselskaya 17, Moscow.
Mr V. M. Kamentsev, Ministry of Fisheries, 12 Rozhdestvensky Blvd., Moscow K-45.

Advisers:

Mr A. A. Volkov, Ministry of Fisheries, 12 Rozhdestvensky Blvd., Moscow K-45.
Dr V. N. Yakovlev, All-Union Research Institute of Marine Fisheries & Oceanography, (VNIRO), V. Krasnoselskaya 17, Moscow.
Mr A. Nikolaev, Ministry of Fisheries, 12 Rozhdestvensky Blvd., Moscow K-45.

UNITED KINGDOM

Commissioners:

Mr A. J. Aglen, Department of Agriculture & Fisheries for Scotland, Argyle House, Lady Lawson St., Edinburgh, EH3 9DR, Scotland.
Dr H. A. Cole, Fisheries Laboratory, Lowestoft, Suffolk, England.
Mr J. Graham, Ministry of Agriculture, Fisheries & Food, Great Westminster House, Horseferry Rd., London S.W.1, England.

Advisers:

Mr T. D. Boyd, Boyd Line Ltd., St. Andrew's Dock, Hull, England.
Mr D. J. Garrod, Fisheries Laboratory, Lowestoft, Suffolk, England.
Mr A. J. Lee, Fisheries Laboratory, Lowestoft, Suffolk, England.
Mr B. B. Parrish, Marine Laboratory, P.O. Box 101, Victoria Rd., Torry, Aberdeen, Scotland.

UNITED STATES

Commissioners:

Mr T. A. Fulham, Boston Fish Market Corporation, 253 Northern Ave., Boston, Mass.
Mr R. W. Green, Department of Sea & Shore Fisheries, State House, Augusta, Maine, 04330.
Mr W. M. Terry, N.M.F.S., Department of Commerce, Washington, D.C., 20240.

Advisers:

Capt. C. W. Bailey, Eastern Area, U.S.C.G., Bldg. 125, Governor's Island, New York.
Mr H. R. Beasley, N.M.F.S., Department of Commerce, Washington, D.C., 20240.
Dr B. Brown, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Dr H. Bruce, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Mr R. A. Buck, Atlantic Salmon Comm., Old Dublin Road, Hancock, New Hampshire, 03449.
Mr W. A. Burpee, Legislative Assistant, Rayburn Building, Washington, D.C., 20515.
Mr C. G. Carothers, Department of the Interior, Washington, D.C.
Mr G. B. Charles, Cooperative Fishing Industries, P.O. Box 441, Provincetown, Massachusetts, 0265.
Mr S. T. Chmura, Massachusetts State Legislature, Boston, Massachusetts.
Mr P. A. Douglas, National Wildlife Federation, 1412 16th St., N.W. Washington, D.C., 20036.
Mr J. J. Dykstra, Point Judith Fisheries Co-op., Point Judith, Rhode Island.
Mr S. J. Favazza, City of Gloucester Fisheries Commission, P.O. Box 568, Gloucester, Massachusetts, 01930.
Cdr J. Fournier, First Coast Guard District, Boston, Massachusetts.
Mr F. Grice, Div. of Marine Fisheries, State Office Bldg., Boston, Massachusetts, 02202.
Dr B. L. Griswold, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Dr M. D. Grosslein, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Mr L. T. Healy, Seafood Producers Association, 60 North Water St., New Bedford, Massachusetts.
Mr R. C. Hennemuth, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Mr J. A. Holston, N.M.F.S., Federal Building, Elm Street, Gloucester, Massachusetts, 01930.
Dr R. F. Hutton, American Fisheries Society, 1040 Washington Bldg., Washington, D.C., 20005.
Mr A. M. Johnson, Marine Mammal Biological Laboratory, Bldg. 192, Sandpoint N.S.A., Seattle, Washington, 98115.
Mr F. Lipman, Lipman Marine Products, 35 Blaisdell St., Augusta, Maine.
Ambassador D. L. McKernan, Coordinator of Ocean Affairs & Special Assistant to the Secretary, Department of State, Washington, D.C.
Mr Q. W. MacLean, House of Representatives, Room 469, State House, Boston, Massachusetts.
Mr E. J. MacLeod, Lipman Marine Products, Gloucester, Massachusetts.
Mr H. W. Nickerson, Seafood Dealers, P.O. Box C-703, New Bedford, Massachusetts.
Mr T. A. Norris, F. J. O'Hara & Sons, 211 Northern Ave., Boston, Massachusetts, 02210.
Mr J. A. Posgay, N.M.F.S. Biological Laboratory, Woods Hole, Massachusetts, 02543.
Mr R. E. Reed, Maine Sardine Council, 15 Grove St., Augusta, Maine, 04330.
Dr G. Ridgway, N.M.F.S. Biological Laboratory, West Boothbay Hbr., Maine, 04575.
Mr J. B. Skerry, Office of Enforcement and Surveillance, N.M.F.S., Gloucester, Massachusetts, 01930.
Mr A. P. Skinner, New Bedford Fisherman's Union, 62 North Water St., New Bedford, Massachusetts, 02740.
Mr C. B. Stinson, Prospect Harbour, Maine, 04669.
Mr W. L. Sullivan Jr., Assistant Coordinator of Ocean Affairs for Marine Science Affairs, Department of State, Washington, D.C.
Mr A. F. Wagner Jr., Congressional Administrator, 20 Perry Ave., Buzzards Bay, Massachusetts.

CUBA

Observer:

Dr J. A. Varea, Institut Nacional de la Pesco, La Habana, Cuba.

FOOD AND AGRICULTURE ORGANIZATION

Observers:

Mr E. Cadima, Department of Fisheries, FAO, Via delle Terme di Caracalla, 00100, Rome.
Mr L. P. Gertenbach, Department of Fisheries, FAO, Via delle Terme di Caracalla, 00100, Rome.
Mr J. A. Gulland, Department of Fisheries, FAO, Via delle Terme di Caracalla, 00100, Rome.

EUROPEAN ECONOMIC COMMUNITY

Observers:

Mr P. Gueben, European Economic Community, Brussels, Belgium.
Mrs O. Quintin, European Economic Community, Brussels, Belgium.
Mr D. Vignes, European Economic Community, Brussels, Belgium.

INTERNATIONAL SOCIETY FOR THE PROTECTION OF ANIMALS

Observer:

Mr T. Scott, Executive Director, 655 Boylston St., Boston, Massachusetts, 02116, U.S.A.

SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH

Observer:

Mr A. J. Lee, Fisheries Laboratory, Lowestoft, Suffolk, England.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

Observer:

Dr O. Kibezaki, Far Seas Fisheries Research Laboratories, Fisheries Agency, 1000 Orido, Shimizu, Shizuoka, Japan.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

Observer:

Dr H. A. Cole, Fisheries Laboratory, Lowestoft, Suffolk, England.

GUEST

Professor P. Finkle, Asst. Prof., Department of Political Science, Memorial University, St. John's, Newfoundland, Canada.

SECRETARIAT

Mr L. R. Day, Executive Secretary.
Mr W. H. Champion, Administrative Assistant.
Mrs V. C. Kerr, Secretary.
Mrs E. R. Cornford, Clerk-Stenographer.
Mr G. M. Moulton, Clerk.

SECRETARIAT ASSISTANCE

Mr J. S. Beckett, Fisheries Research Biological Station, St. Andrews, New Brunswick.
Miss M. E. Day, Halifax, Nova Scotia.
Mrs M. C. Sweet, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia.

APPENDIX II

Agenda

PROCEDURES

1. Opening.
2. Agenda.
3. Publicity.

ADMINISTRATION

4. Panel Memberships.
5. Administrative Report.

FINANCE

6. Auditor's Report (1969-70) (Annu. Proc. Vol. 20, p. 9-13).
7. Financial Statement, 1970-71 (preliminary).
8. Budget estimate, 1971-72 (Appendix I, Agenda STACFAD).
9. Budget forecast, 1972-73 (Appendix II, Agenda STACFAD).

COMMISSION PROPOSALS

10. Status of proposals adopted by Commission:
    a) for changes in Convention,
    b) for regulation of fisheries.

TRAWL REGULATIONS

11. Annual Returns of Infringements.
12. Simplification of international trawl regulations.
13. Differentials for mesh materials.

ENFORCEMENT

14. Exchange of national inspection officers.
15. International inspection scheme.

CONSERVATION

16. Principles and problems of limiting fishing as a conservation measure.
17. Conservation of Atlantic salmon in the Convention Area.
18. Conservation of haddock stocks:
    a) in Div. 4W of Subarea 4,
    b) in Div. 4X of Subarea 4,
    c) in Subarea 5,
19. Conservation of silver and red hakes in Subarea 5.
20. Conservation of yellowtail flounder in Subarea 5.
21. Conservation of herring stocks in the Convention Area.
22. Conservation of seals in the Convention Area.
23. Measures to ensure maximum utilization of catches of regulated species in the Convention Area.

INTERNATIONAL COOPERATION

24. Report of Third Meeting of ICES/ICNAF/IOC Coordinating Group for North Atlantic Oceanography, Copenhagen, 1 October 1970.
25. Reports of meetings of NEAFC, ICES, FAO, IOC, and SCOR.

REPORTS OF COMMITTEES AND PANELS

26. Report of Standing Committee on Research and Statistics.
27. Report of Standing Committee on Finance and Administration.
28. Report of Standing Committee on Regulatory Measures.
29. Report of Panels 1-5 and Panel A (Seals).

OTHER MATTERS

30. Election of Chairman and Vice-Chairman for 1971-1972 and 1972-1973.
31. Date and place of 1972, 1973, and 1974 Annual Meetings.
32. Press statement.
33. Other business.
34. Adjournment.

APPENDIX III
Press Release

1. The 21st Meeting of the International Commission for the Northwest Atlantic Fisheries (ICNAF) was held in the Lord Nelson Hotel, Halifax, Nova Scotia, Canada from 27 May to 4 June, 1971, under the chairmanship of Dr A. W. H. Needler (Canada). Delegates from all member nations including the newest member, Japan, attended. The fifteen member states are: Canada, Denmark, France, Federal Republic of Germany, Iceland, Italy, Japan, Norway, Poland, Portugal, Romania, Spain, the Union of Soviet Socialist Republics, the United States of America, and the United Kingdom of Great Britain. Observers represented the Government of Cuba, the International Council for the Exploration of the Sea, the Food and Agriculture Organization of the United Nations, and the Commission of the European Economic Community.

2. The area of the North Atlantic covered by the Convention, which runs from West Greenland to the coast of Rhode Island, USA, and includes the fishing banks and offshore waters, yielded over 3 million metric tons of fish and shellfish during 1970, with cod comprising one third of this figure and herring another quarter.

3. The Commissioners considered reports compiled by scientists of the many nations at earlier meetings, and took action to conserve the stocks of a number of species in various parts of the fisheries.

4. **Haddock.** Noting that the catch of haddock continues to decline on Georges and the Nova Scotian Banks, and that numbers of young fish remain very low, the Commission further restricted the catch in the western areas, and extended the closed season to include March, April, and May to protect the spawning concentrations. A proposal to ban haddock fishing on Georges Bank was amended to reduce allowable fishing from 12,000 metric tons in 1970 and 1971 to 6,000 metric tons in 1972. Allowable fishing was also reduced in the Browns Bank area from 18,000 metric tons in 1970 and 1971 to 9,000 tons in 1972. Fishing on the central Nova Scotian Banks was limited to 4,000 metric tons.

5. **Herring.** Considerable discussion centred on the need to conserve the stocks of this species which have been very considerably depleted by greatly increased fishing in recent years throughout the southern part of the Convention Area. No decisions were made, however, and the whole matter will be discussed, after further intensive scientific studies, at a special meeting of the Commission next January. This illustrates the great importance the Commission attaches to taking actions on this subject. This will be the first special meeting of the Commission in its 21-year history.

6. **Yellowtail Flounder.** Although primarily fished by the United States, yellowtail flounder are another species threatened by overfishing and measures were adopted to conserve the stocks by limiting the catch in the Georges Bank-Gulf of Maine area to 26,000 metric tons (16,000 metric tons from fishing grounds east of 69°W and 10,000 metric tons from fishing grounds west of 69°W) and by increasing the minimum size of the mesh in trawls to $5\frac{1}{8}$ inches, so as to allow more efficient escapement of undersized and small fish for future recapture at considerably increased weight.

7. **Salmon.** At the 1970 Annual Meetings the decision was taken to limit the catch of salmon on the high seas, notably off West Greenland, to that amount taken in 1969 (2,210 metric tons) and hence to halt the annual rapid increase in the fishery. Despite representations by some nations, notably Canada and the United States, that this fishery should be further restricted, the Commission agreed that the limitations adopted last year for 1971 should be continued for 1972 and 1973. A coordinated multi-nation tagging program was approved for 1972 in the area off West Greenland in order to provide better answers to the questions of the actual relationships between the catch in that area and the reduction of catch in coastal areas on both sides of the Atlantic.

8. **Seals.** The Commission noted that inspection of the 1971 fishery had been carried out at a high level, and that the results generally indicated compliance with all regulations. Consideration of the numbers of seals available to harvest indicated that conservation measures adopted in 1971 should continue but that the numbers taken should be reduced to levels which would maintain the stocks. However, the quota figure for 1972 will be fixed later in the year at a meeting of representatives from Canada, Denmark, and Norway.

9. **International Inspection.** The Commission's International Joint Inspection Scheme, which has been designed to ensure observance of international fishery regulations, is due to come into force on 1 July 1971 and most nations are prepared with the necessary legislation in effect, or expected, in the near future. A standardized procedure of inspection, identification of inspectors and inspection vessels, and of reporting was established.

10. **Next Meeting.** The 1972 Annual Meeting will be held in late May and early June in Washington, D.C., under the chairmanship of Mr K. Løkkegaard (Denmark) with Mr R. Lagarde (France) as Vice-Chairman.

Office of the Commission, Dartmouth, Nova Scotia, 4 June 1971.

PART 3

Summaries of Research and Status of Fisheries by Subareas, 1970

The following summaries were based on reports prepared by the Chairmen of the Groups of Scientific Advisers to the Panels from research reports and other pertinent documents submitted to the 1971 Annual Meeting of the Commission from Member Countries. The Chairmen were:

for Subarea 1 – A. Meyer (Fed. Rep. Germany);
for Subarea 2 – W. Templeman (Canada);
for Subarea 3 H. A. Cole (UK);
for Subarea 4 – J. A. Posgay (USA);
for Subarea 5 – G. F. M. Smith (Canada);
for Seals – G. F. M. Smith (Canada).

Subarea 1 and East Greenland

Reports on research in 1970 were submitted by Canada, Denmark, Federal Republic of Germany (FRG), France, Poland, Portugal, Spain, USSR, UK, and USA.

1. Status of the Fisheries

Total catch of all species, exclusive of catch by non-member countries, decreased 85,000 metric tons to 140,000 tons (62% of the 1969 catch, 26% of the highest recorded catch in 1962, and almost 50% lower than the lowest catch recorded by ICNAF).

Catches by countries in 1970, with the 1969 catch in parentheses, were: Denmark (Faroes) 8,000 tons (19,000); Denmark (Greenland) 38,000 tons (38,000); France 5,000 tons (25,000); FRG 45,000 tons (83,000); Norway 7,000 tons (19,000); Portugal 9,000 tons (16,000); Spain 19,000 tons (24,000); USSR 8,000 tons (200); UK 3,000 tons (1,000); and non-member countries did not report catch in 1969 or 1970.

Cod catches decreased 93,000 tons to 112,000 tons in 1970 which is only 25% of the 1962 catch. The further sharp decline is again apparently due to severe ice conditions for the third consecutive year, to poor recruitment in recent years and consequent diversion of fishing effort.

Redfish catches remained low at about 4,000 tons (7% of the 1962 catch).

Capelin catches increased dramatically from 200 tons in 1969 to 3,100 tons in 1970.

Salmon catches by Denmark, Faroes, Greenland, Norway, and Sweden totalled 2,115 tons, 95 tons less than in 1969.

Deep sea prawn catches, now also from offshore grounds, increased from 7,000 to 8,400 tons.

The East Greenland cod and redfish fisheries were carried out mainly by FRG and Icelandic trawlers. Total catch decreased by 11,000 tons to 39,000 tons in 1970 due to a decrease in market demand for fresh fish. Cod catch, however, increased slightly (18,000 to 20,000 tons) and exceeded those of redfish (30,000 to 17,000 tons) for the first time since the East Greenland fishery started in 1954.

2. Work Carried Out

a) Canada: Hydrographic and geophysical surveys in Baffin Bay. Salmon studies at West Greenland, Labrador Sea and Davis Strait in April and September-October. Salmon tagging (174 fish). Salmon morphometric and meristic studies, blood chemistry, parasites and food studies. Comparative fishing for salmon with Danish R/V *Adolf Jensen*.

b) Denmark: Hydrographic sections by R/V *Adolf Jensen*, May-December. Cod egg and larvae and young fish sampling, May-July. Cod age and size distribution, tagging (1,642 fish). Salmon age and size, blood and tissue studies. Tagging (88 salmon) (639 Greenland halibut) (305 herring). Deep sea prawn offshore studies.

Seal jaw and sex organ collections. Experimental fishing for American plaice.

c) France: R/V *Thalassa*, July and August, hydrographic and exploratory fishing.

d) FRG: Hydrography, R/V *Walther Herwig*, March, off West and East Greenland. Cod samples for length and age in East and West Greenland waters.

e) Poland: Cod and redfish sampling.

f) USSR: Hydrographic sections, August-December, by R/V's *Persey III* and *Portion* cod sampling.

g) UK: Plankton recorder sampling, 1,370 miles. Sampling commercial cod fishery. Salmon studies with Canadian and Danish scientists.

3. Hydrography

Hydrographic studies covered the Greenland area from Dohrn Bank off East Greenland to north of Disko Island off West Greenland. The year 1970 was again a severe ice year. The northward flow of ice started earlier than in 1969. By March the ice, which normally progresses no farther than Cape Desolation (60°45′N), reached the northern edge of Fiskenaes Bank (63°30′N). In April it extended north of Godthaab (64°30′N). Northerly winds in May temporarily scattered the ice, however, in July to August the "storis" again extended to north of Godthaab. As in the two preceding years, the temperatures were unusually low in the upper 100 m. On the western slope of Fyllas Bank negative temperatures were recorded for the first time as late as September. In July west of Fyllas Bank, in the upper 400 m, the temperature and salinity anomalies (from the 1950-66 mean) were in the range of -1.12 to -2.06°C and -0.3 to -0.6‰, respectively, and indicate an unusually strong inflow of polar water to the West Greenland area. In September and October off South Greenland temperatures were 1° to 4°C lower than those found since 1961.

The strong decrease in temperatures in the last half of the sixties is rather alarming especially in respect to the survival of cod larvae.

4. Cod

a) Eggs and larvae: The numbers found were smaller than in 1969, when eggs and larvae were scarce. Sampling results and the decreasing temperatures indicate a very poor 1970 year-class at West Greenland.

b) Young fish: The 1967 to 1969 year-classes were very poor.

c) Commercial stock: In the northern Divisions 1B to 1D, the year-classes 1965 and 1966 are by far the most important. Both year-classes were found to be of pure West Greenland origin and, therefore, are more or less missing from the southern Divisions 1E and 1F.

The 1965 year-class reached commercial importance in the offshore catches for the first time while the 1966 year-class was only fished offshore toward the end of the year. These two year-classes, which probably are at least of medium size, will become of increasing importance for the West Greenland fishery in 1971 and 1972. Off Southwest and South Greenland where, during the last 2 years and especially in 1970, the fishing activity by the German fleet increased in proportion to the northern divisions, the 1963 year-class dominated, followed by the 1962 and 1961 year-classes. Most of these 7- to 9-year-old cod were born off East Greenland. They were fished mainly during the first half of the year off Southwest, South, and East Greenland on their way to the spawning grounds off East Greenland, during spawning, and on their way back to Southwest Greenland as post-spawners. In the catches on the spawning grounds the rich 1961 year-class was dominant. A considerable part of the mature cod emigrated to Iceland for spawning.

The unusually heavy ice-cover over the fishing banks must have again reduced considerably the fishing mortality of the older cod, especially during the time of their post-spawning migration.

5. Atlantic Salmon

Salmon catch in the West Greenland area in 1970 (2,115 tons) was about the same as in 1969 from offshore (drift-net) and inshore (set gill net) components and was composed of salmon which had spent one winter in the sea. Studies of the origin and destination of salmon at West Greenland were continued in 1970 and confirms previous evidence that the stock originates mainly from rivers in Canada and the UK. Studies suggest that approximately equal proportions of the North American and European salmon make up the exploited stock at West Greenland. An international multi-nation salmon tagging experiment at West Greenland in August-October 1972 aims to release 3,000

tagged salmon widely distributed throughout the West Greenland fishing area for information on destinations and estimates of proportions going to each destination, on fishing mortality and rate of exploitation in the West Greenland fishery and on the size of the stock exploited at West Greenland.

6. Other Species

American plaice and offshore deep sea prawn commercial fishing possibilities were investigated by Denmark.

Subarea 2

Reports on researches in 1970 were submitted by the following countries: Canada, FRG, Poland, Portugal, Spain, USSR, UK, and USA.

1. Status of Fisheries

Total catch of all species, excluding catches by non-member countries, was about 236,000 metric tons (441,000 tons in 1969). Landings by country in 1970 in metric tons (1969 in parentheses) were: Canada 3,000 (5,000); France 16,000 (30,000); FRG 51,000 (72,000); Poland, 41,000 (65,000); Portugal 42,000 (66,000); Romania 5,000 (nil); Spain 11,000 (33,000); USSR 65,000 (154,000); UK 3,000 (2,000); USA 505 (391).

Cod catches, which made up about 90% of the total catch of all species, decreased dramatically from 412,000 tons in 1969 to 210,000 tons in 1970. Substantial decreases in offshore catches were recorded by France, FRG, Poland, Portugal, Spain, and USSR. The Canadian inshore catch decreased by 40% to the poorest catch in the recorded history of the fishery.

2. Work Carried Out

a) Canada: The standard section from off Seal Island in southern Labrador across Hamilton Inlet Bank was occupied on 2-3 August. The failure of the inshore Labrador fishery was investigated in August. Assessment work was carried out on cod of the area using "Virtual Population" methods. Aerial photographic survey was carried out for harp seals.

b) FRG: Cod were measured, sexed and aged, and some work carried out in cod fecundity.

c) Poland: Cod, redfish, and American plaice were measured and aged, and Greenland halibut measured.

d) Portugal: Cod from Division 2J were measured and aged.

e) Spain: Cod were measured, sexed, and aged.

f) USSR: The standard section 8-A, extending over Hamilton Inlet Bank, was occupied in late October. Cod were measured and aged, and cod tagging was carried out in Division 2J. Total and natural mortality rates were calculated for cod.

g) UK: Over 3,400 miles were sampled by the Continuous Plankton Recorder.

h) USA: The US Coast Guard studied short-term variations in the Labrador Current using moored buoys from 15 July to 11 August.

3. Hydrography

In early August, temperatures and salinities in the colder more shoreward part of the Labrador Current off southern Labrador were below average, but, in the deep water of the Continental Slope in the part of the Labrador Current derived from the West Greenland Current, both temperatures and salinities were above average and often higher than the highest previously recorded. Below average temperatures in the upper 200 m were also found in late October. The decreasing temperatures and salinities recorded in 1970 in the deep water of the West Greenland Current presumably forecast lower temperatures and salinities in the deeper water on the Continental Slope of the Labrador and Newfoundland shelves in 1971.

4. Plankton

The Plankton Recorder Survey indicated that the numbers of copepods were close to the long-term mean (1962-69).

5. Cod

The Canadian inshore fishery was a failure due to lack of cod and decreased to only 2,038 tons, compared with 5,364 tons in 1969, 17,900 tons in 1968, and 27,700 tons in 1967. Inshore bottom water temperatures were low and there was rapid fouling of nets in the inshore region by "slub", mainly the diatom *Chaetoceros socialis*. Assessments by the "Virtual Populations" method showed that the numbers of older (7+) cod have declined in recent years and indicated that the quantities of younger fish have increased. Fishing mortality indices for cod increased from 0.06 in 1959 to 0.36 in 1961 and were at various levels between 0.28 and 0.57 for different years between 1962 and 1968. Cod in the area are 50% recruited at age 6 and are fully recruited at age 8 with insignificant numbers of 2- and 3-year-old fish being taken. The reduction in the inshore landings in recent years has not been due in any considerable degree to decreased effort and has been very much more severe than that in the offshore landings. The inshore fishery of Labrador has traditionally depended on mature fish which spawn in the offshore area and migrate to the coast for feeding, mainly in June and July. Immature fish were not a significant part of this inshore fishery even in the period when no offshore fishery existed. It is very likely that the reduction in the age and numbers of mature fish by the offshore fishery and the consequent great reduction in the total amount of food needed, have been largely responsible for the much smaller numbers of the cod migrating shoreward and the earlier depletion of the fishery in the inshore than in the offshore area.

The total catch (97% cod) of FRG in Subarea 2 decreased by 32% from that of 1969. This decline was mainly due to a reduction of 25% in fishing effort. Ice conditions interfered with the fishery more than in 1969 and the area of optimum bottom temperature was more expanded than in 1969. Eighty-nine percent of the total catch was taken between February and April. The predominant length groups were 40-60 cm and the predominant year-classes 1962-65. The reduction in effort when the German fleet was driven from 2J by ice in March was compensated for by a corresponding shift in effort to the same stock of cod in the most northern part of 3K from March to May. But even the combined German catches in Subareas 2 and 3 show a decline of 19% against 1969, although the total effort was almost the same.

Polish daily yields, mainly of cod, from Subarea 2 in January-April, decreased from 35.5 tons to 32.1 tons per day fished. (However, in ICNAF Res. Doc. 71/104 the Polish catch per hour of cod in the first half of the year decreased from that of 1969 by 35% in 2H and 24% in 2J.) Fishing effort decreased by 33%. Most of the cod landed were 24-59 cm in length and 3 to 7 years of age. The most abundant year-classes were those of 1961-63 and 1965-67.

Spanish researchers found the most numerous age-group to be 5 years old (1965 year-class); the average length of cod measured was 47.8 cm (53.3 cm in 1969) and the average age 5.3 (5.7 in 1969).

In the Portuguese cod sampling the most numerous year-classes were of 1963 and 1964 (7 and 6 years old).

The main part of the USSR cod catch was 48-62 cm in length, belonging to the 1961, 1962, and 1963 year-classes, all of which were indicated by young cod surveys in preceding years to be slightly above the average level. Young fish survey data indicate that the 1966 and 1967 year-classes are highly abundant. The total mortality index of 2J cod was 0.67 (48.8% annual mortality). The calculated natural mortality rate lay between 0.080 and 0.343 with a mid-point of 0.22.

6. Redfish

Polish measurements of redfish *(Sebastes mentella)* in 2H ranged from 19-52 cm (mainly 28-45 cm). Ages ranged from 4 to 31 years and the mean age was 13.7 years. In 2J redfish measured were 19-48 cm long (mean length 32.4 cm). The range of ages was 5-23 and the mean age 12-14 years.

7. American Plaice

American plaice measured by Poland from 2J were 24-49 cm long and 4-16 years old.

8. Greenland Halibut

Greenland halibut measured by Poland from 2H were 37-105 cm long and had a mean length of 68.7 cm.

9. Atlantic Salmon

Of 27 Atlantic salmon tagged by Canada in the Labrador Sea in April, 3 recaptures were made on the

Canadian mainland. In coastal salmon of the Pack's Harbour area of Labrador, 85% of the salmon stomachs were empty. The main food consisted of pteropods, launce, baby cod, and capelin. In the Labrador Sea the main food was *Paralepis coregonoides borealis*, arctic squid, and fish remains. Biochemical studies of 25 salmon caught in the southern part of the Labrador Sea, close to the Labrador and Northeast Newfoundland shelves, in the spring of 1970 indicated 52% of European origin. This percentage is most unexpected and is similar to the 51% of European origin obtained for 204 Atlantic salmon taken off West Greenland and in the Labrador Sea in the autumn of 1970.

10. Mackerel

Canada reported mackerel to be relatively abundant in southern Labrador coastal waters in August-September and they were reported at Cape Harrison, further north than their most northerly recorded extension in previous years to Black Island (53°46′N).

Subarea 3

Reports on research in 1970 were submitted by Canada, France, FRG, Japan, Poland, Portugal, Spain, USSR, UK, and USA.

1. Status of Fisheries

Total catch of all species, excluding catches by non-member countries, was 960,000 metric tons, a further decrease of 23,000 tons from 1969. Slight decrease in catch was recorded by Canada to 404,000 tons, by Denmark to 10,000 tons, by France to 18,000 tons, by Portugal to 91,000 tons, by Spain to 169,000 tons, by USSR to 186,000 tons, and by UK to 1,000 tons. Small catches were made by FRG (12,000 tons), Japan (4,000 tons), and Romania (3,000 tons) following little or no catch in 1969.

Cod catches, which made up about 55% of the total catch of all species, decreased from 569,000 tons in 1969 to 530,000 tons in 1970. Substantial decreases in catch were recorded by Canada, Denmark, and France. Catches by Poland, Portugal, Spain, and USSR remained about the same as in 1969. FRG, Norway, and USSR recorded slight increases, Japan and Romania took small quantities for the first time in the subarea.

Haddock catches increased from 5,000 tons in 1969 to 7,000 tons in 1970.

Redfish catches decreased from 87,000 tons in 1969 to 77,000 tons in 1970 primarily due to decreased catches by Poland and USSR.

Herring catches, taken mainly by Canadian purse seiners, decreased 10,000 tons to 135,000 tons in 1970.

Flounder catches increased by 16,000 tons to 139,000 tons in 1969. The catch of flounders not specified decreased from 37,000 tons in 1969 to about 500 tons in 1970.

2. Work Carried Out

a) Canada: Five standard oceanographic sections across the Continental Shelf and Labrador Current in July-August. Station 27 off Cape Spear occupied monthly or more often. Otter trawl surveys and sampling of cod stocks. Echo sounder surveys for redfish from Grand Bank and Southern Labrador to Greenland. Mortality studies on American plaice and yellowtail flounder. Tagged 238 Greenland halibut. Herring sampling for length, age, and other biological characteristics and tagging 25,000 fish. Length and age sampling of mackerel and capelin. Studies of inshore and offshore sand launce, Atlantic and pink salmon.

b) France: R/V *Thalassa* and *Cryos*. Hydro and plankton sampling in Div. 3Pn and 3Ps. Exploratory fishing. Length and age samples of cod, red hake, redfish, American plaice, witch, herring and shrimp.

c) FRG: R/V *Walther Herwig*. February-March. Cod length and age samples.

d) Japan: Length samples of cod, redfish and argentine.

e) Poland: Samples of cod and redfish for length and age and of Greenland halibut for length.

f) Portugal: Length, age and sexual maturity of cod.

g) Spain: Length, age and sex ratio of cod.

h) USSR: R/V *Persey III*, *Rosseya*, and *Portion*. Five standard sections over the Banks and Continental Shelf. Young cod and haddock survey. Size, age, and maturity

of *mentella*-type redfish. Tagging 1,056 yellowtail flounders, 807 American plaice, 660 cod, 17 haddock, 16 witch, 5 Greenland halibut, and 1 spring dogfish.

i) UK: Sampling cod catch. Continuous plankton recorder survey (16,915 miles). Cooperative salmon studies at West Greenland.

3. Hydrography

Off Labrador and eastern Newfoundland in July and August, core temperatures in the colder shoreward part of the Labrador Current were generally below average, but in the deeper water of the continental slopes, in the outer West Greenland Current contribution to the Labrador Current, both temperatures and salinities were often similar to or higher than the highest previously recorded. Intensification of the cold Labrador Current caused cooling of the eastern slope of the Grand Bank, while a similar intensification of the Gulf Stream warmed the western part of the Bank.

4. Plankton

The spring outbreak of plankton was below average in the oceanic regions of the Subarea but diatoms were abundant over the Grand Bank in April and May. Copepods were above the long-term mean (1962-69) during the first half of the year in both oceanic and coastal areas and below average from July to November.

5. Cod

a) Young fish: USSR surveys since 1958 show that recruitment to the Labrador-North Newfoundland stock is rather stable from year to year, whereas in the Southern Grand Bank stock a strong year-class may be 40 to 50 times more abundant than a poor one. In Div. 3N and 3O, the 1968 year-class was very prominent and is expected to improve the southern Grand Bank and St. Pierre Bank cod fisheries in 1972.

b) Commercial stock: In the northern Newfoundland area (Div. 3K and 3L) where 75% of cod catch is made, the fishery declined over 10%. The Polish and Portuguese trawlers took mainly the 1963, 1964 and 1965 year-classes, while the Canadian trapnet fishery took mainly the 1965 and 1966 year-classes. In the southern Grand Bank area (Div. 3N and 3O), the strong 1964 year-class has almost disappeared and the 1966 to 1968 year-classes are predominant in the catches.

6. Haddock

The 1966 year-class is still important while the incoming 1967 and 1968 year-classes seem to be poor. USSR scientists continue to find small signs of the beginning of restoration of the Grand Bank haddock stock.

7. Redfish

Canadian echo-sounder surveys confirm the existence of large numbers of pelagic *mentella*-type redfish over deep water from the northern part of the Grand Bank to Labrador and Greenland.

8. Herring

Canadian investigations have shown that the stocks supporting the south coast of Newfoundland fishery in the autumn and winter are now known to be exploited also in the summer fishery in the Gulf of St. Lawrence. Also spring- and autumn-spawning stocks in the Gulf are destined and can be recognized as intermingled components in the south Newfoundland fishery. Estimates show that for the last 5 years, at least two-thirds of the herring landed in the Newfoundland fishery were autumn spawners.

9. Flounders

The steady increase in abundance of yellowtail flounders on the Grand Bank since 1962 may be related to the drastic reduction which has occured in the haddock stock. American plaice in Div. 3L and 3N seem to be separate populations with year-classes of comparatively equal strength, for both stocks, entering the fishery each year. Canadian tagging of Greenland halibut suggests that those fished offshore in Div. 3K and 3L and those caught in the deep coastal bays of Newfoundland may belong to the same stock which migrates to the continental slope for spawning.

Subarea 4

Reports on research in 1970 were submitted by Canada, France, FRG, Japan, Poland, Portugal, Spain, USSR, UK, and USA.

1. Status of Fisheries

Total catch of all species, excluding catches by non-member countries, increased a further 157,000 tons in 1970 to an all-time high of 1,158,000 tons. In the period 1961-68 the Subarea provided about 24% of the catch from the Convention Area; this increased to 30% in 1969 and 37% in 1970. Canada took 715,000 tons (727,000 tons in 1969); Denmark (Faroes) 8,000 tons (nil in 1969); France 34,000 tons (20,000 tons); FRG 6,000 tons (24,000 tons); Japan 4,000 tons (2,000 tons); Poland 2,000 tons (13,000 tons); Portugal 21,000 tons (2,000 tons); Romania 84 tons (nil); Spain 70,000 tons (48,000 tons); USSR 284,000 tons (151,000 tons); and USA 13,000 tons (16,000 tons).

Cod catches increased by 56,000 tons to 262,000 tons due to first time fishing by Faroes trawlers (8,000 tons), a doubling of the French catch to 34,000 tons, a tenfold increase in Portuguese catch to 21,000 tons and an increase of one-third in Spanish catch to 67,000 tons. Canadian catch decreased from 138,000 tons to 129,000 tons, while smaller catches by USSR and USA remained at the same level.

Haddock continued to decline drastically from 42,000 tons in 1969 to 28,000 tons in 1970 due primarily to the catch limitation of 18,000 tons set in 1970 in Div. 4X (Brown and LaHave Banks).

Redfish catches continued to increase from 111,000 tons in 1969 to 119,000 tons in 1970 with larger catches recorded by Canada and USSR, particularly in Div. 4W (central Nova Scotia Banks area).

Silver hake catches have trebled since the 1961-64 period to 169,000 tons taken almost entirely by USSR in Div. 4W (central Nova Scotia Banks area).

Herring catches, although they have declined from 422,000 tons in 1969 to 416,000 tons in 1970, have quadrupled since the 1961-64 period. Catches in the Gulf of St. Lawrence increased, while those on the Nova Scotia Banks decreased.

Flounder catches declined from 52,000 tons to 42,000 tons, although increases were recorded for American plaice and winter flounder.

2. Work Carried Out

a) Canada: R/V *A. T. Cameron*, *E. E. Prince*, and other research vessels. Non-tidal drift, surface and bottom, related to groundfish egg and larval studies. Temperatures and salinities and non-tidal drift in Bay of Fundy, Gulf of Maine, Georges Bank, and western Scotian Shelf related to herring larval studies. Population dynamics and ecology of cod, haddock, and other groundfish species. Studies of sand launce, argentines, herring, swordfish, and tuna. Productivity studies in St. Margaret's Bay. Salmon studies.

b) FRG: R/V *Walther Herwig.* Cod selectivity studies.

c) Japan: Samples of argentine and redfish for length composition. Catch-per-unit effort for argentine in relation to bottom temperature and depth on Browns Bank.

d) Poland: R/V *Wieczno.* Herring sampling for length and age on Emerald Bank in July. Hydrographic and zooplankton studies on the Scotian Shelf in July.

e) Portugal: Biology of cod.

f) Spain: Biology of cod.

g) USSR: Four hydrographic surveys (January, April, August, October) from St. Pierre Bank to Browns Bank on the shelf. Biology of herring. Joint USSR-US groundfish surveys.

h) UK: Continuous plankton recorder sampling, 4,385 miles.

i) USA: R/V *Albatross IV.* Spring and autumn groundfish surveys. U.S. Coast Guard hydrographic surveys. Haddock assessments in Div. 4X (Browns and LaHave Banks).

3. Hydrography

Waters of the Scotian Shelf may be divided into three main water masses: (1) surface water of low salinity or

inshore waters, (2) intermediate cold waters or Labrador waters, and (3) warm bottom waters and those of high salinity. Seasonal observations showed that temperatures in Cabot Strait were higher than in 1969, but in Sambro Deep and Emerald Bank area, they were lower than or close to 1969 values.

4. Plankton

Seasonal studies of the relative abundance and distribution of herring larvae conducted by Canada in the Bay of Fundy and Gulf of Maine from 1967 to 1970 inclusive included plankton hauls, temperature and salinity observations, releases of drift bottles and seabed drifters. The general pattern of larval distribution was similar each year although there were differences between years in the total numbers of larvae caught. Larvae were abundant in autumn, less in winter and spring and absent in summer. Significant spawning is in autumn on the northern edge of Georges Bank (Div. 5Z) and the southwest coast of Nova Scotia (Div. 4X). Surface circulation undoubtedly influences distribution of larvae and it appears that larvae from southwest Nova Scotia spawnings are held within the Bay of Fundy. Canada initiated a program of environmental survey and monitoring in the Gulf of St. Lawrence (Div. 4R and 4T) to assess pollution levels.

5. Cod

Cod catches by Spain and Portugal were made up mainly of the 1963-66 year-classes in the eastern Gulf of St. Lawrence (Div. 4R). Canadian catches in the southwestern Gulf of St. Lawrence (Div. 4T) were mainly of the 1965 and 1966 year-classes. Abundance in the Browns-LaHave Banks area decreased 30% from 1965 to 1969 with fishing mortality considerably above that giving maximum yield per recruit.

6. Haddock

Assessment of the eastern Scotian Shelf (Div. 4V and 4W) haddock stock indicated that the traditional, mainly Canadian, fishery on adults has been exploiting this stock close to its maximum yield-per-recruit under present mesh regulations. Impoverishment of the 1961-64 year-classes by the greatly increased fishery in 1965-66 and recruitment of several poor year-classes has resulted in low adult stock abundance. Studies of the Browns-LaHave Banks (Div. 4X) haddock fishery indicate that the catch limitation of 18,000 tons annually for 1970-72 is much too high. Recruitment has been poor since 1963 and pre-recruit surveys in 1970 do not show any significant improvement.

7. Herring

Canadian tagging in the Gulf of St. Lawrence (Div. 4T) and Southern Newfoundland (Div. 3P) suggest that herring at times occur together in the same general area and the same populations of fish contribute to three major fisheries: off the Magdalen Islands and off Gaspé (Div. 4T) and off southern Newfoundland (Div. 3P) (see also Herring in Subarea 3). Evidence is accumulating that two distinct stocks overwinter on the Scotian Shelf, one in the Banquereau area (Div. 4V) and the other in the Emerald Bank-Middle Bank area (Div. 4W). Recent studies suggest that the Banquereau fish are related to those caught inshore in the Chedabucto Bay-Canso area (Div. 4W) and that they do not migrate to the Gulf of St. Lawrence. Emerald Bank-Middle Bank herring may be over-wintering concentrations of the stock spawning off the southwest coast of Nova Scotia. Studies of the "sardine" component of the Bay of Fundy (Div. 4X) herring suggests that the New Brunswick and Nova Scotia stocks may be distinct. This recognizes a conclusion that Nova Scotia (Div. 4X) herring and those of Georges Bank (Div. 5Z) are discrete. The 1968 "sardine" year-class on the New Brunswick side of the Bay of Fundy (Div. 4X) was apparently poor and that of 1969 seems poor also. Stocks in the Nova Scotia region of Div. 4X are being maintained by the 1966 year-class.

8. Silver Hake

Canadian studies of gill parasites indicate they are useful as biological indicators. The successful 1966 and 1967 year-classes have been responsible for the highly successful USSR fishery in the central area of the Scotian Shelf.

9. Redfish

Canadian increase in landings of redfish was a result of the poor availability of haddock. Canadian effort, expended in the deeper waters of the Scotian Shelf, except for strikes by fishermen and handlers, could have given much higher landings.

10. Atlantic Salmon

Canadian research included analysis of returns of wild fish tagged as smolts on the Miramichi River from 1964 through 1968: 52% as grilse in Canada, 10% from Greenland, and 30% as large salmon in Canada. Returns as grilse from a group of tagged wild smolts given a subacute dosage of DDT were only half as great as from a group given similar handling but without DDT.

Subarea 5

Reports on research in 1970 were submitted by Canada, FRG, Japan, Poland, Sapin, USSR, UK, and USA.

1. Status of Fisheries

Total catches of all species, excluding catches by non-member countries, decreased about 25% from 864,000 tons in 1969 to 659,000 tons in 1970. Increased catches were recorded by FRG (74,000 to 92,000 tons); Japan (9,000 to 11,000 tons); Poland (56,000 to 102,000 tons); and Romania (1,000 to 2,000 tons); and decreased catches recorded by Canada (60,000 to 47,000 tons); Spain (16,000 to 8,000 tons); USSR (380,000 to 166,000 tons); and USA (263,000 to 230,000 tons).

Cod catches continued their decline from 46,000 tons in 1969 to 35,000 tons in 1970 due to decreases for Canada (6,000 to 3,000 tons); Spain (14,000 to 7,000 tons); and USA (25,000 to 22,000 tons).

Haddock catches made mainly by Canada and USA continued to decline dramatically from 25,000 tons in 1969 to 13,000 tons in 1970 due to decreased stock abundance and a catch limitation set by the Commission at 12,000 tons.

Redfish catches made almost entirely by USA continued to increase (12,000 to 17,000 tons) due to increased effort with good prospects for catches in 1971.

Silver hake catches declined from 88,000 tons in 1969 to 48,000 tons in 1970 due almost entirely to decreased catches by USSR (67,000 to 29,000 tons). Stock abundance is low due to poor recruitment and heavy fishing. Red hake catches declined from 50,000 tons in 1969 to 11,000 tons in 1970, mainly due to poorer catches by USSR (45,000 to 7,000 tons). Poor recruitment and low stock abundance is the cause.

Yellowtail flounder catches decreased from 52,000 tons in 1969 to 35,000 tons in 1970, mainly due to decreased effort by USSR (19,000 to 3,000 tons). USA catches decreased by 1,000 tons to 32,000 tons. Groundfish survey indices substantiate a decrease in abundance and the fishery has become dependent on fewer year-classes than formerly. A catch limitation has been set by the Commission (16,000 tons for Div. 5Ze (Georges Bank) and 13,000 tons for Div. 5Zw (Southern New England)).

Herring catches decreased from 259,000 tons in 1969 to 220,000 tons in 1970. USSR catches declined sharply (100,000 to 39,000 tons), while catches increased for FRG (72,000 to 88,000 tons) and for Poland (32,000 to 55,000 tons). Major part of the catch consisted of the 1965 and 1966 year-classes. Polish studies show that for the period 1969-70 the stock of herring was reduced by almost 62%. Low stock abundance and poorer catches resulted in USSR vessels transferring their effort to mackerel.

Mackerel catches increased substantially from 65,000 tons in 1969 to 102,000 tons in 1970 based mainly on the 1967, 1966, and 1965 year-classes. The increase in catch can be attributed partly to a sharp increase in stock abundance in the past 3 years and partly to increased fishing for mackerel following a decline in herring stocks. Alewife catches declined from 26,000 tons in 1969 to 14,000 tons in 1970.

Sea scallop catches decreased slightly from 48,000 tons in 1969 to 47,000 tons in 1970.

2. Work Carried Out

a) Canada: Population estimates and gear selection experiments on sea scallop. Cooperative US, Canadian, and USSR survey of Georges Bank herring spawning beds by submersible. Herring larval abundance and distribution.

b) FRG: Length and age composition of herring samples. Hydrography of Gulf of Maine by R/V *Walther Herwig*. Population dynamics of Georges Bank herring.

c) Poland: Length and age composition of herring samples. Food studies on mackerel and herring. Hydrography and plankton in Gulf of Maine in August.

d) USSR: Four hydrographic surveys (January, April, August, and November on Georges Bank and in the southern Gulf of Maine). Cooperative US, Canadian, and USSR herring spawning studies on Georges Bank. Joint USSR-US groundfish surveys. Abundance and distribution of yellowtail flounder. Length and age studies on silver hake, haddock, red hake, herring, and mackerel.

e) UK: Continuous plankton recorder sampling, 660 miles.

f) USA: R/V *Albatross IV* and Coast Guard vessels. Hydrographic, ichthyoplankton and US-USSR groundfish studies. Spring and autumn hydrographic cruises (Nova Scotia to Cape Hatteras) by Coast Guard. Coastal water temperatures. Herring, haddock, yellowtail, and offshore lobster population studies.

3. Hydrography

In the Gulf of Maine, the Eastern Passage and in the northern Georges Bank area, subsurface temperatures at all seasons were lower than in 1969, whereas, on the southern slopes of Georges Bank, summer and autumn temperatures were higher than in 1969. Mean surface temperature at Boothbay Harbour was the same as in 1969, breaking the upward trend begun in 1967.

4. Haddock

The reported haddock catch was 12,831 tons compared to the Commission's catch limitation of 12,000 tons. The fishery was closed 13 October when 80% of the quota had been reached. US autumn groundfish survey caught no young-of-the-year haddock. Thus, the 1970 year-class is very poor and recruitment in 1972 is expected to be very low. Scientists agree that continuing the fishery at 12,000 tons annually will not allow for improvement of stock abundance. The 1962 and 1963 year-classes are now very much reduced but still account for a large share of the catch.

5. Herring

An explosive increase in fishing for herring from 1961 resulted in a fivefold increase in catch in 1968, followed by a dramatic decline through 1969 to just over a relative twofold increase in catch in 1970. One of the largest herring stocks in the Northwest Atlantic, the Georges Bank stock, has been virtually decimated. Decreased stock abundance and, hence, catch rate, has and will further cause diversion of effort to other species such as mackerel. Research has continued in an effort to identify the stocks of herring and their interrelationships. Coastal juvenile fisheries continued to decline due to small 1967 and 1968 year-classes. Adult stocks in the Western Gulf of Maine (Div. 5Y) contribute to juvenile fisheries in the Gulf of Maine so that an increased exploitation of adults when recruitment prospects are poor is bound to result in a reduced stock size.

In the Georges Bank area (Div. 5Z) the large 1960 and 1961 year-classes are much reduced and contribute very little to the fishery. The weak 1962-64 year-classes were followed by the relatively good 1965 year-class and the larger one of 1966 now primarily supporting the fishery (50% from 1966 year-class and 25% from the 1965 year-class). USSR surveys indicated a large decline in spawning area and a 99% decline in stock size between 1964 and 1970. US spring surveys indicate a 75% decline in the Georges Bank spawning stock south of Cape Cod (Div. 5Zw) and a 93% decline in statistical Subarea 6 from 1968 to 1970.

6. Yellowtail Flounder

Analysis of length frequencies collected on research vessel cruises since 1963 show no consistent population change in relation to fishing rate and recruitment for Georges Bank. However, for Southern New England waters (west of 69°W) numbers of larger fish have been significantly reduced reflecting the heavy fishing pressure. Comparisons of the populations in these two areas showed that in southern New England yellowtail flounder was 2.5 times more abundant than on Georges Bank. Production models indicate that a catch quota of about 25,000 to 30,000 tons should be set for the two areas combined.

7. Silver Hake

The predominant age-groups in the fishery were the 1- to 6-year-olds. Unlike other years there was a considerable increase in the proportion of 1-year-olds (16.5%) belonging to the 1969 year-class but on the whole, the stock remains at a low level.

8. Red Hake

As in the silver hake fishery, decrease in catch was due to poor recruitment and also to limitations on fishing in the winter months. Catches consisted of 2- to 6-year-old fish with the 3-year-olds (64%) and the 4-year-olds (29%) predominating. Autumn trawl survey in 1970 indicated low stock abundance.

9. Mackerel

Rich 1966 and 1967 year-classes contributed about 82% of the increased catch in 1970. These year-classes are expected to be abundant in catches in 1971 and continue to make up for predicted poor catches of herring.

10. Joint USSR-US Groundfish Surveys

From August to October 1970 a groundfish survey and trawl comparison experiments were carried out by USSR and US investigators. The survey covered the area from Banquereau Bank to Cape Hatteras. In addition, a spring survey was carried out by the US investigators.

Seals

Reports on research in 1970 and 1971 were submitted by Canada and Norway.

1. Status of Fisheries

The harp seal fisheries in the Convention Area took a total of 199,722 animals in 1968, 294,780 animals in 1969, and over 270,000 in 1970. In 1971, the seal fishery operated from 12 March to 24 April under an ICNAF catch quota for the 'Gulf' (Div. 4T) and 'Front' (Div. 2J, 3K, and 3L) areas combined of 200,000 seals for vessels, plus 45,000 seals for landsmen. The resulting total harp catch (provisional) was as follows:

'Gulf' area		
by Canadian vessels	37,000	
by Canadian landsmen	33,000	
		70,000
'Front' area		
by Canadian vessels	49,000	
by Canadian landsmen	5,000	
by Norwegian vessels	98,600	
		152,600
		222,600
Greenland area		
by Greenlanders		ca.5,000
Total all areas		227,600

2. Work Carried Out

a) Canada: Studies on seal biology and population parameters.

b) Norway: Biology and dynamics of harp seals.

c) Denmark (Greenland): Biology of seals.

3. Harp Seal

Assessments showed that the present harp seal stock is less than that giving maximum sustainable yield and, therefore, action should be taken to increase the stock. It was noted that the present ICNAF quota of 200,000 plus landsmen's catch of approximately 45,000 is well in excess of sustainable yield. Maintaining this quota will result in a sharp decline in the population and in the possible catch from it. The long potential life-span of seals means that any rehabilitation of a depleted seal stock will be a slow process.

PART 4

List of Scientists and Laboratories Engaged in the Commission's Work

Canada

W. Templeman	Director, marine biology	Fisheries Research Board of Canada, Biological Station, St. John's, Newfoundland.
A. M. Fleming	Cod, groundfish statistics	" " " "
R. Wells	Cod	" " " "
A. T. Pinhorn	Cod, haddock	" " " "
T. K. Pitt	Pleuronectids	" " " "
A. W. May	Anadromous fishes	" " " "
J. H. C. Pippy	Atlantic salmon, parasites	" " " "
W. H. Lear	Atlantic salmon	" " " "
V. M. Hodder	Pelagic fish	" " " "
G. H. Winters	Herring, capelin, launce	" " " "
L. S. Parsons	Herring, mackerel	" " " "
E. J. Sandeman	Invertebrates	" " " "
M. C. Mercer	Cephalopods	" " " "
J. M. Anderson	Director	Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick.
F. D. McCracken	Marine fishes, groundfish	" " " "
A. C. Kohler	Groundfish, cod	" " " "
J. S. Scott	Flatfish	" " " "
R. G. Halliday	Groundfish, haddock	" " " "
A. V. Tyler	Species associations	" " " "
S. N. Tibbo	Pelagic fishes	" " " "
J. S. Beckett	Swordfish, tuna	" " " "
S. N. Messieh	Herring	" " " "
T. D. Iles	"	" " " "
P. J. G. Carrothers	Gear engineering	" " " "
P. F. Elson	Salmon	" " " "
J. F. Caddy	Sea scallops	" " " "
J. W. Saunders	Salmon	" " " "
U. Buerkle	Cod behaviour	" " " "
L. M. Dickie	Director, population dynamics	Fisheries Research Board of Canada, Marine Ecology Laboratory, Dartmouth, Nova Scotia.
R. W. Trites	Physical oceanography	" " " "
E. M. Hassan	" "	" " " "
D. H. Loring	Geology	" " " "
R. W. Sheldon	Environmental oceanography	" " " "
K. H. Mann	Biological oceanography	" " " "
W. H. Sutcliffe	" "	" " " "
A. Prakash	" "	" " " "
D. C. Gordon	Chemical oceanography, environmental quality	" " " "
S. Kerr	Population dynamics, environmental quality	" " " "
T. C. Platt	Biology	" " " "
R. J. Conover	"	" " " "
D. L. Peer	"	" " " "

D. D. Sameoto	"	" " " "
B. S. Muir	Population dynamics	" " " "
K. T. MacKay	" "	" " " "
J. C. McKinnon	" "	" " " "
V. M. Srivastava	" "	" " " "
P. H. Odense	Biochemical systematics	Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia.
R. A. Clarke	Physical oceanography	Atlantic Oceanographic Laboratory, Bedford Institute, Dartmouth, Nova Scotia.
G. Drapeau	Marine geology	" " " "
D. M. Garner	Physical oceanography	" " " "
A. C. Grant	Marine geology	" " " "
L. H. King	" "	" " " "
K. S. Manchester	Marine geophysics	" " " "
C. R. Mann	Physical oceanography	" " " "
R. C. Melanson	Bathymetry	" " " "
H. J. A. Neu	Physical oceanography	" " " "
B. R. Pelletier	Marine geology	" " " "
R. F. Reiniger	Physical oceanography	" " " "
C. K. Ross	" "	" " " "
G. Vilks	Marine geology	" " " "
A. Walton	Chemical oceanography	" " " "
A. W. Mansfield	Acting director, marine mammals	Fisheries Research Board of Canada, Arctic Biological Station, Ste. Anne de Bellevue, P.Q.
A. S. Bursa	Phytoplankton	" " " "
E. H. Grainger	Biological oceanography	" " " "
D. E. Sergeant	Marine mammals	" " " "
G. F. M. Smith	Biological consultant	Fisheries Research Board of Canada, Ottawa, Ontario.
A. Marcotte	Director	Service de Biologie, Ministère de l'Industrie et du Commerce, Qué.
G. Beaulieu	Estuarine fishes	" " " "
J. Bergeron	Ichthyology – eels	" " " "
F. R. Boudreault	Physical oceanography	" " " "
Y. Boudreault	Engineering-electronics	" " " "
R. Couture	Crustacea – shrimps	" " " "
J. M. Roy	Lampreys	" " " "
J. M. Boulanger	Director	Service de Pêche expérimentale, Ministère de l'Industrie et du Commerce, Qué.
P. Fontaine	Mechanical engineering	" " " "

Denmark

Sv. Aa. Horsted	General fisheries biology	Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, 2920 Charlottenlund.
E. Smidt	" " "	" " " "
J. Møller Jensen	" " "	" " " "
P. Kanneworff	" " "	" " " "
F. O. Kapel	Marine mammals	" " " "
F. Hermann	Hydrography	Danmarks Fiskeri-og Havundersøgelser, Charlottenlund, Slot, 2920 Charlottenlund.

O. Christensen	Salmon	" " " "
S. J. Joensen	General fisheries biology	Fiskirannsóknarstovan, 3800 Tórshavn, Faerøerne.

France

R. Letaconnoux	Assistant Director	Institut scientifique et technique des Pêches maritimes, B.P. 1049, 44 Nantes.
C. Allain	Oceanography	" " " "
J. Morice	Director of Research Centre, General biology, *Gadidae* and *Rajidae*	Institut scientifique et technique des Pêches maritimes, B.P. 26, Saint Pierre-et-Miquelon.
P. Décamps	*Gadidae* and herring	" " " "
B. Fontaine	Benthos and crustaceans	" " " "
Y. Hamon	Biology of redfish	" " " "
R. l'Herrou	Ichtyoplankton and haddock	" " " "
J. Minet	Oceanography and flat-fish	" " " "

Federal Republic of Germany

A. v. Brandt	Director, fishing gear, fishing methods	Bundesforschungsanstalt für Fischerei, Institut für Fangtechnik, Palmaille 9, Hamburg 50.
H. Bohl	Selectivity of fishing gear	" " " "
G. Dietrich	Director, hydrography	Institut für Meereskunde an der Universität Kiel, Niemannsweg 11, Kiel.
H. Dornheim	Herring	Bundesforschungsanstalt für Fischerei, Institut für Fangtechnik, Palmaille 9, Hamburg 50.
M. Gillbricht	Plankton	Institut für Hydrobiologie u. Fischereiwissenschaft der Universität Hamburg, Olbersweg 24, Hamburg 50.
K. Grasshoff	Marine chemistry	Institut für Meereskunde an der Universität Kiel, Niemannsweg 11, Kiel.
G. Grunewald	Meteorology	Deutscher Wetterdienst, Seewetteramt, Bernhard-Nocht Str. 76, Hamburg 4.
K. Kosswig	Redfish biology, age determination	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Aussenstelle Bremerhaven-F, Fischkai.
A. Kotthaus	Ichthyology	Biologische Anstalt Helgoland, Zentrale, Palmaille 9, Hamburg 50.
G. Krause	Hydrography	Institut für Meereskunde an der Universität Kiel, Niemannsweg 11, Kiel.
G. Krefft	Fishes, systematics and distribution	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Palmaille 9, Hamburg 50.
F. Krugler	Meteorology	Deutscher Wetterdienst, Seewetteramt, Bernhard-Nocht Str. 76, Hamburg 4.

K. Lillelund	General fisheries biology	Institut für Hydrobiologie u. Fischereiwissenschaft der Universität Hamburg, Olbersweg 24, Hamburg 50.
O. Mertins	Meteorology	Deutscher Wetterdienst, Seewetteramt, Bernhard-Nocht Str. 76, Hamburg 4.
J. Messtorff	Northwest Atlantic fisheries cod, haddock, biology, hydrography	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Aussenstelle Bremerhaven-F, Fischkai.
A. Meyer	Cod, haddock, Greenland fisheries	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Palmaille 9, Hamburg 50.
H. Mohr	Behaviour of fishes	Bundesforschungsanstalt für Fischerei, Institut für Fangtechnik, Palmaille 9, Hamburg 50.
F. Mombeck	Redfish biology	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Aussenstelle Bremerhaven-F, Fischkai.
G. Prahm	Hydrography	Deutsches Hydrographisches Institut, Bernhard-Nocht Str. 78, Hamburg 4.
H. H. Reinsch	Saithe biology	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Aussenstelle Bremerhaven-F, Fischkai.
U. Schmidt	Director, saithe, redfish	Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Palmaille 9, Hamburg 50.
K. Schubert	Herring, herring fisheries	" " " "
A. Schumacher	Population dynamics	" " " "
G. Siedler	Hydrography	Institut für Meereskunde an der Universität Kiel, Niemannsweg 11, Kiel.
K. Tiews	Tuna	Bundesforschungsanstalt für Fischerei, Institut für Küsten- und Binnenfischerei, Palmaille 9, Hamburg 50.
H. Walden	Hydrography	Deutsches Hydrographisches Institut, Bernhard-Nocht Str. 78, Hamburg 4.
G. Wurlitzer	Meteorology	Deutscher Wetterdienst, Seewetteramt, Bernhard-Nocht Str. 76, Hamburg 4.

Iceland

J. Jónsson	Director, cod, haddock, whales, population studies	Marine Research Institute, Skulagata 4, Reykjavik.
I. Hallgrimsson	Zooplankton	" " " "
J. Jakobsson	Herring	" " " "
E. Jónsson	Herring, age determination	" " " "
G. Jónsson	Radiobiology	" " " "
J. Magnusson	Redfish	" " " "
Mrs J. Magnusson	Fish larvae	" " " "
Sv. Aa. Malmberg	Physical oceanography	" " " "
I. Oskarsson	Cod, age determination, marine molluscs	" " " "

A. Sigurdsson	Flatfish	" " " "
Mrs U. Skuladóttir	Marine invertebrates	" " " "
U. Stefansson	Hydrography, chemistry of sea water	" " " "
Mrs Th. Thórdardóttir	Phytoplankton	" " " "
G. Thorsteinsson	Fishing gear technology	" " " "
H. Vilhjalmsson	Herring	" " " "

Japan

O. Kibezaki	Director	Far Seas Fisheries Research Laboratory, 1000 Orido, Shimizu City, Shizuoka Prefecture.
Y. Fukuda	Fisheries biology	" " " "
F. Mitani	" "	" " " "
I. Ikeda	" "	" " " "
T. Sato	" "	" " " "
H. Hatanaka	" "	" " " "

Norway

G. Saetersdal	Director	Institute of Marine Research, Directorate of Fisheries, 5011 Bergen-Nordnes.
J. Blindheim	Hydrography	" " " "
I. Christensen	Whales	" " " "
O. Dragesund	Pelagic fish	" " " "
A. Hylen	Arctic fisheries, cod, halibut, redfish	" " " "
Kj. W. Jensen	Salmon	Ferskvannsfisket, Vitensk. avd., P.O. Box 21, 1432 Vollebekk.
B. Rasmussen	Arctic fisheries, seals	Institute of Marine Research, Directorate of Fisheries, 5011 Bergen-Nordnes.
L. Rosseland	Salmon	Ferskvannsfisket, Vitensk. avd., P.O. Box 21, 1432 Vollebekk.
T. Øritsland	Seals	Institute of Marine Research, Directorate of Fisheries, 5011 Bergen-Nordnes.

Poland

F. Chrzan	Chief, Fishery biology	Sea Fisheries Institute, Gdynia.
F. Bucki	Fishing grear technology	" " " "
B. Draganik	Herring	" " " "
A. Furtak	Hydrography	" " " "
A. Glowinska	"	" " " "
S. Grimm	Crustacea	" " " "
A. Góra	Fish handling and processing	" " " "
Z. Karnicki	Fish processing	" " " "
A. Kosior	Flatfish	" " " "
E. Kordyl	Fish technology	" " " "
J. Krepa	Fishing gear technology	" " " "
J. Kochanowski	Fish microbiology	" " " "
W. Kuźma	Fish protein biochemistry	" " " "
B. J. Kowalewski	Fishery statistics, management and economics	" " " "
B. Lubieniecki	Fish parasites	" " " "
S. Mickiewicz	Fishery statistics	" " " "

J. Netzel	Redfish	" " " "
Z. Polanski	Fishery economy	" " " "
S. Richert	Fishing gear technology	" " " "
J. Salmonowicz	Fish oil biochemistry	" " " "
E. Stanek	Cod	" " " "
W. Strzyzewski	Fishing gear selectivity	" " " "
J. Zaucha	Fishing gear technology	" " " "
C. Zukowski	Demersal fish	" " " "

Portugal

R. Monteiro	Cod	Instituto de Biologia Maritima, Ministerio da Marinha, Cais do Sodré, Lisbon 2.
M. Lima Dias	Cod	" " " "

Romania

M. Niculescu-Duvaz	Fishery biology	Romanian Fisheries Research and Designing Institute, Bucharest.
L. Popescu	Fishery economics	Department of Food Industry, Central of Fishing, 63-69 Calea Victoriei, Bucharest.
V. Stoenescu	Fishery management	" " " "

Spain

J. Traspaderne	Fishery laws	Dirección General de Pesca Marítima, Ruíz de Alarcón, 1-4°, Madrid 14.
V. Bermejo	Fishery statistics and laws	" " " "
J. Pinies	Fishery statistics	" " " "
M. Gomez-Larrañeta	Biological sciences	Instituto de Investigaciones Pesqueras, Avda. Orillamar, 47, Vigo (Pontevedra).
J. Rucabado	" "	" " " "
R. Robles Pariente	" "	Instituto Español de Oceanografía, Felipe Sánchez, 18, Vigo (Pontevedra).
H. Quiroga Lorenzo	" "	Laboratorio Oceanográfico del Noroeste, Muelle de Linares Rivas, La Coruna.
O. Cendrero Uceda	" "	Instituto Español de Oceanografía, Lealtad, 13, Santander.

Union of Soviet Socialist Republics

A. S. Bogdanov	Director, population dynamics	All-Union Research Institute of Marine Fisheries and Oceanography (VNIRO), 17, V. Krasnoselskaya, Moscow B-140.
S. S. Fedorov	Fishery biology, herring	" " " "
T. F. Dementjeva	Population dynamics	" " " "
A. I. Treschev	Fishing gear technology	" " " "
K. A. Zemskaja	Population dynamics	" " " "
G. I. Tokareva	Fishery biology	" " " "
L. A. Popov	Seals	" " " "
K. G. Konstantinov	Fishery biology, cod, haddock, redfish	Polar Research Institute of Marine Fisheries (PINRO), 6 Knipovich Street, Murmansk.

V. A. Chekhova	Fishery biology	" " " "
I. N. Sidorenko	Fishery biology, cod, redfish	" " " "
A. S. Noskov	Chief of Laboratory, fishery biology, silver hake, herring	Atlantic Research Institute of Marine Fisheries and Oceanography (AtlantNIRO), 5 Dmitry Donskoy Street, Kaliningrad.
V. P. Rikhter	Fishery biology	" " " "
A. A. Volkov	Fisheries law	Ministry of Fisheries, 12 Rozhdestvensky Blvd., Moscow K-45.
A. B. Kuzmitchev	Fishery economy and statistics	Central Research Institute of Fisheries Information and Economics (CNIITEIRH), 29 Dubininskaya, Moscow.
M. A. Pavlov	Fishery biology	" " " "

United Kingdom

B. B. Parrish	Director, fish population dynamics and behaviour studies	Marine Laboratory, Aberdeen, Scotland.
J. H. Steele	Physical oceanography and producivity studies	" " " "
A. Saville	Pelagic fish studies, ecology and population dynamics	" " " "
R. Jones	Demersal fish studies, ecology and population dynamics	" " " "
J. A. Pope	Population dynamics and fishery statistics	" " " "
J. J. Foster	Fishing gear technology	" " " "
K. A. Pyefinch	Officer in charge, salmon investigations	Freshwater Fisheries Laboratory, Pitlochry, Scotland.
W. R. Munro	Salmon investigations	" " " "
W. M. Shearer	" "	" " " "
R. S. Glover	Director, plankton ecology	Institute for Marine Environmental Research, Oceanographic Laboratory, Edinburgh, Scotland.
G. A. Robinson	Phytoplankton ecology	" " " "
V. Bainbridge	Plankton ecology and fisheries	" " " "
J. M. Colebrook	Zooplankton ecology	" " " "
L. T. Jones	Zooplankton ecology	" " " "
R. H. Bruce	Physical oceanography and instrumentation	" " " "
R. Williams	Zooplankton ecology	" " " "
C. M. Lee	Zooplankton ecology and taxonomy	" " " "
J. Aiken	Instrumentation	" " " "
J. A. Booth	Zooplankton ecology	" " " "
P. J. B. Hart	Plankton ecology and fisheries	" " " "
H. A. Cole	Director	Fisheries Laboratory, Lowestoft, Suffolk, England.
A. J. Lee	Hydrography	" " " "
D. J. Garrod	Stock assessment – general	" " " "
M. Holden	Selectivity of trawls	" " " "
R. Blacker	Age determination	" " " "
A. Jamieson	Stock identification	" " " "
J. Pope	Stock assessment	" " " "

United States

H. E. Bruce	Laboratory Director	National Marine Fisheries Service, Woods Hole, Massachusetts.
E. D. Anderson	Population dynamics	" " " "
B. E. Brown	" "	" " " "
J. B. Colton, Jr	Environmental studies	" " " "
B. L. Griswold	Groundfish biology	" " " "
M. D. Grosslein	" "	" " " "
R. C. Hennemuth	Population theory	" " " "
G. F. Kelly	Groundfish biology	" " " "
F. E. Lux	" "	" " " "
R. R. Marak	Planktology	" " " "
F. E. Nichy	Age and growth	" " " "
J. A. Posgay	Groundfish ecology	" " " "
H. Stern, Jr	Population dynamics	" " " "
R. L. Wigley	Bottom ecology	" " " "
G. J. Ridgway	Acting Laboratory Director	National Marine Fisheries Service, Boothbay Harbour, Maine.
V. Anthony	Population dynamics	" " " "
H. C. Boyar	Herring ecology	" " " "
R. A. Cooper	Lobster behaviour	" " " "
S. B. Chenoweth	Herring ecology	" " " "
C. W. Davis	" "	" " " "
J. J. Graham	" "	" " " "
K. A. Honey	Ichthyoplankton	" " " "
R. D. Lewis	Biochemistry, serology	" " " "
F. E. Perkins	Herring ecology	" " " "
A. P. Stickney	Herring behaviour	" " " "
J. R. Uzmann	Parasitology	" " " "
J. E. Watson	Herring biology	" " " "
W. R. Welch	Environmental studies	" " " "
J. B. Skerry	Management	" " " "
F. Riley	Statistics	" " " "
D. F. Bumpus	Hydrography	Woods Hole Oceanographic Instutition, Woods Hole, Massachusetts.