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RAPPORTS

ET

PROCÈS-VERBAUX DES REUNIONS

VOLUME XXVI

PROCÈS-VERBAUX

(1918–19 & 1919–20)

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A

RAPPORT ADMINISTRATIF

BUREAU OF THE INTERNATIONAL COUNCIL FOR THE STUDY OF THE SEA

Report of Administration
1918-19 & 1919-20.

Composition of the International Council

In the year 1918—19 no change took place in the composition of the International Council.

In 1919—20, at the meeting in London of the International Council from March 2nd to March 6th, the following countries were represented: Belgium, Denmark, Finland, France, Great Britain, the Netherlands, Norway, and Sweden.

Administrative Report

The usual work has been carried out by the Bureau and the work in relation to the resolutions of the Council has, as far as possible, been continued in all participating countries during 1918—19 and 1919—20. This refers in particular to herring, salmon and eel investigations and to investigations as to how the stock of certain food fishes (plaice and haddock) in the North Sea has altered since the outbreak of the war. This work is going to be carried on in Great Britain on a large scale in 1919—20.

Several publications have been issued as to the result of former and recent investigations (see p. 90).

Report of work carried out by the Departments of the Bureau
during the years 1918—19 and 1919—20.

Hydrographical Department.

Care was taken of the printing of the "Bulletin Atlantique" which was published in the spring of 1919.

A working up of the material of decade surface temperatures in the North Sea published in the Hydrographical Bulletin since 1905 has been commenced (Knudsen) and the preliminary results laid before the meeting in London 1920.

A working up of the surface salinity material collected by liners in the North Atlantic and published in the Hydrographical Bulletin since 1905 has been commenced (Gehrke).

A paper on the influence of cold winters upon the salt bottom-water of the Kattegat is under preparation (GEHRKE). An abstract was laid before the meeting in London 1920.

Attention was paid to the distribution of standard water and the testing and distribution of instruments as in previous years. Experiments on a new method for the determination of light-absorption in sea-water were carried out, and for the consideration of the Bureau a Memorandum on the Hydrographical Department of the Bureau and the Laboratoire Hydrographique was prepared.

Plankton Department.

1. The head of the Department has continued the elaboration of the material for the concluding "General Part" of the Résumé planktonique.

The extracts of the different special reports are now finished and their arrangement into general groups is nearly fulfilled, but the final writing of the manuscript is not yet ready. At present an Introduction is ready for print, and the general Alphabetical Index to the three already published special parts has been arranged. It is expected that the whole manuscript will be finished in course of the present year.

2. The Department has finished the printing of the paper by H. H. GRAN and THORBJØRN GAARDER: "Über den Einfluss der atmosphärischen Veränderungen Nordeuropas auf die hydrographischen Verhältnisse des Kristianiafjords bei Drö-bak im März 1916", which appeared in August 1918 as "Publication de Circonstance" No. 71.

Biological Department.

As mentioned in the report of work carried out by the Biological Department for the years 1916—18, the statistics for the year 1913 were sent to Professor D'ARCY THOMPSON for perusal. The statistics were returned to the Department in the spring 1919 with Professor D'ARCY THOMPSON's "Introduction" and have been published and distributed. It is expected that the statistics for the year 1914 will be edited before the end of the present year; it has taken a very long time to collect the material for these statistics. The work on the statistics for the year 1915 has been started and is nearly finished, only waiting for some material. For 1916 several of the participating countries have not yet the material worked out. For certain countries, like Russia and Belgium, we have received no statistics since 1912.

Contributions

For 1918—19 the usual contributions have been paid by Denmark, Great Britain, the Netherlands, Norway and Sweden.

Statement of Accounts

From the Statement of Accounts for the financial year 1918—19 (see below) it will be seen that the balance at the end of the year was Kr. 61137.66.

Statement of Accounts for the financial year 1918—19.

Receipts:

			Estimates	Real Receipts
I.	1.	Balance brought forward from 1917/18—1918/19	Kr. 38519.00	52306.84[1])
II.	2—6.	Annual contributions of the governments concerned	- 40925.00	40466.94
III.	7.	Interest	- 0.00	1540.89
IV.	8.	Sale of publications	- 0.00	95.67
		Total...	Kr. 79444.00	94410.34

Expenditure:

			Estimates	Real Expenditure
I.	1—3.	Salaries	Kr. 5960.00	5960.00
II.	4—6.	Assistance	- 7220.00	6860.00
III.	7—10.	Incidental Expenses	- 5000.00	8000.00
IV.	11.	Travelling Expenses	- 1500.00	545.60
V.	12—18.	Expenses of the Office in Copenhagen	- 6170.00	5772.44
VI.	19.	Minor Expenses of Meetings	- 0.00	0.00
VII.	20—25.	Printing	- 10500.00	6134.64
		Total...	Kr. 36350.00	33272.68

Receipts for the financial year 1918—19..... Kr. 94410.34
Expenditure - - — - — ..... - 33272.68

Cash balance to carry forward to 1919/20 ..... **Kr. 61137.66**[1])

[1]) + Russia's contribution 1914/15, **Rbl. 14430.54,** deposited in a Petrograd bank.

Revision of accounts

The accounts for 1918—19 have been revised by the Financial Committee and found correct. At the meeting of the Council in March 1920 the Statements of accounts for the years 1912—1919 were finally approved by the Council.

B

PROCÈS-VERBAUX

DE LA TREIZIÈME RÉUNION DU CONSEIL

TREIZIÈME RÉUNION
LONDRES — MARS — 1920

BUREAU DU CONSEIL

Avant la réunion: M. Otto Pettersson, Président du Conseil.
M. H. G. Maurice, Vice-Président du Conseil.
M. C. F. Drechsel, Secrétaire-Général du Conseil.

Après la réunion: M. H. G. Maurice, Président du Conseil.
M. Otto Pettersson, Vice-Président du Conseil.
M. J. Hjort, Vice-Président du Conseil.
M. F. Kerzoncuf, Vice-Président du Conseil.
M. C. F. Drechsel, Secrétaire-Général du Conseil.

MEMBRES DU CONSEIL ET EXPERTS
et leurs adresses

Belgique: M. G. Gilson, Professeur, Directeur du Musée Royal d'histoire naturelle de Belgique, *Bruxelles.*
M. A. Hamman, Président du Comité de Mariculture, Membre du Parlement Belge, Rue longue 60, *Ostende.*

Danemark: M. le Commandeur C. F. Drechsel, *Copenhague*, Jens Kofodsgade 2.
M. Martin Knudsen, Professeur à l'Université, *Copenhague*, Jens Kofodsgade 2.
Experts: M. le Dr. A. C. Johansen, Jens Kofodsgade 2, *Copenhague.*
M. le Professeur C. H. Ostenfeld, Sortedamsdossering 63A, *Copenhague.*

Finlande: M. le Dr. R. Witting, Professeur, Directeur de l'institut finlandais pour l'exploration de la Mer (ou Directeur de "Merentutkimuslaitos"), *Helsingfors.*
M. le Dr. T. H. Järvi, Directeur des Pêcheries (ou Directeur de "Kalastushallitus"), *Helsingfors.*

France: M. F. KERZONCUF, Directeur des Pêches Maritimes, 5, rue Castiglione, *Paris.*

M. THÉODORE TISSIER, Président de Section au Conseil d'État, Président du Conseil de l'Office des Pêches Maritimes, 13, rue Monsieur, *Paris.*

Experts: M. BEHAL, Professeur à l'École Supérieure de Pharmacie, 4, Avenue de l'observatoire, *Paris.*

M. JOUBIN, Professeur au Muséum d'Histoire Naturelle, 21, rue de l'Odéon, *Paris.*

M. LE DANOIS, Docteur, Secrétaire, 38bis, rue Voltaire, *St. Germain en Laye, Seine et Oise.*

Grande Bretagne (et Irlande): Mr. H. G. MAURICE, C. B., Fisheries Secretary, 43, Parliament Street, *London.*

Professor, D'ARCY W. THOMPSON, C. B., F. R. S., The University, *St. Andrews.*

Experts: Mr. D. T. JONES, C. B. E., Chairman of the Fishery Board for Scotland, *Edinburgh.*

Dr. E. W. L. HOLT, Chief Inspector of Fisheries of Ireland, Department of Agriculture and Technical Instruction, 3, Kildare Place, *Dublin.*

Professor J. STANLEY GARDINER, F. R. S., Director of Fishery Investigations, 43, Parliament Street, *London.*

Dr. WEMYSS FULTON, Scientific Superintendent of the Fishery Board for Scotland, *Aberdeen.*

Dr. E. J. ALLEN, F. R. S., Director of Marine Laboratory, *Plymouth.*

Dr. J. JOHNSTONE, The University, *Liverpool.*

Mr. J. O. BORLEY, O. B. E., 43, Parliament Street, *London.*

Dr. E. C. JEE, 43, Parliament Street, *London.*

Dr. E. S. RUSSELL, 43, Parliament Street, *London.*

Mr. BUCHANAN WOLLASTON, 43, Parliament Street, *London.*

Mr. A. E. HEFFORD, 43, Parliament Street, *London.*

Mr. C. GREEN, Inspector of Fisheries of Ireland, 3, Kildare Place, *Dublin.*

Mr. G. P. FARRAN, Inspector of Fisheries of Ireland, 3, Kildare Place, *Dublin.*

Mr. SOUTHERN, Inspector of Fisheries of Ireland, 3, Kildare Place, *Dublin.*

Norvège: M. le Dr. JOHAN HJORT, (p. t. London).
M. le Professeur H. H. GRAN, à l'Université, *Christiania.*
Experts: M. EINAR LEA, Bureau of Fisheries, Research Branch, *Bergen.*
M. Oscar SUND, Bureau of Fisheries, Research Branch, *Bergen.*

Pays-Bas: M. le Dr. E. VAN EVERDINGEN, Professeur à l'Université, Directeur-en-Chef de l'Institut Météorologique Royal, *De Bilt.*
M. le Dr. H. C. REDEKE, Directeur du "Rijksinstituut voor Biologisch Visscherijonderzoek", *Helder.*
M. J. M. BOTTEMANNE, Inspecteur Général des Pêches, *'s Gravenhage*, attended the Meeting officially.

Suède: M. le Dr. O. PETTERSSON, Professeur, Holma, *Lysekil.*
M. le Dr. GUSTAF EKMAN, Södra Hamargatan 11, *Göteborg.*
Experts: M. le Dr. K. A. ANDERSSON, Directeur du Bureau des Pêcheries, Kungl. Landtbruksstyrelsen, *Stockholm.*
M. le Dr. H. PETTERSSON, Docent, *Göteborg.*
M. le Dr. N. ROSÉN, Inspecteur des Pêcheries, *Lysekil.*

États-Unis: M. LINCOLN HUTCHINSON, Attaché à l'Ambassade des États-Unis d'Amérique à Londres, a assisté aux séances du Conseil.

AGENDA

1. Opening of the Proceedings, Administrative Report, Formation of Sections.
2. Final approval of the accounts for 1912—13 *(vide* Rapp. & Proc. Verb. Vol. XIX), 1913—14 (Vol. XXI), 1914—15 (Vol. XXIV), 1915—16 (Vol. XXIV), 1916—17 (Vol. XXV), 1917—18 (Vol. XXV). Statement of Accounts for 1918—19. Nomination of the Members of a Finance Committee.
3. Settlement of the Estimates for the financial year 1919—20 and 1920—21. — Proposition regarding expenses of printing, language of Reports etc.
4. International Study of the Sea after July 1919.
   a. The General Secretary: Report as to the present participation and the general situation.
   b. Measures to be taken for the future as to the continuation and organisation of the International Council and the participation of the Governments.
   c. Nomination of the Members of the Bureau, the Assistants, the Finance and the Editorial Committee.
5. The General Secretary: Work carried out during the war.
6. Communication and deliberation regarding the Plaice question of the North Sea and the Baltic: Danish proposal as to the minimum measure for Plaice landed.
7. The Herring and Salmon questions.
8. Danish Atlantic Expedition for Sea Research.
9. Mr. Maurice: Proposition regarding yearly Administrative Report, and statement of the work done in each country, and how far the Council's resolutions have been carried out.
10. Report and proposals in regard to Sections: Programme for future work.
11. Other business.
12. Conclusion of the meeting.

REPORT

of

the 13th Meeting of the Council.

First Sitting: Tuesday, March 2nd, 1920 at 11 a. m.

The President, Prof. O. PETTERSSON, in the Chair.

Present: the Members, Experts, etc. (list, p. 3).

Under **Point 1** of the Agenda (Opening of the Proceedings, Administrative Report, Formation of Sections), the President, Prof. O. PETTERSSON, opened the sitting at 11 o'clock by saying:

This meeting has been under preparation a long time, more than a year. We hoped at first to assemble the Council in March or April last year, then in September or November. When at last the opening has been fixed for to-day, we are indebted for this happy solution of a difficult question to the initiative of the British Government and the energetic efforts of its Fishery Department and its able representative here, Mr. MAURICE.

Although our usual meeting-place is Copenhagen, it is by no means unusual to hold meetings in other countries. Our first conferences were held in Stockholm and Christiania. Afterwards we met in Edinburgh, in Stralsund, Hamburg and Bremen, twice in Amsterdam. Our last meeting in London will be fresh in the memory of everyone who attended it. The Central Bureau, which has to decide the place of the meeting, after careful consideration found that we might easier convoke the representatives from the countries at the western side of the North Sea — England, Scotland, Belgium or France — if the Council this time assembled in London.

Under these circumstances the Central Bureau resolved thankfully to accept the invitation to meet in London, and the more so because this invitation of the British Government involved the prospect of a future extension of the international co-operation to other countries with which we have long wished to co-operate. These expectations have been splendidly fulfilled to-day when we have the pleasure to see representatives from Finland and from France amongst us.

The first acts of the Finnish Government after Finland had gained its

independance and freedom was to reorganise on a broader and more liberal basis both the Board of Fisheries and the Thalassological Institute.

Mina herrar kolleger från Finland, må det tillåtas mig, då jag framför uttrycken af vår beundran och sympati för denna patriotiska och vidsynta handling af Finlands folk och regering att tillfoga en lyckönskan från edra stamförvandter i de skandinaviska länderna och närmast från oss svenskar som dela med eder den ansvarsfulla uppgiften att undersöka Östersjön. Vi känna och värdera hvad I uträttat och hoppas på ett resultatrikt samarbete i framtiden.

Messieurs les délégués de la France,

Vous savez que les recherches de notre Conseil ne sont pas limitées à la mer du Nord et la mer Baltique. Maintenant, que nos expéditions fréquentent les mers septentrionales et vont visiter les parages de l'Islande et de Terre Neuve, ou les pêcheurs Français depuis des siècles ont trouvé un terrain fertile pour leur pêche, terrain qui promet aussi des résultats importants pour l'investigation scientifique, nous éprouvons un vif désir d'associer nos efforts à ceux des savants océanographes de votre pays pour entamer ensemble l'étude des grands problèmes de la circulation de l'océan, de la vie et des migrations des poissons. Maintenant, que le Gouvernement français a répondu favorablement à notre invitation, j'ai l'honneur au nom du Conseil International pour l'étude de la Mer de vous souhaiter la bienvenue.

I think, gentlemen, that we have good reasons to expect a successful continuation of the international research which we commenced 18 years ago. These future results must, however, be based on those formerly acquired. If we give a retrospective glance on that work we remember the excellent work of the Russian expeditions in the Murman Sea whereby Knipowitsch opened a new field of research to science and new and rich fields for the fishery industry of Europe. Nor will we forget the long and methodic exploration of the fish life in the Baltic and the North Sea by Heincke, Ehrenbaum, Reibisch a. o.

As the oldest member of this Council, who have been with it from the beginning, I, for my part, look forward to the time when the international work can be resumed on its former extension.

I have the honour to declare the 13th meeting of the International Council for the Study of the Sea opened and, following an old custom, I would propose in the first instance to send a telegram of homage to His Majesty the King of England. May I take this as granted? (Applause.) The following telegram was sent:

A Sa Majesté Le Roi de la Grande Bretagne et d'Irlande.

Les membres du Conseil International pour l'Exploration de la Mer réunis à Londres en abordant pour la première fois après la guerre leurs travaux annuels demandent la permission de témoigner à Votre Majesté leurs sentiments les plus respectueux.

Pettersson, Président. Fishery Department, 43, Parliament St.

After this the General Secretary said: The countries participating in this meeting are represented by the same delegates as represented them at the last Council Meeting in 1913, except Finland for which country one of the Delegates, Dr. JÄRVI, Director of Fisheries, is partaking for the first time. We also for the first time have the pleasure of seeing French delegates here, France being represented by the two Delegates: M. F. KERZONCUF, Directeur des Pêches Maritimes, M. THÉODORE TISSIER, Président de Section au Conseil d'État, and the Experts: M. BÉHAL, Professeur a l'École Supérieure de Pharmacie, Membre de l'Académie de Médecine, M. JOUBIN, Professeur au Muséum d'Histoire Naturelle, and M. le DANOIS, Docteur, Secrétaire. Some British Experts also attend the Council Meeting for the first time: Mr. STANLEY GARDINER, Mr. WOLLASTON, Mr. FARRAN, Mr. RUSSELL, Mr. SOUTHERN, Mr. HEFFORD, Mr. HOLT, Mr. ALLEN and Mr. JOHNSTONE. From Holland we welcome M. BOTTEMANNE, Chief Inspector of Fisheries; from Norway Dr. SUND, and from Sweden Docent PETTERSSON and Mr. ROSÉN, Inspector of Fisheries.

I regret to record the death of Captain RIDDERSTAD of Sweden, and also that of the former Biological Assistant at the Bureau, Dr. REICHARD.

Further the General Secretary reported: Although the investigations of the Sea and the work of the Council have been very much hampered during the war, and although it consequently has been of minor importance compared with the work of previous years, it touches, however, a series of different subjects, and as it embraces a large period of five years the task to report about it is somewhat difficult.

I have thought to get over the difficulties hereby by referring to memoranda about the principal questions, as for instance the plaice question, the participation in the International Council of the various countries, and to the Rapports et Procès-Verbaux issued during the war, in particular that for 1913—1914, which gives the position regarding all matters dealt with by the Council at the outbreak of the war. Moreover, delegates and experts present here are going to report about some special questions. This enables me now to report about the main features of the work during the war, the accounts, etc.

Point 2 of the Agenda. (Final Approval of the Accounts for 1912—13, 1913—14, 1914—15, 1915—16, 1916—17, 1917—18. Statement of Accounts for 1918—19. Nomination of the Members of a Finance Committee.)

In the first place I beg to lay before you: Statement of Accounts for the financial years since 1912—13, which is the last statement approved by the Council.

As will be seen from the Procès-Verbaux issued during the war the accounts have since 1913—14 been audited by a Financial Committee and have been found correct. This Financial Committee could not be elected in the usual way, but the

President, Professor PETTERSSON, Professor D'ARCY THOMPSON, Professor VAN EVERDINGEN, Dr. HJORT, Professor GRAN and Professor MARTIN KNUDSEN have been good enough to act as auditors during the whole war time. I think much credit is due to these gentlemen for the work done in this matter.

With a letter of 5th January from the Bureau the draft Agenda for the present meeting was forwarded to the delegates, and the Agenda referred to the Statements of Accounts contained in Rapports et Procès-Verbaux 1912—13 (Vol. XIX); 1913—14 (Vol. XXI); 1914—15 and 1915—16 (Vol. XXIV); 1916—17 and 1917—18 (Vol. XXV).

I think it would take a very long time now to read all these statements, and in the above named letter they were therefore submitted to the delegates to examine before the meeting. Presuming that this has been done I now ask for your permission, Mr. President, to submit these statements to the final approval of the delegates.

The said financial statements were then approved.

The General Secreatary continued: The only statement now left for your final approval is the Statement of Accounts for the past financial year 1918—19 The revisal of these accounts has been finished about a month ago, and Statements showing the balance have just now been distributed to the delegates. It is the Statement of greatest actual importance because it gives the cash balance at the end of the last financial year, viz. on the 21st of July, 1919. This statement of accounts (see page III) for the financial year 1918—19 was read and approved by the Council.

The General Secretary next suggested that a Finance Committee be elected at this meeting for Audit of the Accounts for the present financial year 1919—20, and proposed the following gentlemen: The President, Prof. D'ARCY THOMPSON, Prof. GILSON, Prof. VAN EVERDINGEN and Dr. JÄRVI. This proposal was carried.

Point 3 of the Agenda. (Settlement of the Estimates for the financial year 1919—20. Proposition regarding expenses of printing, language of Reports etc.)

The President, Prof. O. PETTERSSON, said: The estimates for the financial year 1919—20 will be laid before the Council for approval at a later meeting, and, as for the estimate for 1920—21, the Bureau does not intend to prepare this before it has been enlarged by the addition of two more members to replace the representatives of Germany and Russia. The Bureau intend to ask these two members to act until the next Council Meeting.

The Vice-President, Mr. MAURICE suggested in this connection to elect M. KERZONCUF, of France, and Dr. HJORT, of Norway (repeated in French). The proposal was seconded by Mr. HOLT and was carried.

Point 4a of the Agenda. (Report as to the present participation.)

The General Secretary then made the following statement: As will be seen from my Memorandum about the participation of the various countries, only Germany has officially withdrawn from the Council, and the Council has during the war been supported by Great Britain, Holland and the Scandinavian countries: Norway, Sweden, and Denmark. Thereby the Council has been kept in being, and it has enabled all the departments of the Bureau to continue the work during the war. The Council, the Bureau, and all interested in this work are very much in debt to those which have in this way given their support.

Point 5 of the Agenda. (Work carried out during the War.)

In the above named "Rapports et Procès-Verbaux" from the war time will be found the reports of the work carried out by the departments of the Bureau during this time. I have therefore now only to report about the work carried out during the past financial year 1918—19.

The reports of the various departments of the Bureau (see page I) were read.

Now about the general work in connection with the resolutions carried out by the Council, I beg to refer to the above named Rapports et Procès-Verbaux Vol. XXI, for 1913—14, containing, besides the usual reports etc., a statement of the position regarding all matters dealt with by the Council at the outbreak of the war, as for instance the British proposal regarding five years participation, the North Sea Plaice question, the Baltic Plaice question, the Atlantic Hydrographical research question, the Salmon question, and the Statistical question. In this Procès-Verbaux will also be found all official answers from the various governments received through the Danish Foreign Office.

Based upon these statements I propose now regarding these matters to report only about what has been carried out since the period of above named Rapports et Procès-Verbaux of 1913—14, Vol. XXI.

Point 8 of the Agenda. (Danish Atlantic Expedition for Sea Research)

One of the subjects dealt with in this volume, viz. the plan to carry out Atlantic research by the man-of-wars of the various nations which were to be represented at the opening of the Panama Canal, must of course be considered abolished. It has, however, been replaced on the agenda by the plan for a Danish Atlantic expedition for Sea Research which will be dealt with at this meeting.

Point 6 of the Agenda. (Communication and Deliberation regarding the Plaice question of the North Sea and the Baltic. Danish proposal as to the minimum measure for Plaice landed.)

Of the remaining questions the Plaice question will be dealt with separately on point 6 of the agenda, and a special Memorandum about it, by the General Secretary and Dr. A. C. Johansen, has been distributed.

This Memorandum deals with the North Sea plaice question. I need there-

fore only now to draw attention to the Baltic plaice question. At the meeting of the Council in September 1913, a Recommendation was adopted for an agreement between Germany and Denmark as to protective measures for Plaice and Flounder in the Western Baltic.

On account of the war, this agreement has not taken place officially by the two countries in question, but it has happened that new fishery laws have been carried in both countries during the war, and in these laws the said protective measures, recommended by the Council, have been inserted.

Point 7 of the Agenda. (The Herring and Salmon questions.)

At the meeting of the Council in September 1913 it was resolved that a Committee should be appointed to formulate proposals for the future conduct of herring investigations on a wide scale. The Committee, for which Dr. HJORT was elected as President, held a meeting in Copenhagen in April 1914, and drew up a detailed programme for the investigations (see Procès-Verbaux Vol. XXI, page 18). This programme should have been laid before the Council at a meeting to be held in September 1914; this was, however, deferred on account of the war. Nevertheless herring investigations have been carried out during the war by the neutral countries: Holland, Norway, Sweden and Denmark, in accordance with the lines laid down in the said programme. The results of these investigations will be dealt with in the sectional meetings.

As will be remembered, this question has been discussed by the Council in order to have the biology of the salmon and the sea trout examined, to see, whether international measures regarding size limits, hatching operations, etc. for these fishes would be desirable in countries bordering on the Baltic.

All these countries have participated in such investigations, and two reports about the result have been given by Professor HENKING (Rapports at Procès-Verbaux Vol. XVI, 1913, and Vol. XXIII, 1916.) The investigations have been continued during the war in Sweden, Germany, and Denmark, and after the lines laid down in the programme published in the Procès-Verbaux Vol. XIV, 1912. A large material concerning the growth and migrations of the salmon and sea trout has been collected. Further report about the investigations will be given in the sectional meetings.

Point 11 of the Agenda. (Other business.)

At a meeting of delegates from the Scandinavian countries and the Netherlands, held in Copenhagen from 23rd—25th May, 1918, (see Procès-Verbaux, Vol. XXV) several of the above named questions were discussed, in particular the plaice question and plans for continuing investigations of plaice during the war, the Bulletin hydrographique, and the Swedish and Danish investigations as to races of herring. Several administrative matters were dealt with, and a lecture was given by Professor GRAN about Investigations and experiments during the last years about the reproduction of the plant plankton in the Christiania-

fjord in relation to the oxygen content, alkalinity and content of organic matter in the sea water.

On the suggestion of the President, Professor PETTERSSON, a plan for compilation and publication of surface temperatures from 1900—1913, in certain parts of the North Atlantic, was agreed upon at this meeting. The results hereof have been published in the Bulletin Hydrographique.

A long series of publications has been printed and issued during the war. I beg to refer to the report distributed to the members of this meeting. (Appendix. See p. 90.)

Point 1 of the Agenda (continued). At the suggestion of the President, the Sections were formed, so that the Sectional work could be commenced the following morning and, while offering to open the Hydrographical and Plankton Section himself, he asked that Prof. D'ARCY THOMPSON should open the Section for Statistics and Fisheries.

To this Prof. THOMPSON agreed, and at the same time he expressed a desire that those gentlemen who had special knowledge of the subject matter of the Bulletin Statistique would communicate with him so that they could fix a time to discuss the details of the Bulletin, as he would like their help especially as regarded literary criticism and suggestions. He wanted men who were sufficiently acquainted with the national statistics, so that they would know what could actually be attained, which was a very different matter from what was conceived in the imagination. For practical purposes it was urgently desirable that they should again consider the case and have a small committee, more or less of specialists who were willing and able to advise in the matter. Other statistical questions, as well as the Fisheries question, would come within the scope of the general biological discussions.

The President further expressed a desire that the various delegates should, for practical reasons, inform the General Secretary to which Section they would mainly attach themselves, even though they might also participate in the work of the other Section. The names were announced to the General Secretary as follows:

Hydrographical and Plankton Section: Prof. PETTERSSON, Dr. ALLAN, Prof. BEHAL, Dr. EKMAN, Prof. VAN EVERDINGEN, Mr. FARRAN, Prof. GARDINER, Prof. GILSON, Prof. GRAN, Dr. JEE, Dr. JOHNSTONE, Prof. KNUDSEN, Prof. OSTENFELD, Docent PETTERSSON, Prof. WITTING and Dr. WOLLASTON.

Fisheries and Statistical Section: Dr. ANDERSSON, Mr. BOTTEMANNE, Dr. FULTON, Dr. JOHANSEN, Mr. JONES, Mr. BORLEY, Dr. JÄRVI, Dr. REDEKE, Dr. ROSÉN, Dr. RUSSELL, Mr. SUND, Mr. LEA. It was decided that the Sections should meet the next morning at 10 o'clock in the Lecture Hall, Surveyors' Institution.

Point 6 of the Agenda (continued). The President then proposed that the remaining time of the meeting should be devoted to hearing a résumé by Captain DRECHSEL of the Plaice Question, which had been a cardinal question for 18 years. This was agreed to.

The Danish Delegate Captain Drechsel then referred to the memorandum about the plaice question by himself and Dr. A. C. Johansen. He mentioned the results arrived at by previous investigations and the resolutions as to an international minimum size limit for plaice in the North Sea, further the publications issued during the war about the plaice question by Professor d'Arcy Thompson and Dr. Fulton for Scotland, Dr. Masterman for England. On the whole the results arrived at by these authors confirm the previous results, only Dr. Masterman's show an increase of medium and small plaice during the years from 1906—12, not ascertained by previous investigators.

It was pointed out that the proposal of the Council as to a minimum size of 22—23 cm was not satisfactory and that it should now be examined whether better and more effective results could be attained.

The stock of plaice in the North Sea had in all probability been considerably affected by the strong and continued restriction of the North Sea fishery caused by the war. Many observations and measurements of plaice had been carried out during the war with the result that plaice and other important flat fishes, as well as haddock seem to be very abundant and of considerable sizes in the North Sea. The present moment and the present situation are therefore very favourable for a revision of previous results. Measures should be taken as soon as possible because very likely the plaice fishery in the North Sea will before long be carried on very intensely, and if the stock of fish thereby should again be reduced the Council would then have to face the same difficulties as before the war in carrying through effective restrictions of fisheries.

In recommending the adoption of a high size limit for plaice the conclusions of the Council, agreed upon in 1913, were referred to. Besides the size limit it was then suggested that the best way to protect the fish in the North Sea would be by closed areas. The chief nursery grounds should be closed to steam trawlers. This question ought to be dealt with now very carefully.

The French interest in the North Sea fishery was dealt with and the hope expressed that the French Government would share the desire of the Council to obtain international protective laws for the North Sea Fishery. Finally the questions which were thought useful to deal with now were formulated as follows:

1. Whether a common minimum size for plaice of 25—26 cm. total length for the North Sea is regarded as desirable.

   If not, whether a minimum size of 25—26 cm. for steam trawlers and of 22—23 cm. for sailing crafts can be adopted.
2. Whether on the whole a minimum size for plaice can be considered sufficient for the protection of young plaice, even if the size agreed upon should be 25—26 cm.

If this is not the case, whether closed areas for trawlers in the North Sea should be recommended, and if so, to what extent.

3. The manner in which the violation of such closed areas should be controlled.
4. The fisheries which should be declared legal within the closed areas and the minimum size for plaice required in addition to the closed areas, in order to prevent destructive fishery within them.
5. The way in which the closing of certain areas can be expected to interfere with other fishery, in particular of turbot, sole and haddock. This also considered from an economical point of view.
6. Besides this, in my opinion the question should be dealt with, whether it would be possible now to agree upon certain minimum sizes for other flat fish than plaice, as turbot and sole.

1. Peut-on demander que la taille limite de la plie débarquée dans les ports soit fixée à 0.25 cm. ou 0.26 cm.?

   Pourrait-on en cas contraire accepter que cette taille soit fixée pour les plies débarquées par les chalutiers à vapeur à 0.25 cm. ou 0.26 cm. et pour les plies debarquées par les voiliers à 0.22 cm. ou 0.23 cm.
2. Peut-on considérer qu'une limite de taille marchande pour les jeunes plies constitue par sa fixation une protection suffisante pour ces poissons?

   Doit-on au contraire fermer certains secteurs aux chalutiers de la mer du Nord? Quelle serait l'étendue de ces secteurs?
3. Comment controler la fermeture de ces secteurs?
4. Quelles pêches peuvent être faites dans ces secteurs en dehors des plies? En dehors des secteurs fermés, quelle taille minima fixer?
5. Quelles seraient les conséquences de cette fermeture de certains secteurs pour la pêche du turbot, de la sole, de l'églefin? au point de vue économique?
6. Quelles tailles minima seraient à fixer pour les autres poissons plats, la sole et le turbot, par exemple?

Point 9 of the Agenda (Proposition regarding Yearly Administrative Report, and statement of the work done in each country, and how far the Council's resolutions have been carried out).

Mr. MAURICE said: President and Gentlemen; I have asked the President to allow me to take No. 9 on the Agenda. It is a very simple point, but a very important one. In the past we have been rather too much inclined to promote programmes which were beyond our ability to carry out, and at this moment, when we are forming sections in which the detailed programmes of work will be thrashed out, I would like to utter a word of warning and I suggest, that the Council should remember — and that all the representatives of the different countries who are

working in the sections should always have in mind — in recommending any particular programme of work that they are going themselves to undertake to play a part in it, and that they should not undertake anything that they are not quite certain they can carry out. Nothing is so unsatisfactory as to have a very fine programme, ideally perfect perhaps, and to know before you start that you will fall far short of it. We had better make up our minds what we can do, and we must all feel that at the present moment our resources are so limited — we are only slowly recovering from the conflict on which we have been engaged for the last five years — that we cannot expect to have at our disposal at the present moment all the funds for research work that we should like to have, whether in the form of ships and material, or in the form of men, because, as everybody knows, during the last 5 years there has been no considerable output of young scientists coming on to help us in research work, and many have lost their lives in the war. Therefore we must start with a heavy handicap and I should like to impress on the Council and on the Sections the importance of making up their minds on what can be done, and not advocating programmes which cannot be carried out.

Coupled with that I make the suggestion — though I do not suggest that the person should be named now — that the Council should appoint, in respect of each of the principal questions, or possibly in respect of all questions together — somebody who should frame an administrative report for every year, indicating how far the programmes which we have laid down have been actually carried out, and that it should be the business of that individual to keep in touch with the different countries and, not waiting till the end of the year or to the next meeting, but, say, once in every three months, to ask for a report as to how the work is going on which they have undertaken. That is a practical measure which I think it desirable to adopt from a knowledge of human nature. Everybody knows and will admit that if somebody comes at intervals and asks whether you have done so and so or not, you are more likely to do it. That is the kind of stimulus that, I think, might usefully be given.

Perhaps you will allow me to add a few words in French for the benefit of our French friends. Je propose au Conseil qu'on ne propose aucun programme qui ne puisse être complètement achevé; dans les Sections qui vont établir ces programmes il est désirable que chacun se limite à ce que son pays peut faire et ne propose pas des recherches alors qu'il n'est pas certain que le pays qu'il représente pourra les exécuter. Il faudrait que quelqu'un prenne régulièrement connaissance par les rapports des différents pays de ce qu'ils ont accompli de leur tâche, tous les trois mois par exemple.

Dr. Jones heartily concurred with the remarks made by Mr. Maurice, emphasising the need for concentration. Instead of dividing energies over many subjects he thought it would be better to concentrate on two or three.

The President also supported Mr. MAURICE, only he asked for some explanation as to how this control of the work should be exercised. It seemed to be a matter of Bureau control. Was it intended that the person chosen should be outside the Bureau?

Mr. MAURICE explained that he was not proposing to usurp the functions of the Bureau, but he did not think in the past that it had been the practice of the General Secretary to call for a report of progress at regular intervals. He was anxious that the Bureau — if it was thought well that it should be the Bureau — should be empowered at any time to find out what had been done as regarded the programmes by the various countries. He did not attach importance to the appointment of anybody specially for the purpose, provided that the reports were secured.

Dr. HJORT thanked Mr. MAURICE for his proposal and for the able way in which he had put forward his suggestions. He thought at the same time that they must take into consideration some great difficulties of the past which might excuse apparent shortcomings. For instance, the work had to be started with incomplete equipment and arrangements. The workers had to feel their way very vaguely and develop the methods of work as they went on. There was also the difficulty that when at the meeting proposals were made and programmes drawn up, plans were discussed and made, and then afterwards in the different countries money had to be found for carrying out these plans and administrative difficulties had to be faced. Delegates did not come to the meetings with so much money in their pockets to spend on this work, but they had to raise it afterwards. It was therefore difficult to know beforehand exactly how much could be undertaken. This was, to some extent, an excuse for incomplete work, but of course it would be better to have it otherwise. He also thought the ideas Mr. MAURICE had laid before them were not so easy to discuss generally at the meeting. He thought it would be better not to take any particular standpoint at this meeting of the Council, but to talk the matter over in the different committees and be guided by the result of these discussions during the next few days. When the programmes were decided upon it might be the right moment to consider how Mr. MAURICE's ideas could be carried out in definite proposals.

Mr. MAURICE concurred in Dr. HJORT's proposal. He had not meant to ask for a formal resolution, but merely wanted the sections to take these points into consideration, which was the reason he had raised them at the first meeting. It also was not his wish to ask Dr. HJORT or anyone else to appear in a white sheet before the Council and apologise for deficiencies in the past. He was conscious himself, as one of the British delegates, of having lent himself to programmes that could not be carried out. All were in the same boat.

The President said he knew from experience that it was necessary to bear in mind the principle underlying point 9, and thought it would be quite possible

to carry it into execution in some way. Every resolution went first to the Bureau and if it found obstacles in the way the Bureau could accept it conditionally. In this way they could guard against unripe propositions.

Point 9 on the Agenda was then put to the meeting in principle and carried.

Second Sitting: 6th March 11.30 a. m.

Chairman: President PETTERSSON.
Present: Members, Experts, etc. (vide List p. —).

Point 1 of the Agenda (continued). The President opened the Meeting by announcing that the President had received the following reply from Buckingham palace to the Council's telegram to His Majesty the King: —

> "I have received the King's Commands to thank you and the Members of the Conseil International pour l'Exploration de la Mer for the Message you have addressed to the King on the occasion of your first meeting since the war, and I am to express the hope that every success may attend the important work you have in hand."
>
> Private Secretary.

Point 10 of the Agenda (Reports and Proposals in regard to Sections, Programme for future work). The Reports and recommendations of the Sections and Committees were then laid before the Council for consideration and approval, i. e.:

a. Joint Hydrographical and Plankton Section.
b. The South-Western Committee.
c. The Statistical Bulletin Committee.
d. The Plaice Sub-Section.
e. The Herring Sub-Section.
f. Resolution on Eel question.
g. Resolution on the Salmon question.
h. The Limnological Sub-Section.

(See the Resolutions pp. 28—43).

As regards b, Mr. MAURICE stated that this work would be carried out by the joint efforts of the English and French Committees.

During the consideration of d and e Professor PETTERSSON stated that it was thought desirable by the Swedish Commission to try to improve fishing gear in order to spare immature fish. Experiments in this direction had been made by Captain Ridderstad and it was believed with success. If any Commission would like further information on this matter in order to make experiments they were asked to communicate with the Bureau.

When f was considered Dr. REDEKE pointed out that the eel was one of the most important fish and that therefore work should be continued on as large a scale as possible. Holland was interested in anything concerning the eel. He therefore proposed that Resolution 10 of the Procès-Verbaux of 1912, Volume 15, be confirmed in respect of the present year, and that the programme be carried out in the countries concerned as far as present circumstances permit. He continued in French: —

Parmi les poissons les plus importants, étudiés par le Conseil International se trouve l'Anguille. Tout ce qui concerne ce poisson est intéressant, mais de plus sa pêche dans les différents pays est si importante que nous devons continuer nos recherches et nos études dans le sens où nous les avons entreprises depuis quelques années. Dans cette résolution, vous trouverez nos conclusions.

Point 2 of the Agenda (Settlement of the Estimates for the financial years 1919—20 and 1920—21). These Estimates were laid before the Council for approval.

In connection with the second of these Budgets, i. e. 1920—21, Prof. KNUDSEN made the following statement: —

I suppose that this estimate is to be considered as a prolongation of the war estimates, and I am not going to propose alterations in individual items. I only wish to state plainly before the Council that the expenses can not be kept as low in the future as here proposed. To take an instance from the Hydrographical Department of the Bureau, which I know best, I may mention that the salary of Dr. GEHRKE, who has served for 17 years in the Department, was 4,000 Kr. before the war, and in the present estimate it is proposed that he shall receive 6,000 Kr. only. As the cost of living, according to official statements, has increased by more than 140 per cent. in Denmark, giving Kr. 9,600 as an adequate salary for Dr. GEHRKE, he cannot be expected in future to devote the whole of his working power to the service of the Bureau. Other instances might be mentioned, but I will confine my remarks to Dr. GEHRKE. For various reasons I do not think it likely that Germany and Russia will be able to take their former share in the expenses of the Bureau in the near future. Therefore it seems to me that the only way of escape from the present unsatisfactory conditions is to ask the participating countries to increase their contributions. I therefore beg leave to put the following proposal before the Council: —

"Considering the increased cost of printing and the necessity of giving adequate "remuneration to scientific assistants, the Council asks the Bureau to enter into negotia- "tions with the participating countries in order to obtain properly increased contributions "to the Council."

This proposal is couched in somewhat vague terms because it might be thought better to leave the matter of obtaining increased subventions from the

participating countries in the hands of the Bureau. But if scientific work is to be carried on properly, as it was before the war, increased contributions are necessary.

Dr. HJORT said: When the war broke out we were in a very difficult position, having to consider the uncertain problem of how this International Council could continue during the war. I discussed privately with my friends the possibility of some of the smaller countries paying a larger contribution, the Great Powers being involved in a very costly struggle. Great Britain has paid a most liberal contribution to this work, which saved the situation. On the other hand the interest of the smaller countries varied in each case. I myself have the honour to represent a small country, whose fisheries are perhaps second to none but Great Britain. It might therefore be our duty and our wish to contribute more than some of the others, and I have suggested that Norway should try to make up its share by undertaking the expense of the administration of the Herring work. In the same way I think that the only practical course open to us is that each country shall do something specially besides making their contribution. I therefore recommend that the Danish delegates — if we cannot ask all the countries to raise their contributions — request their Government liberally to support the scientific work done in Denmark.

The General Secretary endorsed the remarks of Dr. HJORT and Prof. KNUDSEN. The Bureau had dealt very carefully with the question, but it was complicated by the fact that they did not know how many countries would participate. Germany and Russia would probably not join for next year and the United States and Canada did not as yet propose to join. It was therefore thought better not to raise salaries or contributions now but to wait until the number of participants and the amount of income to be expected would be known as we hope at the next Council Meeting. The proposed Budget must be considered as a War Budget and as adapted to the present income of the Council.

Professor D'ARCY THOMPSON felt sure that Prof. KNUDSEN's suggestion would meet with the greatest sympathy. There was no doubt that Dr. GEHRKE's proposed income was exceedingly small, while the services he had rendered for many years had been exceedingly important. He therefore asked the Bureau to reconsider the salary allotted to Dr. GEHRKE in view of the fact that they were looking forward to a more or less prosperous future.

Professor WITTING seconded Prof. THOMPSON's proposal and suggested to raise the head II, 9, in the expenditures for the financial year 1920—21 with 2000 Kroner to be taken from "Unforeseen Expenses".

The General Secretary replied that the Bureau would like to comply with the suggestion made, but it would entail consideration of the whole question of salaries, which could not be increased at the present moment.

Prof. VAN EVERDINGEN supported Prof. KNUDSEN because his proposal was put in a vague form, but he did not support the proposal of the other two gentlemen because the raising of one salary opened up other considerations. It would be better at the moment to be content with raising the contributions of the participating States. Though the entry of other countries would raise the income it would also increase the cost. He considered the present moment particularly suitable for discussing this question, when prices were going up in all countries, and urged that if other States joined the Council now it would be better to ask for the increased contribution at once and not to have to raise it next year.

The General Secretary said that the Bureau was in general agreement with Prof. VAN EVERDINGEN and would negotiate with the countries in question and try to draw up a proposal as soon as possible.

The President explained that the great desire of the Bureau, in drawing up the estimates, was to keep within its income, and having regard to the very great expenses, they could not consider increasing the salaries of specialists yet. Prof. KNUDSEN had moved the Resolution and they might be sure that the Bureau would take the matter into consideration. The contributions of the various countries was a matter which concerned the Governments and they must be approached through the usual channel of communication, — the Danish Foreign Office.

The two Budgets for 1919—20 and 1920—21 were then approved.

Point 4 a of the Agenda (Present participation and general situation).

The General Secretary said that a very important point was to be informed as soon as possible with regard to the participation of the United States. He applied to the representative of the United States Mr. HUTCHINSON and asked him to do his best to promote the decision of the United States as soon as it might be convenient to his Government.

Mr. HUTCHINSON, of the United States, replied that, speaking personally, having no official authorisation to commit the Government of the United States, he had been very much interested in the proceedings and was convinced of the importance of this work in the Atlantic region. It was his intention to urge his Government to take a part in these investigations, though he could give no assurance whatever that his endeavours would meet with success.

Dr. REDEKE felt that this was the proper place in which to say a word or two upon the work done by the Bureau during a time of war with a very small income. In doing so he claimed to represent all the members of the Council, on whose behalf he thanked the personnel of the Bureau and especially the General Secretary, who had succeeded through his carefulness and zeal in bringing this International work through the transition from pre-war to post-war conditions. He moved a formal vote of thanks to the Bureau and the General Secretary for the work they had done during the war.

The General Secretary acknowledged the tribute and associated his colleagues in the Bureau with himself. He also recognised the great support received from the President, from Great Britain and the British delegates. The financial assistance of Great Britain had been of the greatest importance.

Point 3 of the Agenda (Language of Reports, etc.). The General Secretary stated that the Bureau had gone into this matter and had come to the conclusion that as a rule one language only should be used, although it might be necessary to print two in particular cases. Should a publication appear which was of special interest to France it should be published in the two languages. The main reason for this decision was the extremely high cost of printing.

Dr. HJORT thought it unnecessary to publish anything in both French and English.

Prof. THOMPSON agreed with Dr. HJORT. The bulk of the publications would no doubt appear in English, but if it were thought desirable to publish anything in French that would be sufficient. Should it ever be necessary to publish some special paper in Finnish he could see no objection.

Prof. van EVERDINGEN was of opinion that the Reports should only be printed in one language by the Council, either the one or the other.

Dr. REDEKE meant that the Reports should be printed in the language in which they were written by the author.

The President stated that the choice of language must be considered by the Editorial Committee consisting of Prof. GILSON, Prof. THOMPSON and himself, and possibly another member might be chosen. The President here invited Mr. le DANOIS to serve on the Editorial Committee, and Mr. le DANOIS agreed.

Point 4 b of the Agenda (Measures to be taken for the future as to the continuation and organisation of the International Council and the participation of the Governments. The continuation of work for five years).

Mr. MAURICE said that at the last Meeting it had been agreed that the participating Powers must continue work for five years on the ground that it was not worth while embarking on a scientific programme without a reasonable period of work from which definite conclusions might be expected. Assurances had been received from all the Powers of their readiness to accept this principle, subject always to the understanding that the necessary money must be voted from year to year by the Powers concerned. The British delegates were authorised to say that Great Britain was prepared to contemplate a period of five years' work, subject to the necessary Parliamentary Votes, and he hoped it might be possible to get a similar declaration from the other countries concerned. It would probably be best if the General Secretary obtained assurances from other powers through the Danish Foreign Office.

Professor PETTERSSON stated that Sweden was willing to adhere to the principle of 5 years.

Point 6 and 7 of the Agenda (continued). Mr. MAURICE thought the proposal he had made under this head regarding reporting on the Plaice and Herring questions had practically been met by a counter proposition of Dr. HJORT, i. e., that the countries which took the lead in any special research should also take responsibility for the reporting of progress. Only two items were really concerned — the Herring programme, for which Norway had taken the responsibility, and the Plaice programme, for which Great Britain was prepared to be responsible. Mr. MAURICE's motive in making the suggestion was the desire that it should be someone's duty to secure that the various countries taking part in the programme should keep their work up to date. And he proposed that Mr. BORLEY should act as reporter for the Plaice question, keeping in communication with other countries, especially Holland and Denmark, and inviting them to state, say once in three months, what progress had been made with the programme.

It was agreed that Mr. BORLEY should be Reporter for the Plaice question, and Mr. LEA for the Herring question.

Point 4 c of the Agenda (Nomination of the Members of the Bureau, etc.)

M. KERZONCUF said: Monsieur PETTERSSON m'assure qu'il a l'intention d'abandonner la présidence de ce Conseil. Je le regrette infiniment, mais il m'assure que son décision est irrévocable. Il ne peut pas rester. Dans ces circonstances nous proposons de nommer comme Président Mr. MAURICE, qui a les qualités nécessaires et qui a gagné l'estime de ses collègues. J'ai l'honneur de vous proposer l'élection de Mr. MAURICE. (Applause.)

Dr. HJORT seconded the election of Mr. MAURICE and said: When the war broke out little more hope seemed left to this International Council than that it might survive the great world conflagration. Great was our surprise and admiration, therefore, when we learnt that Great Britain not only would contribute to fulfil what perhaps might be regarded as old obligations, but that even new investigations were to be undertaken. We have during this Meeting seen reports made of scientific work from Great Britain and from Canada in the most difficult circumstances.

For us, who through twenty years have been trying to develop this co-operation and who have sometimes doubted whether some of the ideas underlying the work would ever be put on a firm and exact basis, it is a source of the greatest pleasure that the extraordinary circumstances of the war, which gave experimental proof of the influence of the fisheries on the stock of certain fish, have not been lost but taken advantage of to the benefit of science for many years to come. We all know how much this is due to our colleague, Mr. MAURICE, to the great belief he has shown in science and in the aims of the International Council.

Acknowledging his great services to the cause of scientific work and international co-operation, it is a great pleasure to me to second the proposal to elect Mr. MAURICE as President of this Council. In doing so I ask permission to add a word in my special capacity as Norwegian delegate. When the war broke out it seemed a critical moment for the Norwegian fisheries; they appeared doomed to ruin and inactivity. They could in my opinion be saved only by the recognition on the part of the Allied countries, and especially of Great Britain, of the hardships entailed by the war upon the Norwegian fisheries. At this critical moment Mr. MAURICE was the first to make full acknowledgment of the necessity for fairly considering the situation of the Norwegian fishermen, thereby rendering the greatest service both to the country of Norway and to its 100,000 fishermen. Having spent the greater part of my life in the attempt to assist this seafaring population, I count myself fortunate to be offered this opportunity of giving Mr. MAURICE my support and also to make this recognition — the only recognition possible at present — for his great services to my country, and I desire to have these words recorded in the report of the proceedings.

The election of Mr. MAURICE was carried with acclamation.

Professor PETTERSSON remarked that it was clear that this election was a popular one. No one understood better than himself the reason for this popularity. The Presidentship of the Council was placed in the hands of Mr. MAURICE with full confidence, and they begged him to undertake as the first duty of his new office the expression of their respectful thanks to his Government and to the Chief of the Fisheries Department for all they had done in the past.

Mr. MAURICE, who was received with applause, said:

Monsieur le Président, Messieurs les Délégués, c'est de grand cœeur que je vous remercie de l'honneur que vous me faites. J'accepte très volontiers la charge de Président du Conseil International pour l'Exploration de la Mer, si pleine de dignité et de résponsabilité, mais croyez que j'éprouve en l'acceptant, les sentiments les plus variés: de la fierté que m'inspire votre confiance, de la reconnaissance pour les compliments plus gracieux que justes que m'ont adressés mes bons amis, M. KERZONCUF, M. le Dr. HJORT, et vous-même, Monsieur le Président, — de l'inquiétude, étant simple fonctionnaire, de me voir appelé à régler les affaires d'une assemblée de savants éminents, mais surtout soyez assuré que j'ai la résolution bien arrêtée de ne rien négliger qui soit en mon pouvoir et qui puisse aider au succès des travaux si importants qui nous occupent.

Messieurs, je profite de l'occasion qui m'est offerte pour vous exprimer le vif plaisir ressenti par le Gouvernement de Sa Majesté, et particulièrement par la Délégation Britannique, en accueillant à Londres nos collègues des pays étrangers: ceux d'autrefois, et ceux qui pour la première fois prennent part à nos délibérations. Nous sommes fiers que vous ayez bien voulu vous réunir à Londres pour recommencer

vos travaux interrompus par la crise de la guerre. J'espère que nous avons pu vous prouver quelle importance nous attachons aux études scientifiques que nous avons commencé et que nous continuerons ensemble, et que non seulement les Départements de l'Etat, écossais, irlandais et anglais, s'y intéressent, mais aussi les grandes Sociétés scientifiques de notre pays. Peut-être me permettrez-vous de vous proposer d'adresser un message de remerciements à la Société Royale, à la Société Royale Géographique, et au Musée Britannique d'Histoire Naturelle, pour leur excellent accueil. Enfin, Messieurs, j'espère que vous avez eu, entre les Séances du Conseil et des Sections et les visites officielles, le temps de vous amuser un peu, car pour bien travailler il n'est pas nécessaire d'avoir toujours un air très sérieux.

Messieurs, je n'ai pas l'intention de vous faire un discours. Ce qu'il nous faut à présent, ce ne sont pas des mots, mais des travaux. Nos programmes sont établis, il nous faut les mettre à exécution et en tirer des résultats pratiques et définitifs.

Monsieur le Président, ce serait de ma part de la maladresse et de l'ingratitude de ne pas essayer d'exprimer nos sentiments de reconnaissance affectueuse et de respectueuse admiration pour le collègue vénéré, si estimé pour ses études océanographiques, qui a occupé la présidence de notre Conseil pendant les tristes et pénibles années de la guerre, et qui vient de présider avec dignité cette récente conférence: je vous suis reconnaissant, Monsieur le Président, de la bonté que vous m'avez toujours témoignée depuis notre première entrevue; nous tous ici, savons que c'est à vous surtout que doit son existence le Conseil International pour l'Exploration de la Mer. Nous espérons que vous continuerez longtemps à participer à ces délibérations auxquelles vous avez toujours apporté tout de sagesse, de science et d'érudition.

Messieurs les Délégués, je suis certain que vous voudrez bien témoigner par acclamations notre gratitude envers M. le Professeur Pettersson.

Professor Pettersson thanked the Council heartily for the expression of their confidence in him and assured them that the knowledge that he had been of some service to them was the best reward he could wish for. He desired also to express his gratitude for the co-operation and friendship he had met with on the part of his English friends and his collaborators in the Bureau — the General Secretary and his able staff. He proposed that the Bureau should be empowered to signify their gratitude for the services rendered by the Foreign Offices of Great Britain and Denmark by sending a telegram to the respective Ministers.

M. Kerzoncuf said: Messieurs, avant de quitter une ville dans laquelle nous avons été reçus avec tant de courtoisie et d'amabilité, c'est un agréable devoir pour moi de vous exprimer à vous tous qui avez été mes collègues à la conférence mes remerciements personnels et ceux de mon pays. Dans cette importante question de l'exploration des mers, la France est venue apporter sa collaboration dévouée

et en particulier celle de ses biologistes et de ses chimistes qui sont prêts à faire tous leurs efforts pour rattraper le temps perdu. En effet par suite de circonstances particulières, la France n'a pas donné son adhésion au Conseil aussi tôt qu'elle eut du le faire et je suis le premier à reconnaître combien ce retard a été préjudiciable à l'intérêt de la pêche de mon pays. Cette industrie prend chaque jour une extension nouvelle; elle se transforme partout, devient une grande industrie, et de même que dans les industries de la métallurgie, de la construction navale, des mines, il est nécessaire d'avoir des ingénieurs et des savants qui guident les professionnels par leur science élevée, par leurs connaissances générales; de même dans l'industrie de la pêche, il est indispensable d'avoir recours à la science pour guider les pêcheurs dans l'exploitation des richesses de la mer. Cette vérité est maintenant reconnue dans tous les pays; il ne faut comme preuve que la présence dans cette assemblée du nombre considérable de savants qui sont venus à la Réunion du Conseil apporter la contribution de leurs connaissances scientifiques. Et ce n'est pas une des choses les moins importantes que cette collaboration scientifique qui vient de permettre au Congrès d'élucider les questions importantes qui concernent les études sur la plie et le hareng, et d'établir une programme de recherches pour le merlu, la sardine, le maquereau et le thon.

Pour ces dernières études j'ai été tout particulièrement heureux de pouvoir apporter une aide spécial au comité au moyen des navires de recherches que la France arme en ce moment. Les recherches poursuivies sont tellement importantes, tellement nécessaires pour le développement de l'industrie de la pêche que les amateurs et pêcheries français ont été les premiers à proposer d'aider à l'exécution des recherches en apportant volontairement leur contribution financière. La conséquence a été qu'à côté de l'action gouvernementale elle-même, on a pu créer un organisme autonome et indépendant qui porte le nom d'Office scientifique et technique des Pêches Maritimes. C'est à cet office qu'incombera surtout, dans l'avenir, le soin de poursuivre les recherches et je suis auprès de vous le sur garant que tous ses efforts seront dirigés en vue d'une collaboration fructueuse avec le Conseil International des Mers.

Permettez moi, Messieurs et chers Collègues, de vous adresser encore une fois mes remerciements et de vous dire que vous pouvez compter dans l'avenir sur tout notre dévouement. J'espère également pouvoir compter sur le vôtre.

Mr. MAURICE: There is only one name which will quite naturally present itself to us when considering the election of Vice-President and Chairman of the Editorial Committee. This latter post has been occupied as we all know with great dignity and erudition by Prof. PETTERSSON in the past, and since he has seen fit to renounce the Presidentship of the Council, I am certain I am expressing the views of all when I propose Prof. PETTERSSON for the position of Vice-President and Chairman of the Editorial Committee.

This election was also carried with acclamation, as also the re-election of the General Secretary.

Prof. D'Arcy Thompson, Prof. Knudsen and Prof. Ostenfeld were appointed Editors af the Statistical, the Hydrographical and Plankton Bulletins respectively.

Besides the Chairman, Professor O. Pettersson, were appointed Prof. D'Arcy Thompson and Prof. Gilson as members of the Editorial Committee.

Point 6 of the Agenda (continued). The General Secretary pointed out that the programme of future work was laid down in the various proposals from the sections which had just been adopted. He wished to point out the special importance of the Plaice question. He knew well the difficulties connected with this question and with International agreements, for it had taken many years to conclude a Convention between Sweden and Denmark on the protection of the Plaice fisheries in the Cattegat. He wished however to point out the supreme importance of arriving at some results. The practical results for many years might not seem great, but from a scientific point of view much had been attained. The Governments regarded the Plaice question as a very vital one and were anxious that conclusions should be arrived at. He also urged the importance of early replies to letters sent out from the Bureau. Sometimes reports were received from all countries participating in some particular work, with the exception of one, and without that one report it was impossible to proceed further with the matter.

Point 12 of the Agenda. (Conclusion of the meeting). The Chairman then declared the thirteenth meeting of the International Council closed.

C.
RESOLUTIONS

of

the International Council for the Study of the Sea. March — 1920.

Hydrographical Section

Resolution 1.

It is recommended that the British Hydrographical proposals, in connection with the Plaice investigations, be carried out, as amended in protocol, during the year 1920—21, and that Holland be invited to conduct certain observations at Helder, daily if possible, throughout the year.

Resolution 2.

It is recommended that surface observations of salinity and temperature be taken over the whole area of the north atlantic ocean at least as far as 10° S., and that these observations be extended in greater detail into the tributary waters to enable surface charts of mean conditions to be drawn up. It is further recommended that this task be entrusted to the Meteorological office, London, as arranged in 1912—13.

Resolution 3.

It is recommended that France be invited to participate in the carrying out of resolution (2) especially by observations from ships leaving Mediterranean ports.

Resolution 4.

It is recommended that the United States of America be invited to participate in the carrying out of Resolution (2) by observations on the following routes. —

(a) Halifax N. S. to Bermuda,
(b) Bermuda to West Indies,
(c) New York to Bermuda,
(d) New York to West Indies,

and on other routes especially those crossing the Atlantic Ocean.

C.

RESOLUTIONS

du

Conseil International pour l'Exploration de la Mer. Mars 1920.

Section Hydrographique.

Résolution 1.

Il est désirable que les recherches hydrographiques proposées par la Grande Bretagne, en relation avec les recherches sur la Plie, soient poursuivies conformément au programme, pendant l'année 1920—21, et que la Hollande soit invitée à faire au Helder certaines observations, journalières si possible, pendant toute l'année.

Résolution 2.

Il est désirable que des observations sur la salinité et la température des eaux de surface soient faites dans tout le secteur nord-atlantique jusqu'au 10° S., et que ces observations soient étendues en détail aux eaux tributaires en vue de pouvoir établir des cartes indiquant les conditions des eaux de surface. De plus il est désirable que ce travail soit assuré par le Bureau Météorologique de Londres, comme il a été prévu en 1912—13.

Résolution 3.

Il est désirable que la France participe à l'exécution de la précédente résolution (2) particulièrement par des observations faites à bord des navires quittant les ports de la Méditerranée.

Résolution 4.

Il est désirable que les Etats-Unis d'Amérique participent à l'exécution de la résolution (2) par des observations sur les routes suivantes:

a) d'Halifax N.S. aux Bermudes;
b) des Bermudes aux Indes Occidentales;
c) de New-York aux Bermudes;
d) de New-York aux Indes Occidentales;

et toutes autres routes, surtout ceux traversant l'Océan Atlantique.

Resolution 5.

It is recommended to Great Britain that the whole time services of one vessel for one complete year be allocated for the study of the hydrography and plankton of the entrance to the northern North Sea and that the area so investigated should be extended to the Norwegian Coast. At the same time it is recommended that Sweden should similarly examine the Skagerak.

Resolution 6.

It is recommended that observations on Lightships in the North Sea should be carried out on a similar scale to that adopted in 1913.

Resolution 7.

It is recommended that France be invited to participate in the carrying out of resolution (6) by observations of surface salinity and temperature at the Sandettie Lightship.

Resolution 8.

It is recommended that the study of submarine waves be continued by Norway and Sweden on as intensive a basis as possible.

Resolution 9.

It is recommended to Great Britain that intensive current measurements lasting at least one full year be carried out by Great Britain with the object of tracing the monthly fluctuations of the Resultant Current from the English Channel into the North Sea, and that this investigation be closely associated with meteorological observations.

Resolution 10.

It is recommended that the following material be worked up in the Bureau during the year 1920—21: —

(a) Mean sea temperatures,
(b) Ice and its influence on sea temperature,
(c) Hydrographical Bulletin for 1915—19.

Resolution 11.

It is recommended that continuous observations from Lightships and Lighthouses in the Baltic be undertaken in the way proposed before the war.

Resolution 12.

It is recommended that a study of the conditions of the ice in the Baltic be undertaken on such a scale that the distribution and the amount of ice can be followed.

Résolution 5.

Il est désirable que la Grande-Bretagne consacre le service continuel d'un navire pendant une année entière à l'étude de l'hydrographie et du plankton dans la région de l'entrée de la Mer du Nord et que ce secteur soit étudié jusqu'à la côte de Norvège. Il est désirable qu'en même temps la Suède étudie de la même façon le Skagerrak.

Résolution 6.

Il est désirable que des observations soient faites sur les bateaux-phares de la Mer du Nord d'après une méthode semblable à celle adoptée en 1913.

Résolution 7.

Il est désirable que la France participe à l'exécution de la résolution (6) par des observations de salinité et de température des eaux de surface faites au bateau-phare de Sandettie.

Résolution 8.

Il est désirable que l'étude des vagues sous-marines soit continuée par la Norvège et la Suède sur une base aussi étendue que possible.

Résolution 9.

Il est désirable que la Grande Bretagne entreprenne pour une année entière au moins des mesures de courant, aussi étendues que possible, en vue de préciser les fluctuations mensuelles du courant de sortie de la Manche dans la Mer du Nord, et que ces observations soient étroitement liées à des observations météorologiques.

Résolution 10.

Il est désirable que les sujets suivants soient étudiés par le Bureau pendant l'année 1920—21.

a) Températures moyennes de la mer;
b) Glace et son action sur la température de la mer;
c) Bulletin Hydrographique pour 1915—19.

Résolution 11.

Il est désirable que des observations continues soient faites des bateaux-feux et des phares de la Baltique dans la voie proposée avant la guerre

Résolution 12.

Il est désirable qu'une étude de la glace dans la Baltique soit poursuivie sur une échelle suffisante pour pouvoir connaître la distribution et le volume de la glace.

Resolution 13.

It is recommended that the study of the inflow and outflow of water through the Belts, Cattegat and Skagerak be quantitatively examined.

Resolution 14.

It is recommended that the mechanics of the interchange of heat between the atmosphere and the hydrosphere should be investigated and that special attention should be given to the phenomenon of evaporation.

Resolution 15.

For the study of the residual currents in the sea it is necessary to have very accurate knowledge of the tidal movements. It is therefore recommended that there shall be a sufficient number of tidal gauges established from which reliable data can be obtained, and the results be co-ordinated by some central office.

Plankton Committee

The plankton section does not recommend a formal programme of investigations to be carried out by all countries for the year 1920—21 as sufficient equipment and staff are not available.

The section recommends the general ideas proposed by Professor Stanley Gardiner and wishes especially to urge the importance of the following points.

Resolution 16.

Investigations should be carried out to determine how far the variations in the content of dissolved oxygen and of hydrogen ion concentration of sea water can be used as a measure for the photosynthesis and production of organic matter in the sea, and to what extent the same factors influence the animal life.

It is desirable that investigations as outlined above should be carried out during the English plaice egg investigations and also during a short period subsequently.

It is also desirable that a similar investigation should be carried out from the Norwegian coast during the spawning period of the herring and in the subsequent month.

Resolution 17.

It is of great importance that investigations should be commenced in order to determine the quantity of organic matter present in solution in sea water and the importance of this to vegetable and animal life.

Resolution 18.

It is recommended that investigations on the life-cycle of the larger species of copepods and other planktonic Crustacea be carried out.

Résolution 13.

Il est désirable que le flux et le reflux des eaux à travers les Belts, le Cattégat et le Skagerak soient étudiés quantitativement.

Résolution 14.

Il est désirable que le mécanisme des échanges de chaleur hydro-athmosphériques fasse l'objet de recherches, particulièrement en ce qui concerne le phénomène d'évaporation.

Résolution 15.

Pour l'étude des courants residuels en mer, il est nécessaire d'avoir une connaissance approfondie des mouvements des marées. Il est en conséquence désirable que des données exactes d'amplitude des marées soient établis en quantité suffisante et que les résultats soient groupés par un bureau central.

Comité du Plankton.

La section du Plankton ne demande pas qu'un programme spécial soit exécuté par tous les pays en 1920—21, faute du matériel et du personnel nécessaires.

La Section recommande les idées générales proposées par le Professeur Stanley Gardiner et insiste spécialement sur les points suivants:

Résolution 16.

Des recherches doivent être faites pour déterminer si des variations d'oxygène dissous et de la concentration des ions hydroxyles dans l'eau de mer peuvent servir de mesure à la photosynthèse et à la production de matière organique dans la mer et combien ces mêmes facteurs influencent la vie animale.

Il est désirable que des recherches dans ce sens soient exécutées pendant les études anglaises sur les œufs des plies et pendant une courte période un peu-après.

Il est également désirable qu'une semblable étude soit faite sur la côte norvégienne pendant la période de ponte du hareng et un peu après, dans le mois suivant.

Résolution 17.

Il est de grande importance que des recherches soient entreprises en vue de déterminer la quantité de matière organique en solution dans l'eau de mer et son importance par rapport à la vie végetale et animale.

Résolution 18.

Il est désirable que des recherches sur le cycle évolutif des grandes espèces de Copépodes et des autres Crustacés planktoniques soient entreprises.

Resolution 19.

The study of the Distribution and Conditions of Life of Fish Larvae and young fish should be continued. Their food at different stages should be determined. The development of a method for catching fish-larvae quantitatively is regarded as of special importance.

Resolution 20.

The South Western Committee

That a specific area of investigations be recognised, namely the entrance to the English Channel.

Resolution 21.

That a permanent Committee be formed for the study of the above area, consisting of representatives of France, England and Ireland.

Resolution 22.

That work in this area be apportioned as follows: — France to carry out research in connection with the Hake, Tunny and Sardine, and Great Britain to investigate the Hydrography, the Plankton and the Mackerel.

Resolution 23.

That England be requested to organise regular Hydrographical and Plankton Cruises, to investigate the movements of the water in the hope of discovering the causes governing the migration of fishes.

In order to carry out these proposals, the Sub-Committee consider and recommend that, commencing this year and with the shortest possible delay: —

(1) France should organise a cruise in the area limited on the North by the line of latitude 49° N., on the South by the line of latitude 48° N., on the West by the 500 M. isobath representing the edge of the Atlantic Slope.

(2) That twice monthly, England should carry out, by means of commercial vessels, a hydrographic series of observations, which would be completed by further observations taken between England and Ireland.

(3) That Ireland should undertake a voyage during each of the months June, July and August along the line of longitude 8° W. to the line of latitude 49° N., for the study of Hydrography, Plankton and conditions of Trawling.

Resolution 24.

Statistical Committee

The Statistical Committee desire to represent to the Council the extreme importance of prompt publication. The Committee draw attention to the great disadvantage of the delay hitherto experienced in the issue of the Bulletin, and the advantages to be expected

Résolution 19.

Il faut continuer l'étude de la distribution et des conditions de vie des larves et des jeunes poissons. Leur nourriture à différents stages doit être déterminée. L'application d'une méthode pour prendre quantitativement des larves de poissons est spécialement importante.

Résolution 20.

Qu'un secteur spécial de recherches soit reconnu à l'entrée de la Manche. Comité du sud-ouest.

Résolution 21.

Qu'un comité permanent soit formé pour l'étude du dit secteur par des représentants de la France, de l'Angleterre et de l'Irlande.

Résolution 22.

Que le travail dans ce secteur soit reparti de façon à ce que la France assure les recherches sur le merlu, le thon et la sardine et que la Grande Bretagne fasse les études sur l'Hydrographie, le Plankton et le Maquereau.

Résolution 23.

Qu'on demande à l'Angleterre d'organiser des croisières périodiques pour des recherches d'Hydrographie et d'étude du Plankton, pour essayer de définir par les mouvements de l'eau les lois des déplacements et des migrations des poissons.

Comme suite à cette proposition le Sous-Comité est d'avis et recommande que dès la présente année et dans le plus bref délai possible:

(1) La France organise une croisière dans un secteur dont les limites sont au N. le 49° L. N., au Sud le 48° L. N., à l'Ouest la ligne de l'isobathe 500 m qui représente le bord du plateau continental.

(2) L'Angleterre assure avec le concours des navires marchands une double série mensuelle d'observations hydrographiques qui seront complétées par des renseignements recueillis entre l'Angleterre et l'Irlande.

(3) L'Irlande entreprenne un voyage mensuel pendant les mois de Juin, Juillet et Août le long du Méridien Lg. W. 8° jusqu'au 49° L. N. en vue d'étudier l'hydrographie, le Plankton et les conditions du chalutage.

Résolution 24.

Le Comité de Statistique désire exprimer au Conseil l'extrême importance d'une publication rapide. Le comité attire l'attention au grand inconvénient des retards apportés jusqu'ici à la publication du Bulletin et les avantages qu'on peut attendre d'une publication des stati Comité de Statistique

from a publication of general statistics within a year of the period to which they relate even though some sacrifice of detail and accuracy may thus be entailed.

With this end in view the Committee recommend that the Fishery Departments of the various nations be earnestly requested to furnish the Bureau with the main annual statistical results of the fisheries as early as possible and in advance of the publication of their official Reports.

Resolution 25.

That it is desirable both for scientific and commercial reasons that the Statistical Bulletin be extended as opportunity occurs to include the statistics of all countries so as ultimately to furnish an epitome of the fishery statistics of the world.

Resolution 26.

That the Statistical Bulletin should also contain a brief prefatory account of the methods followed in each country in the collection of the statistics with the special object of giving a measure or indication of the degree of accuracy and completeness attained in each case, or in other words the extent to which the statistics in the various countries may be considered comparable.

Resolution 27.

The Committee recognise the disadvantage of bilingual publication and consider that the practise recently adopted of publishing the Statistical Bulletin in one language only, viz., English, should be confirmed and continued; but that all facilities should be given for the use of diagrams, tabular matter, etc., to any country desiring to publish an edition of the Bulletin in its own language.

Resolution 28.

That it is strongly recommended that the practice already adopted in most cases of publishing the statistical data in round numbers (i. e. with the omission of the last three figures in the case of kilograms and shillings) be adopted universally.

Resolution 29.

That the Statistical Bulletin should contain a short list of the more important fishes with their names in the various languages and their scientific equivalents.

Sub-Section for Plaice

The sub-section for the plaice having considered the results of investigations carried out before and after the outbreak of war are of opinion.

stiques générales dans un délai moindre qu'un an après la période qu'elles concernent, même s'il fallait sacrifier certains détails ou certaines précisions.

Dans ce but, le Comité demande aux Services des Pêches des différentes nations de fournir au Bureau les résultats principaux des statistiques annuelles de pêche aussi rapidement que possible, avant même la publication des documents officiels.

Résolution 25.

Il est désirable pour des raisons à la fois scientifiques et commerciales, que le Bulletin statistique comprenne, quand les circonstances s'y prêteront, les statistiques de tous les pays, en vue de fournir un résumé statistique de la pêche mondiale.

Résolution 26.

Il est désirable que le Bulletin statistique contienne une notice préliminaire sur les méthodes suivies dans chaque pays pour l'établissement des statistiques dans le but de donner la mesure et l'indication du degré de précision et d'extension atteint en chaque cas, ou en d'autres termes indiquant dans quelle mesure les statistiques des différentes nations sont comparables entre elles.

Résolution 27.

Le Comité reconnaît le désavantage d'une publication bilingue et considère que le principe de publier le Bulletin Statistique en une seule langue, à savoir l'anglais, doit être adopté et continué; mais que toutes facilités seront données pour se servir des diagrammes, des tables, etc. . . . à tout pays désirant publier une édition du Bulletin dans sa langue.

Résolution 28.

Il est fortement désirable que le procédé employé dans bien des cas de publier les données statistiques en chiffres ronds, (c'est à dire en laissant de côté les trois derniers chiffres quand il s'agit de kilogrammes ou de shillings), soit universellement adopté.

Résolution 29.

Le Bulletin statistique devra contenir une courte liste des poissons les plus importants avec leurs noms dans les différentes langues et leurs équivalents scientifiques.

Sous-Section de la Plie

La sous-section de la Plie ayant considéré les résultats des recherches faites avant et après la guerre, émet les avis suivants:

Resolution 30.

That owing to the profound effects upon the stock of fish in the North Sea, produced by the conditions prevailing during the war, it is necessary to ascertain as fully as possible the present conditions now obtaining on the North Sea fishing grounds.

Resolution 31.

That the evidence now available indicates that the closure of limited areas of the North Sea to steam trawling and trawling by highly powered motor fishing vessels, would be of benefit to the plaice fisheries.

Resolution 32.

That since the question of closed areas is to be further examined, and special investigations are to be undertaken in this connection, the resolutions of the Plaice Committee of 1913 as to the impositions of size limits should be reconsidered also.

The sub-section agrees to a programme of further researches for the ensuing twelve months outlined in the schedule attached, with the object of providing material which may form the basis of new proposals for the protection of the plaice fisheries and recommends accordingly. (See also page 59 & 73).

Schedule of Researches upon the Plaice Question undertaken by the Countries specified.

Belgium:	Market statistics.
	Measurements of unselected catches on steam trawlers.
	Observations and putting out of drift bottles from Lightships.
Denmark:	Statistics of plaice and other fish indicating area of capture, the areas to be used being subdivisions of the depth areas.
	Measurements and weighing of plaice.
	Investigation of small plaice near the Danish coast.
	Age determination of plaice.
	Marking of plaice.
	If possible, putting out of drift bottles from Light Vessel.
England:	As in programme circulated to the Fisheries Section.
Holland:	Market statistics.
	If possible, statistics indicating area of capture for the catch of steam trawlers.
	If possible, measurements of unselected catches of steam trawlers.
	Age determinations and general biological observations on plaice of the Texel grounds.
	If possible, liberation of drift bottles from Noordhinder and Terschelling Lightships.

Résolution 30.

Par suite des effets profonds obtenus sur les réserves de poissons de la mer du Nord par les conditions ayant prévalu pendant la guerre, il est nécessaire d'assurer autant que possible les conditions actuelles des fonds de pêche de la Mer du Nord.

Résolution 31.

L'expérience montre maintenant que la fermeture de certains secteurs de la Mer du Nord au chalutage exercé par des navires à vapeur ou à moteurs puissants, serait bienfaisante pour les pêcheries de plies.

Résolution 32.

Depuis que la question de fermeture de certains secteurs se pose à nouveau et que des recherches spéciales sont entreprises à ce point de vue, il semble utile de considérer de nouveau les résolutions du Comité de la Plie de 1913, aussi que les projets de fixation des tailles-limites.

La sous-section propose un programme de recherches pour les 12 mois suivants décrit dans le résumé ci-joint, en vue de se procurer des documents qui pourront former la base de nouvelles propositions pour la protection des pêcheries de plies. (Voir aussi p. 59 & 73).

Programme de recherches sur la question de la Plie entreprises par les pays ci-dessous indiqués:

Belgique: Statistiques commerciales.
Mesures de plies non triées sur les chalutiers.
Observations et lancement de flotteurs dans les bateaux-phares.

Danemark: Statistiques des plies et des autres poissons indiquant le lieu de pêche, en employant comme secteurs des subdivisions des secteurs de profondeur.
Mesure de la taille et du poids des plies.
Recherche de jeunes plies près de la côte danoise.
Détermination de l'âge des plies.
Marquage de plies.
Si possible, lancement de flotteurs d'un bateau-phare.

Angleterre: D'après le programme établi par la Section des Pêches.

Hollande: Statistiques commerciales.
Si possible, statistiques indiquant les lieux de pêche des chalutiers à vapeur.
Si possible, mesures de prises non triées à bord des chalutiers.
Détermination de l'âge et observations générales sur la biologie de la plie des fonds du Texel.
Si possible, lancement de flotteurs des bateaux-feux de Noordhinder et Terschelling.

Ireland: As in programmes circulated to the Fisheries Section.
Scotland: As in programmes circulated to the Fisheries Section.
Sweden: Observations on plaice in the Skagerak & Kattegat.

Resolution 33.

Herring Committee.

The Herring Committee, having reviewed the work which has been going on since its last meeting in 1914, is satisfied that its recommendations have in the main been carried out, though not to the extent of the programme drawn up at the meeting mentioned.

Considering the pressing nature of the Plaice problem, the Committee does not propose to formulate anything more than a temporary and provisional programme of work on the lines of that of 1914 given in Rapports et Procès-Verb. No. 21. It is recommended, however, that the Committee be continued and that the Norwegian Government be asked by the Council to undertake the responsibility and expense of its administration and further that Mr. LEA be nominated to act as reporter to the Committee.

Resolution 34.

Having heard with interest Dr. ANDERSSON's proposals as to the collection of statistics and records of the fluctuations in the herring fisheries during the past in the North Sea and adjacent waters, the Committee recommends to the Council that its members, representing each of the countries concerned, be asked to supply Dr. ANDERSSON with all available data on the subject and that Dr. ANDERSSON be asked to collate this and present it for publication.

Resolution 35.

Eel Investigation.

According to proposal of Mr. MAURICE, Resolution 10 of the Procès-Verbaux of 1912, Volume 15, was confirmed in respect of the present year, and the programme to be carried out in the countries concerned as far as present circumstances permit.

See Procès-Verbaux, Volume 15, page 62, Resolution 10, that reads:

(a) That investigations on the eel of the nature set forth in the programme of Dr. TRYBOM and Dr. JOHS. SCHMIDT be commenced in the countries interested, and continued and extended in those countries where operations have already been begun;
(b) That a programme of investigations, in accordance with the main ideas referred to in the said programme, be adopted, and,
(c) That Dr. JOHS. SCHMIDT be the leader and reporter for such investigations.

Resolution 36.

Salmon question.

The sub-committee on the Salmon question recommend that the investigations be continued in accordance with the programme formulated in April 1912 (Rapports et Procès-

Irlande: Comme en Programme distribué aux membres de la Section des Pêches.
Ecosse: Comme en Programme distribué aux membres de la Section des Pêches.
Suède: Observations sur la plie dans le Skagerak et le Kattégat.

Résolution 33.

Comité du Hareng

Le Comité du Hareng ayant fait la revision du travail exécuté depuis sa dernière réunion de 1914, est satisfait des résultats obtenus et pense qu'il n'y a pas lieu d'étendre le programme fixé à cette réunion. Considérant l'urgence de la question de la Plie, le Comité se borne à ne formuler qu'un programme de travail provisoire d'après les grandes lignes de celui de 1914 donné dans les Rapports et Procès-Verbaux n° 21. Il est cependant désirable de proroger l'existence du Comité et de demander au Gouvernement Norvégien de la part du Conseil, de supporter les frais de son administration. De plus il est désirable que Mr. Lea soit désigné comme rapporteur du Comité.

Résolution 34.

Ayant entendu avec intérêt les propositions du Dr. Andersson en vue de grouper les statistiques et les rapports sur les variations des pêcheries de hareng dans la Mer du Nord et les eaux-voisines, le Comité demande au Conseil que ses membres, comme représentants des différents pays, veuillent bien fournir au Dr. Andersson toutes les données intéressantes sur ce sujet et que le Dr. Andersson accepte de les réunir et de les publier.

Résolution 35.

Recherches sur l'Anguille

D'après la proposition de Mr. Maurice, résolution 10 des Procès-Verbaux de 1912, volume 15, le programme a été adopté pour l'année présente pour être exécuté dans chaque pays autant que les circonstances le permettront:

Cf. Procès-Verbaux, volume 15, page 62, Résolution 10.

a) Des recherches sur l'anguille de la nature de celles proposées dans le programme du Dr. Trybom et du Dr. Johs. Schmidt seront commencées par les nations intéressées, et continuées et étendues dans les pays ayant déjà commencé des études sur ce sujet;
b) Un programme de recherches en rapport avec les idées principales du précédent est adopté;
c) Le Dr. Johs. Schmidt sera le directeur et le rapporteur de ces recherches.

Résolution 36.

Question du Saumon

Le sous-comité du Saumon désire que l'on continue des recherches d'après le programme établi en Avril 1912 (Rapports et Procès-Verbaux, vol. XIV) mais il est d'avis que les résultats

Verbaux, Vol. XIV) but they are of opinion that the results of the work which has since been carried out show that it is desirable to extend the investigation of the stock of salmon and sea trout to other rivers of each country than those mentioned in the programme.

Resolution 37.

That it is desirable to study the relation between the output of fry from hatcheries and the subsequent catches of salmon and sea-trout; and to this end steps should be taken to improve the collection of statistics of the catch of each of these kinds of fish.

Resolution 38.

That marking experiments of Salmonidae should be continued on a larger scale than hitherto.

Resolution 39.

The sub-committee are agreed that the value of these investigations would be increased if researches on the above lines could also be carried out by countries other than those bordering on the Baltic, and therefore suggest that participation in the work of the Salmon Committee should be extended to other countries interested in salmon fisheries which are represented on the International Council.

Resolution 40.

Limnological Sub-Section.

The Limnological Subsection founded for the consideration of problems connected with the fresh water fisheries recommends that the opportunity given by the Annual Meetings of the International Council should be utilised for the purpose of discussion on the possibility of co-operating in the solution of such problems, since researches of such nature will, to a certain extent, supplement the work done hitherto by the I. C.

Resolution 41.

The sub-section further recommends as a preliminary step, that the delegates of each of the participating countries shall be requested by the Bureau to furnish at the next meeting of the Council a report setting forward the present state of knowledge and the nature of the investigations in progress on the natural history of fresh-water food fishes in their respective countries.

déjà obtenus montrent qu'il est désirable d'étendre les recherches sur le saumon et la truite aux rivières des pays autres que ceux mentionnés dans le programme.

Résolution 37.

Il est désirable d'étudier les rapports entre les distributions de frai faites par les établissements de pisciculture et les captures ultérieures de saumons et de truites: dans ce but des mesures devront être prises pour améliorer le groupement des statistiques de captures de ces deux espèces.

Résolution 38.

Des expériences de marquage de Salmonides devront être continuées sur une plus grande échelle que précédemment.

Résolution 39.

Le Sous-Comité est d'accord sur ce point que la valeur de ces recherches serait augmentée si des études sur les mêmes bases pourraient être entreprises par des nations autres que celles riveraines de la Baltique et en conséquence suggère que d'autres nations intéressées par la pêche du Saumon, représentées dans le Conseil International, devront participer au travail du Comité du Saumon.

Résolution 40.

Sous-Section Limnologique

La Sous-Section limnologique fondée pour étudier les problèmes ayant trait aux pêcheries d'eau douce désire que l'occasion fournie par les Réunions annuelles du Conseil International soit utilisée pour discuter sur la possibilité de coopérer à solutionner ces problèmes; des recherches de cette nature devant en effet completer dans une certaine mesure le travail déjà fait par le Conseil International.

Résolution 41.

La Sous-section désire comme mesure préliminaire, que les délégués de chacune des nations participantes soient priés par le Bureau de fournir pour la prochaine réunion du Conseil une rapport constatant l'état des connaissances actuelles et la nature des recherches entreprises sur l'histoire naturelle des poissons d'eau douce comestibles, dans leurs pays respectifs.

D.

ESTIMATE

of

the International Council for the Study of the Sea, for the financial year 1919—1920.

Receipts:

Head	Nr.	Items	Kroner	Kroner
I	1	Cash balance on 21st July 1919 estimated	56881*)	
II	2—6	Annual contributions of governments for 1919—20		
	2	Denmark.....	4675	
	3	Great Britain.....	22225	
	4	The Netherlands.....	4675	
	5	Norway.....	4675	
	6	Sweden.....	4675	
		Total receipts.....	97806	97806

Expenditures:

Head	Nr.	Items	Before the war	1919—20	
I	1-3	**Salaries**	Kroner	Kroner	Kroner
	1	Principal Assistant for hydrography*)	6000	3000	
	2	Principal Assistant for Plankton*) ...	2100	1400	
	3	a) 1st Assist. Secretary	2500	2500	
		Increase for dear times.....	0	1000	
		b) 2nd Assist. Secretary	1560	1560	
		Increase for dear times.....	0	840	
		Total Head I...			10300
II	4-6	**Assistance**			
	4	Hydrographical Department*).....	6160	6750	
	5	Biological Department*).....	2760	3680	
	6	Plankt. Department .	1500	800	
		Total Head II..			11230
III	7-10	**Incidental Expenses**			
	7	President*).....	3600	0	
	8	General Secretary*).	8000	5000	
	9	Chairman of Editorial Committee ...	2000	0	
	10	Chairman of Statistical Committee ...	2000	0	
		Total Head III...			5000
		Carried forward			26530

*) See "Remarks".

D.

VERANSCHLAGTER ETAT

des

Zentralausschusses für die internationale Meeresforschung für das Rechnungsjahr 1919—1920.

Einnahmen:

Titel	Nr.	Positionen	Kronen	Kronen
I	1	Veranschlagter Kassenbestand am 21. Juli 1919 ...	56881*)	
II	2—6	Jahresbeiträge der beteiligten Staaten für 1919 - 20		
	2	Dänemark.....	4675	
	3	Grossbritanien.....	22225	
	4	Die Niederlande	4675	
	5	Norwegen.....	4675	
	6	Schweden.....	4675	
		Sa. der Einnahmen..	97806	97806

Ausgaben:

Titel	Nr.	Positionen	Vor dem Kriege	1919—20	
I	1-3	**Gehälter**	Kronen	Kronen	Kronen
	1	Assistent für Hydrographie*)	6000	3000	
	2	Assistent für Plankton*).....	2100	1400	
	3	a) Sekretär.....	2500	2500	
		Teuerungszuschlag	0	1000	
		b) Sekretär.....	1560	1560	
		Teuerungszuschlag	0	840	
		Sa. Titel I...			10300
II	4-6	**Hilfskräfte**			
	4	Hydrographische Abteilung*).....	6160	6750	
	5	Biologische Abteilung*).....	2760	3680	
	6	Plankton Abteilung .	1500	800	
		Sa. Titel II..			11230
III	7-10	**Dienstaufwandsgelder**			
	7	Präsident*).....	3600	0	
	8	Generalsekretär*)...	8000	5000	
	9	Vorsitzender der Druckschriftenkommission.....	2000	0	
	10	Vorsitzender der statistischen Kommission.....	2000	0	
		Sa. Titel III..			5000
		Transp....			26530

*) Siehe „Bemerkungen".

Head	Nr.	Items	Before the war	1919—20	
			Kroner	Kroner	Kroner
		Brought forward			**26530**
IV	11	**Travelling Expenses**	6000	1500	
		Total Head IV..			**1500**
V	12-18	**Expenses of the office in Copenhagen**			
	12	Rent, including heating and service at the Bureau*)	5200	4200	
	13	Stationery	800	300	
	14	Charts, books, instruments, etc.	1900	100	
	15	Telephone, electric light, gas	450	300	
	16	Insurance	70	70	
	17	Postage, freights, telegrams and similar office expenses	1000	600	
	18	Translation, extra typewriting, correction of proofs. etc.	1800	600	
		Total Head V..			**6170**
VI	19	**Minor expenses** of meetings	500	500	
					500
VII	20-25	**Printing**			
	20	Annual Report	1600	1600	
	21	Hydrographical Bulletin	4000	3300	
	22	Statistical Bulletin	2000	2500	
	23	Plankton Bulletin	5500	1500	
	24	Occasional Papers	2500	2000	
	25	Distribution of publications	2000	1200	
		Total Head VII..			**12100**
		Total Expenditures Kr.			**46800**

*) See "Remarks".

Titel	Nr.	Positionen	Vor dem Kriege	1919—20	
			Kronen	Kronen	Kronen
		Transp....			**26530**
IV	11	**Reisekosten**	6000	1500	
		Sa. Titel IV..			**1500**
V	12-18	**Kosten des Bureaus in Kopenhagen**			
	12	Miete, einschliesslich Heizung und Bureaudienst*)	5200	4200	
	13	Schreibgeräte	800	300	
	14	Karten, Bücher, Instrumente usw.	1900	100	
	15	Telephon, elektrisches Licht, Gas	450	300	
	16	Versicherung	70	70	
	17	Porti, Frachten, Depeschen und sonstige Bureauausgaben	1000	600	
	18	Uebersetzungen, extra Maschinenschreibarbeiten, Korrekturlesen usw.	1800	600	
		Sa. Titel V..			**6170**
VI	19	**Kleinere Unkosten** der Sitzungen	500	500	
					500
VII	20-25	**Druckkosten**			
	20	Jährlicher Bericht	1600	1600	
	21	Hydrographisches Bulletin	4000	3300	
	22	Statistisches Bulletin	2000	2500	
	23	Plankton Bulletin	5500	1500	
	24	Gelegentl. Schriften	2500	2000	
	25	Expedition der Publikationen	2000	1200	
		Sa. Titel VII..			**12100**
		Summa der Ausgaben			**46800**

*) Siehe „Bemerkungen".

Remarks to Estimate.

Receipts:

I-1. Balance on 21st July, 1918 according to revised accounts for 1917—18 . Kr. 52306.00

Annual contributions of governments concerned - 40925.00

Kr. 93231.00

Expenditures for 1918—19 estimated ..... - 36350.00

Cash balance on 21st July, 1919 estimated ..... Kr. 56881.00

+ Russia's contribution for 1914/15.....(Rbl. 14430,54)

Expenditures:

I-3a. Miss Hougens, formerly 1st Assistant Secretary, has, during the last few years, been in charge of a public appointment that will cease at the conclusion of peace. She may then either return to her previous position as Assistant Secretary, or take some other appointment.

Since the service of a 1st Assistant at the Bureau is supposed to be necessary during 1919—20, and in view of Miss Hougens' acquaintance with the affairs of the Bureau, her previous salary, 2500 Kr., has been inserted on the present Budget and provisionally increased by about 40 % on account of the high prices now prevailing.

I-3b. In accordance with the rules introduced in Danish public offices in view of the dear times, the salary has been increased provisionally by 840 Kr.

II-4. On the Budget for 1918—19 this item was 4,500 Kr. (4,000 Kr. for Dr. Gehrke's salary and 480 Kr. to Professor Knudsen's Assistant). On account of the dear times these sums have been raised provisionally on the present Budget by 2,000 Kr. and 270 Kr. respectively, making a total of 6,750 Kr.

Bemerkungen zum Budget.

Einnahmen:

I-1. Kassenbestand am 21. Juli 1918 nach dem revidierten Rechnungsabschluss 1917—18 . . Kr. 52306.00

Jahresbeiträge der beteiligten Staaten ..... - 40925.00

Kr. 93231.00

Veranschlagte Ausgaben 1918—19..... - 36350.00

Veranschlagter Kassenbestand am 21. Juli 1919 Kr. 56881.00

+ Der russische Beitrag für 1914/15.....(Rbl. 14430,54)

Ausgaben:

I-3a. Fräulein Hougens, früher 1. Sekretärin, bekleidet seit den letzten Jahren eine öffentliche Stellung, was mit Friedensschluss aufhören wird. Sie wird dann entweder in ihre frühere Stellung als Sekretärin zurückkehren oder eine andere Stellung übernehmen.

Da der Dienst einer 1. Sekretärin am Bureau im Jahre 1919—20 als notwendig angesehen wird und Fräulein Hougens' Einsicht in die Arbeiten des Bureaus in Betracht zu nehmen ist, ist ihr früheres Gehalt, 2,500 Kr., im gegenwärtigen Budget aufgeführt und wegen der gegenwärtigen hohen Preise vorläufig um etwa 40 % erhöht worden.

I-3b. In Übereinstimmung mit den Regeln, die wegen der hohen Preise in dänischen öffentlichen Bureaus eingeführt worden sind, ist das Gehalt vorläufig um 840 Kr. erhöht worden.

II-4. Im Budget 1918—19 betrug dieser Posten 4,500 Kr. (4,000 Kr. Gehalt für Herrn Dr. Gehrke und 480 Kr. für die Assistentin des Herrn Professor Knudsen). Wegen der hohen Preise sind diese Summen im gegenwärtigen Budget vorläufig um 2,000 Kr. und um 270 Kr. erhöht worden, so dass sie eine Totalsumme von 6750 Kr. betragen.

II-5. Before the war, this item was 2,760 Kr. (1,440 Kr. for Captain Schøning's salary, 1,200 Kr. to Miss Hansted, and 120 Kr. for attendance). The biological Assistant was paid 5,200 Kr. Now, since the retirement of the said Assistant, Captain Schøning has the principal work with the statistics. His salary is therefore, on the present Budget proposed to be raised to 2,000 Kr., Miss Hansted's salary is to be provisionally increased by 40% to 1,680 Kr. on account of the prevailing dear times, the total of the item thus making 3,680 Kr.

I. I-2 & III, 7-8. The salaries and incidental expenses of the President, the General Secretary, and the Hydrographical and Plankton Assistants for this year have been reduced as in foregoing years. In case the British contribution for 1919—20 should be paid, the item III-8, — the General Secretary's salary — should, as for 1918—19, be raised, by 3,000 Kr., to its previous figure.

V-12. This sum is likely even to cover the expenses on this item for 1919—20.

The President intends to propose that instead of the Assistants named in head I, 1—2, three Editors — viz. for Hydrography, Plankton and Statistics — be elected by the Council, the redaction of the corresponding Bulletins to be entrusted to the care of these Editors.

II-5. Vor dem Kriege betrug dieser Posten 2,760 Kr. (1,440 Kr. für das Gehalt des Herrn Kommandör Schøning, 1,200 Kr. für Fräulein Hansted und 120 Kr. für Bureaudienst). Der biologische Assistent erhielt 5,200 Kr. Kommandör Schøning hat jetzt, seitdem der erwähnte Assistent ausgetreten ist, die hauptsächliche Arbeit mit der Statistik. Es wird deshalb im gegenwärtigen Budget vorgeschlagen, sein Gehalt auf 2,000 Kr. zu erhöhen; gleichfalls das Gehalt von Fräulein Hansted wegen der gegenwärtigen hohen Preise vorläufig um 40% auf 1680 Kr., insgesamt also 3680 Kr.

I. I-2 & III. 7-8. Die Gehälter und Dienstaufwandsgelder des Präsidenten, des Generalsekretärs, des hydrographischen und des Plankton-Assistenten für dieses Jahr sind wie in vorhergehenden Jahren reduziert worden. Falls der britische Beitrag für 1919—20 eingehen sollte, soll der Posten III-8 — Gehalt des Generalsekretärs — wie für 1918—19 um 3,000 Kr. bis auf seine frühere Grösse erhöht werden.

V-12. Dieser Betrag wird wahrscheinlich auch die Ausgaben auf diesem Posten für 1919—20 decken.

Der Präsident beabsichtigt vorzuschlagen, dass anstatt der unter Titel I, 1—2, erwähnten Assistenten, drei Redakteure — nämlich für Hydrographie, Plankton und Statistik — vom Zentralausschuss ernannt werden, zu welchen die Redaktion der drei betreffenden Bulletins anvertraut werden sollte.

E.

ESTIMATE

of

the International Council for the Study of the Sea for the financial year 1920—21

Receipts:

Head	Nr.	Items	Kroner	Kroner
I	1	**Cash balance** on 21st July 1920 estimated		50000
II	2-9	**Annual contributions** of the Governments for 1920-21:		
	2	Belgium	4675	
	3	Denmark	4675	
	4	Finland	4675	
	5	France	22225	
	6	Great Britain	22225	
	7	The Netherlands	4675	
	8	Norway	4675	
	9	Sweden	4675	72500
		Total Receipts...	.....	122500

Expenditures:

Head	Nr.	Items	Before the war	1920—21	
			Kroner	Kroner	Kroner
I		**Incidental Expenses:**			
	1	President	3600	3600	
	2	General Secretary	8000	8000	
	3	1st Vice President and Chairman of Editorial Committee	2000	2000	
	4	Editor for Hydrography	6000	3000	
	5	Editor for Statistics	2000	2000	
	6	Editor for Plankton questions	2100	2000	
					20600
II		**Assistance:**			
	7	1st Assistant Secretary	2500	5000	
	8	2nd » »	1560	3000	
	9	Hydrographical Department	6160	6750	
	10	Statistical Department	2760	5000	
	11	Plankton Department	1500	800	
					20550
III	12	**Expenses of the Office in Copenhagen:** Rent, service, stationery, books, light, gas, telephone, telegrams, postage, freights, translation, typewriting, minor expenses of meetings and other expenses	11700	10000	
					10000
IV	13	**Travelling Expenses** of the administrative Staff...	6000	4000	
					4000
V	14	**Printing**	17600	17000	17000
					72150
VI	15	**Unforeseen Expenses**			50350
					122500

F.

REPORTS

of Meetings of Sections and Committees.

I. Joint Meeting of Hydrographical and Plankton Section.

Wednesday, 3rd March, 1920.

Professor PETTERSSON in the Chair.

Present: Messrs. ALLEN, EKMAN, VAN EVERDINGEN, FARRAN, GARDINER, GILSON, GRAN, JEE, KNUDSEN, OSTENFELD, H. PETTERSSON, WITTING, WOLLASTON.

1. After introductory remarks by the Chairman, Professor STANLEY GARDINER proposed that the joint Section should recommend fundamental researches of a biochemical nature to be taken up by special investigators. This matter was referred to the Plankton Section for discussion and report.

2. Professor GARDINER briefly indicated the nature and scope of the British Plaice programme of 1920—21. He expressed the hope that other countries would be able to collaborate in this scheme of work.

Mr. WOLLASTON proposed to include quantitative plaice egg researches as part of the scheme and gave an outline of his previous investigations.

Dr. JEE outlined a proposal to put out 20.000 drift bottles.

These matters were referred to the respective sections for detailed discussion and report.

Professor PETTERSSON stated on behalf of the Bureau that the results of the Plaice programme were wanted in April 1921.

3. Professor GARDINER proposed the formation of a Sub-Comittee to formulate a scheme of hydrographical and plankton research in the area to the west of the English Channel. It was agreed to appoint the representatives of Great Britain and France for this purpose.

The meeting then resolved itself into the respective sections.

(Signed) E. C. JEE.

II. Meeting of Hydrographical Section.

First sitting, Wednesday, 3rd March, 1920.

Dr. JEE in the Chair.

The British hydrographical proposals were accepted as the basis for discussion. See Appendix I, p. 64.

Plaice Programme.

1. Prof. VAN EVERDINGEN stated that in his opinion few drift bottles were required on the line from Swarte Bank to Haaks owing to the indeterminate drift of the water in this area, and suggested the liberation of larger numbers more to the South and on the Flamboro-off Grounds respectively. He accepted the recommendation that drift bottles, supplied by Great Britain, should be put out throughout the year at North Hinder and Terschelling L. V. but suggested that the weekly liberation of 10 bottom and 25 surface drifters would give satisfactory information. They should be accompanied by regular meteorological observations which should include log and wind observations for surface water drift every four hours starting at midnight. These log and wind observations should also be taken at all possible Lightships throughout the year in question. These proposals were agreed to.

Professor KNUDSEN stated that owing to the commitments of Denmark in carrying out Research in the North Atlantic Ocean, it would only be possible to support practically the British programme with observations at the Horns Riff Lightship.

Professor PETTERSSON suggested that the British Research Ship should endeavour to make a study of Hydrogen Ion concentration and Oxygen Content at various depths and positions; but only in the two months of maximal spawning. This suggestion was approved, and Holland was also invited to carry out similar observations at Helder, daily if possible, throughout the year.

With these amendments the Hydrographical section approved the British hydrographical proposals.

Surface Observations.

2. It was recommended that surface salinity and temperature observations should be collected on the following routes: —

By Denmark between (1) Esbjerg and Harwich.
(2) Copenhagen and New York.
(3) Copenhagen, Iceland and Greenland.

By Finland between Helsingfors and Hull.

By Holland between (1) Flushing and Folkestone.
(2) Rotterdam and London.
(3) Amsterdam and Hull.

(4) Amsterdam and Buenos Ayres.
(5) Amsterdam and Dutch Guiana.

By Sweden between Göteborg and Newcastle.

By France on cross Atlantic routes especially from the Mediterranean.

By Great Britain on routes across the North Sea, Irish Sea, English Channel, and Atlantic Ocean, as arranged in 1913.

It was agreed that samples of water should be collected for analysis and surface temperatures be taken at Lightships at as many positions in the North Sea as possible. The following Lightships were recommended: —

Great Britain at Varne, Smith's Knoll, Outer Gabbard, Galloper, Swarte Bank, Cross Sand, Outer Dowsing, East Goodwin. Also at Seven Stones L. V.

France at Sandettie.

Belgium at West Hinder.

Holland at North Hinder and Haaks.

Denmark at Horns Riff.

It was recommended that Lightship salinity observations with temperatures should be taken at regular intervals not fewer than eight per month, and that on trans-Atlantic routes water samples with temperatures should be collected not less than three times per 24 hours.

It was agreed that the Meteorological Office, London, be asked to undertake the task of collecting all surface material and the charting of the results according to the plan arranged in 1913.

Instruments.

3. To be discussed at meeting on March 4th.

Sub-Surface Observations.

4. The British proposals were generally accepted as highly desirable. In conjunction with the proposed investigations in the Northern North Sea, which should comprise the complete traversing of the Norwegian Channel, Sweden was invited to undertake similar intensive observation in Skagerak. The details of these investigations could be drawn up at a later date.

5. Current Measurements and (6) Publication of Results were postponed until the next meeting.

The desirability of continuing the study of submarine waves was discussed. It was recommended that Sweden and Norway be requested to continue, on as intensive a basis as possible, the investigation of the changes of level which take place in the boundary layers of waters of different salinities.

Tidal Observations.

Dr. WITTING proposed that the Section would consider the possibility of making the observations of the Sea-level more attainable and the use of these for the Study of the currents etc. A Sub-Committee was formed for this purpose.

The meeting then adjourned.

(Signed) E. C. JEE.

Second sitting: Thursday, March 4th 1920.

Prof. VAN EVERDINGEN in the Chair.

Proposal of Prof. Knudsen.

Prof. KNUDSEN outlined his memorandum to the Bureau who invited the opinion of the Section in regard to the work which should be carried out during the year 1920—21 by the hydrographical department of the Bureau. He stated that the General Secretary had asked him to do so, and not to invite the section to enter upon wages and other financial matters mentioned in the memorandum.

The Section considered the various details of Prof. Knudsen's Memorandum and recommended as follows: —

1. That mean decade sea temperatures should be worked up on the completion of the material;
2. That ice material and its influence on the temperature of the following year should be worked up, if time permits;
3. That if possible a Hydrographical Bulletin for the period 1915—19 should be prepared.

Prof. PETTERSSON announced from the Bureau that it was decided to appoint a Redactor for each of the Bulletins and that a meeting to decide publication methods would be convened tomorrow.

The discussion of the British hydrographical proposals was then resumed.

3. Instruments.

Sweden. Dr. Hans Pettersson described new forms of total immersion Hydrometers costing about £ 10 each for use where the salinity range was rather high. A description of these appears in the "Monthly Weather Review" (English) for February 1919. The meeting expressed general approval.

France. It was hoped that a demonstration of the Favé tidal gauge would be given before the close of the meeting.

England. Mr. Wollaston gave an account of the principles of a continuous recording current meter which the meeting recommended to Sweden for construction and trial.

Holland. The Chairman gave an account of a vertical self-registering tidal gauge at use in the Zuider Zee which had an accuracy of 5 cm in height of the water level.

He also described a design of Dr. SCHOUTE to eliminate the error due to the bending of the wire in the Jacobsen Current Meter.

The meeting expressed the hope that these instruments would be made available at the Bureau.

Denmark. Prof. KNUDSEN gave an account of his new photometric method for measuring the absorption of light by sea water. It was suggested by Prof. D'ARCY THOMPSON that this account would be of great interest to the members of the Royal Society meeting during the afternoon. A vote of thanks was given to Prof. KNUDSEN.

5. Current Measurements.

Dr. JEE called attention to the Memorandum circulated to the meeting and to the requirements for future investigations. Se Appendix II, p. 66.

Mr. EDSER gave an account of this statistical study of current measurements and showed curves illustrating the various points of his memorandum.

The Chairman commented upon the results obtained and agreed that continuous observations were necessary.

Dr. JEE then formally moved the following resolution: —

"It is desirable that intensive current measurements lasting at least a full year be carried out with the object of tracing the monthly fluctuations of the resulting current of the Channel into the Flemish Bight and that this investigation be closely associated with meteorological observations."

This resolution was approved.

Prof. WITTING brought before the Section a proposal with regard to the publication by the Bureau of abstracts of the various scientific papers of interest to the International Council. The consideration of this proposal was deferred to the next sitting.

The section then adjourned. (Signed) E. C. JEE.

Joint Meeting of Hydrographical and Plankton Section.

Third sitting: Friday, 5th March, 1920.

Professor M. KNUDSEN in the Chair.

All Members present together with Mr. MAURICE, Mr. HUTCHINSON (United States) and the Delegates of France.

The meeting was attended by Mr. HARRIES as representative of the Meteorological Office and opened by considering the hydrographical contributions of each country for the year 1920—21.

Great Britain
France
Belgium
Holland
Norway

The contributions of these countries have already been dealt with under other headings.

Sweden. Professor PETTERSSON enumerated —

(1) Researches at Sea for hydrography and in connection with the herring fisheries in collaboration with Denmark;
(2) Researches on shore in connection with submarine waves;
(3) Surface samples in the North Sea in conformity with the general scheme.

Finland. Professor WITTING outlined —

(1) Coastal observations of salinity, temperature, ice, etc.;
(2) Lightship observations of salinity, temperature, stream etc.
(3) A deep-water expedition in the Baltic in the autumn of 1920.

It is desirable to make observations of the nature and measurements of the distribution and thickness of the ice in the whole Baltic. Charts based upon ice observations taken every Friday are issued in Finland.

Prof. WITTING urged Denmark and Sweden to extend their observations in the Belts and Cattegat, so that a quantitative determination of the in-flow and out-flow of the water could be made. Agreed.

Prof. WITTING pointed out the necessity of making studies of the interchange of heat between the hydrosphere and the atmosphere.

The proposals were approved.

The Chairman informed the Sections of the intention of the Danish Commission to send an Expedition into the North Atlantic during the present year. (See Appendix VII, p. 81).

Professor OSTENFELD outlined the Danish proposals for their North Atlantic expeditions. It is proposed to make a preliminary cruise in 1920 and on the results to plan the main cruise for 1921.

Professor PETTERSSON proposed that the Section should express its appreciation of the highly valuable scientific contributions which Denmark has made in the past to oceanography and marine biology. This was unanimously agreed to and the hope was expressed that the coming Danish expeditions would be fortunate in all circumstances attending the cruises.

Surface Atlantic Observations of Salinity and Temperature.

Professor PETTERSSON explained that the subnormal sea temperature of 1904 in the North Atlantic could be traced on to the Swedish coast and that it was important to follow such transmission of hydrographical changes from the ocean on to the fishing grounds.

After discussion it was agreed to elaborate an intensive surface salinity and temperature programme for the whole area of the North Atlantic Ocean and its tributary waters and to invite France and United States to share in this investigation. It was agreed that surface samples for salinity should be collected at intervals of not less than every eight hours during the crossing of the Atlantic, and more frequently on coastal routes in the North Sea and adjacent waters. It was understood that the first year's work was to be preliminary and that a complete plan of investigation could be better laid down at the next meeting of the Council.

Professor STANLEY GARDINER in moving that the Council be requested to invite the United States of America to join the International Council laid stress upon the unity in brotherhood between all men engaged in science and in the applications of science, a unity second only to that of their nationality, and upon the desirability of all scientific work upon any line of research being carried out by similar standard methods in all countries for purposes of comparison; he thought that all would be greatly helped in understanding the principles underlying their work by extension to the west and south, and that ultimately the United States eastern fisheries would be directly benefitted thereby.

After several other speakers had supported the CHAIRMAN ruled the motion out of order as not being in the province of the Section. He asked Mr. HUTCHINSON to convey to his Government the unanimous desire of all present to see the United States a member of the Council and to have their scientific men helping in the discussions in its Sections and Committees.

Mr. HUTCHINSON stated that although he attended as a lay man with no official instructions to promise participation in the work of the Section, he personally fully appreciated the importance of the proposed researches and therefore undertook with pleasure to convey to his Government the views now expressed.

The Section thereupon decided to include in its resolutions those which referred to investigations off the coasts of U. S. A. and recommended the Bureau to transmit these resolutions officially to the Government of the U. S. A., in support of the representations of Mr. HUTCHINSON.

On the proposal of Professor VAN EVERDINGEN, supported by Professor M. KNUDSEN, it was agreed that the results obtained in each month should be charted and it was proposed to ask the Meteorological Office, London, to act as the Bureau for collecting all surface observations of temperature and salinity from all participating countries on the plan arranged in 1912—13. The details of this scheme were left for arrangement between the British Offices.

Investigations in the area to the S. W. of the British Isles.

The French delegate, M. KERZONCUF, read a Memorandum drawn up by the special Committee convened to consider this matter. He explained that it would

only be possible during the first year to carry out a certain part of the original British programme and that the investigation would be carried on in collaboration with Ireland.

Mr. Farran outlined the part to be taken by the Irish vessel.

Tidal Gauge Measurements.

Professor D'Arcy Thompson explained that an informal meeting to discuss Tidal measurements had been held Thursday afternoon at which the following conclusions had been arrived at —

It was agreed that for a study of resultant currents in the sea, a very accurate knowledge of the tidal movements was necessary. It is therefore most desirable that there shall be a sufficient number of tidal gauges established from which reliable data can be obtained, and the results be co-ordinated by some central office.

The data to be so obtained will give the following informations —

(1) Movements of water from the points of view of —
   (a) Fisheries.
   (b) Navigation, both surface and submarine.
(2) Height of mean sea level, showing whether the land is rising or falling relative to the sea. This is of importance both for Harbour work and drainage of low-lying land.
(3) Tidal predictions for Harbours, etc.

This information is therefore required for widely different purposes and by bodies which do not ordinarily cooperate in the course of their normal activities.

The conference therefore recommends that a Committee or a Central Office be established to study the water movements in the North Sea, and that in each country some one body should become responsible for the collection of data from the various observing stations, and also for the inspection and control of the various gauges, so as to ensure that they are properly connected to fixed marks on shore and that their results are of sufficient accuracy for the purposes outlined above.

The meeting concluded with a vote of thanks to the Chairman.

(Signed) E. C. Jee.

As for the hydrographical resolutions see pag. 28.

III. Meeting of Plankton Section.

First sitting: Wednesday, 3rd March, 1920. 11.30 a. m. to 1 p. m.

Present: Messrs. Stanley Gardiner, E. J. Allen, H. J. Buchanan Wollaston, G. P. Farran, Gran, Ostenfeld.

Professor Gran was elected Chairman.

Professor Ostenfeld reported on the work done by the Bureau since the last meeting in September 1913.

See Proc. Verb. vol. XXI, pp. IX—X, vol. XXIV, p. X, vol. XXV, p. 6, and vol. XXVI, p. II.

Further he drew the attention to the following two points:

1. In May 1914 the Plankton Department sent out to the participating countries a circular asking their opinion as to the desirability of, that the Plankton Department should undertake the examination of plankton samples collected by the different countries, acting as a kind of centre for the identification of plankton organisms.

This circular was answered from most of the participating countries, but on the whole not in favour of the proposal. Yet it was the intention to take the matter up to discussion on the next Council meeting, but owing to the war this question has been abandoned.

2. The Plankton Department has not much information, if the plankton investigations proposed for the spring 1914 according to the resolution No. 15 of the meeting of the Council in September 1913 have been carried out. No reports of these investigations have been received.

With regard to the second point it was now reported that Norway had made collections at two coast stations, England had made 3 cruises and Denmark one.

In addition to this statement Professor Gran reported on his experimental work on the metabolism of the sea (cultures of phytoplankton) and Dr. Allen referred to the contents of his last paper (Journ. Marine Biological Association, Vol. XII, No. 1, 1919).

A general discussion followed of the desirability of investigating the oxygen content of sea water and determining the hydrogen ion concentration. It was agreed to recommend the carrying out of such investigations.

Professor Stanley Gardiner then laid before the meeting a typewritten memorandum (given p. 71) dealing generally with "The Physicochemical conditions underlying Life in the Sea."

This matter was discussed and the proposals given therein were recommended for adoption, especially with regard to the study of the organic matter dissolved in the water.

Some further general discussion then followed.

(Signed) C. H. Ostenfeld.

Second Sitting: Thursday 4th March. 10.30 a. m. to 11 a. m.
Professor GRAN in the Chair.
Present: Messrs. ALLEN, BUCHANAN WOLLASTON, FARRAN, STANLEY GARDINER, OSTENFELD.

The section discussed and agreed upon different recommendations to be laid before the Council. See the resolutions No. 16—19, p. 32—35.

Third Sitting: Friday 5th March. 12 noon — 1 p. m.
Professor GRAN in the Chair.
Present: Messrs. ALLEN, FARRAN, STANLEY GARDINER, OSTENFELD.

Professor OSTENFELD gave a lecture on the seasonal variation of some Plankton Copepods.

As regards the investigation to be carried out in the S.W. Area during the months of June, July and August, 1920, the Plankton Committee made the following suggestions: —

(1) At least 6 Stations on the Irish line and 7 on the French line.
(2) Collections to be made once each month.
(3) Nets (a) for microplankton; Nansen net 25 cm diameter of the opening, silk No. 25.
(b) for macroplankton: Nansen net, 50 cm diameter, coarse silk (No. 3).

(Signed) C. H. OSTENFELD.

IV. Joint meeting of the Fisheries and Statistical Section.

Sitting on Wednesday the 3rd March 1920.
Professor D'ARCY THOMPSON in the Chair.
Present: Members of the Council, and Experts.

A joint meeting was held and the following Committees were formed:

Plaice Committee,
Herring Committee,
Salmon Committee,
Southwestern Fishery Committee,
Limnological Committee,
Statistical Committee.

As for the Eel question see Appendix VII pag. 81.

V. Meeting of the Plaice Commitee.

Chairman: Dr. Redeke.
Present: Messrs. Borley, Russell, Fulton, Hamman, Johansen, Holt, Joubin.

The subsection for the plaice question considered the results of investigations carried out before and after the outbreak of war, and agreed upon various recommendations to be laid before the Council for adoption.

See the resolutions 30—32 pag. 36—41.

The following I "Schedule of Researches" and II (Appendix IV) "Outline of the United Kingdom" were laid before the Committee.

I. Schedule of Researches upon the Plaice Question undertaken by the Countries Specified.

Belgium.	Market statistics.
	Measurements of unselected catches on steam trawlers.
	Observations and putting out of drift bottles from Lightships.
Denmark.	Statistics of plaice and other fish indicating area of capture, the areas to be used being subdivisions of the depth areas.
	Measurements and weighing of plaice.
	Investigation of small plaice near the Danish coast.
	Age determination of plaice.
	Marking of plaice.
	If possible, putting out of drift bottles from Light Vessel.
England.	As in programmes circulated to the Fisheries Section (see p. 73).
Holland.	Market statistics.
	If possible statistics indicating area of capture for the catch of steam trawlers.
	If possible measurements of unselected catches of steam trawlers.
	Age determinations and general biological observations on plaice of the Texel grounds.
	If possible putting out of drift bottles from Noord Hinder and Terschelling Lightships.
Ireland.	As in programmes circulated to the Fisheries Section (see p. 73).
Scotland.	As in programmes circulated to the Fisheries Section (see p. 73).
Sweden.	Observations on plaice in the Skagerak and Kattegat.

VI. Meeting of the Herring Committee.

Sitting — March 5th, 1920.

Chairman: Dr. Hjort.

Present: Mssrs. Fulton, Jones, Lea, Sund, Russell, Johnstone, Wollaston, Hefford, Järvi, Redeke, Andersson, Johansen.

Dr. Hjort referred to the last meeting of the Herring Committee, which took place in May 1914. At this meeting a definite programme of work was drawn up, to be carried out by all countries concerned. The prosecution of this work was to a great extent prevented by the War, but Norway had continued researches on seine and drift caught herrings during the war. Dr. Hjort referred to his visit to Canada in 1914, to examine the conditions of age and growth of the herrings in Canadian waters. The data dealing with these points had been worked up by Mr. Einar Lea, and the published report was laid before the meeting. One of the most interesting results of the work was the discovery that in Canadian, as in European waters, herrings from different localities showed marked differences in their rate of growth, and in the predominance of certain year classes, which persisted from year to year. Thus, the Canadian herrings could be divided into so many "kinds" or races, according to these characters. Dr. Hjort in expressing his regret at having to sever his connection with the herring work, proposed that the Norwegian Government should be asked to undertake the expenses and responsibility of administration of the herring researches. He then requested Mr. Einar Lea to give an account of the researches carried out on seine-caught herrings in Norway during the war.

Mr. Einar Lea read a paper on the above question, which had been prepared for public information in Norway. He referred to diagrams which were laid before the meeting. The samples of herring examined were very strongly marked by the predominance of certain year groups. In the beginning of 1915 herrings of the year group 1904 formed by far the largest part of the catch, though, later in the season, a new and rich year group, namely that of 1910, began to make its appearance. Between the year groups 1904 and 1910 lies a series of poorly represented year groups.

In 1915, year group 1904 is still predominant at the beginning of the season; the year groups 1910, 1911 and 1912 later make their appearance and form a large percentage of the catch.

In 1916 similar conditions prevail. In 1917 a very rich new year group, that of 1913, preponderates in the latter part of the season, the larger herrings being mainly of the group 1904, as in former years. In 1918 and 1919 the year-groups 1913 and 1904 still form over 50 % of the total catch, though the herrings of the latter group are now 15 years old.

The "Large" drift-caught herrings proved to be of the same age composition as the seine-caught "spring herrings".

A short discussion followed.

Mr. Wollaston made a statement as to the position of the herring race researches in England.

Mr. Borley remarked that a report by Mr. Savage on the Structure of Herring scales had been published, that a report by Mr. Paget on Morphology and Development of Scales, and a general report on the Economic Aspects of Herring Trawling by Mr. Russell and himself were in process of publication. The latter utilized the results of scale readings and maturity observations though not specially devoted to these subjects.

Dr. Andersson gave a short resumé of the Swedish herring investigations. In the Swedish waters the same year groups were predominant as in Norway.

Dr. Hjort laid before the meeting the programme of investigations which the Norwegian Government intend to carry out in 1920. (see Appendix V).

Dr. Andersson read a memorandum urging the necessity of collecting statistics of the herring-fisheries in past times, with a view to the study of the fluctuations of the fisheries and their causes.

Dr. Johansen suggested that the members of the herring committee should be responsible for the collection of such statistics in their respective countries, and should supply Dr. Andersson with the data obtained.

Dr. Hjort asked the committee to adopt a resolution in support of this proposal (See Appendix VI).

Dr. Hjort proposed the election of members of the herring committee for the present year.

The Meeting proceeded to carry out the election of members (See below).

Dr. Hjort thanked the Committee for their services during the time in which he had been associated with them.

The Proceedings then terminated.

(Signed) H. J. Buchanan-Wollaston.

The following were elected as members of the Committee for 1920:

Dr. Andersson.	Mr. Borley.
Dr. Johansen.	Dr. Wemyss Fulton.
Dr. Redeke.	Dr. C. Green.
Dr. Järvi.	Mr. Einar Lea.

As for the resolutions see pag. 34.

VII. Meeting of the Salmon Committee.

Sitting: Friday, 5th March, 1920.

Dr. K. A. Andersson (chairman).

Present: Dr. A. C. Johansen, Dr. N. Rosén, Dr. T. H. Järvi, Mr. G. P. Farran, Mr. R. Southern, Professor J. Stanley Gardiner (during part of the session).

Mr. A. E. Hefford acted as Secretary.

Expositions of investigations carried out in Denmark and in Sweden were given by Dr. Johansen and by Dr. Rosén respectively.

The Danish researches, which were mainly conducted in the River Gudenaa in Jutland, dealt principally with the following points: —

1) The size and age of the young salmon and sea trout when leaving the river.
2) Their growth in the sea and the duration of their sojourn there.
3) The migrations of salmon and sea trout with special reference to the question as to whether they return to their native river.
4) The question of the effect of the output of artificially hatched fry on the subsequent stock of the species.

The Swedish investigations also had a bearing upon questions of direct economic importance.

The points dealt with by Dr. Rosén with reference to the salmon of Norrbotten and Vesterbotten and the sea trout in Upper Norrland were principally as follows: —

1) Age determinations by scale examination.
2) The duration of the period of life in the river and in the sea.
3) The growth in fresh and sea water.
4) Migrations and distribution.

Dr. Rosén also discussed results of similar work in South Sweden and referred to the investigations of Dr. Alm and himself on the factors concerned in the growth of the young (fauna and physical conditions of streams and rivers): on the effects of industrial usage of rivers and how far hatchery operations may be utilised to obviate these effects: age groups of running salmon from a certain stock of liberated fry: relation between good spawning years and subsequent catches of running fish: and the relation between growth in the river and in the sea.

After a general discussion in which reference was made to the salmon questions of Finland, Ireland and England, the Meeting agreed upon various recommendations which should be laid before the Council for adoption.

See the Resolutions pag. 40—43.

VIII. Meeting of the Southwestern Fishery Committee.

Rapport.

Le Sous-Comité pour l'étude de l'entrée de la Manche et du Golfe de Gascogne, institué à la Séance du 3 Mars 1920 par la Réunion du Conseil International de l'exploration de la mer, après deux séances tenues le 3 Mars et le 4 Mars, soumet au Bureau du Conseil International les propositions suivantes: —

Le Sous-Comité comprenant des délégués de la France, de l'Angleterre et de l'Irlande, considère que des recherches systematiques sur la pêche doivent être entreprises aussitôt que possible pour assurer la protection des poissons comestibles à l'entrée de la Manche, dans le Golfe de Gascogne et plus généralement sur le versant ouest du plateau continental européen. Cette région est un secteur de recherches indiqué par suite de la continuité des formations rocheuses à la fois sur les côtes qui la bordent et dans les profondeurs; de plus elle reçoit une branche unique du Gulf-Stream qui se divise en face d'Ouessant en plusieurs rameaux se répartissant entre la Manche, le Golfe de Gascogne et la mer d'Irlande. Il faut ajouter qu'au point de vue biologique ce secteur répond à une réalité naturelle par suite de la présence de poissons spéciaux tels que le merlu, le thon, la sardine.

Le Sous-Comité reconnait que la région de l'entrée de la Manche en ce qui concerne les poissons qui y vivent est de peu d'intérêt pour de nombreux pays appartenant au Conseil International. Toutefois les recherches qui portent sur les rapports entre les poissons et les organismes vivants qui constituent sa nourriture, sur les variations physiochimiques, sont de nature par leur progrès à intéresser toutes les nations en tant que problème général de la science océanographique.

Le Sous-Comité considère que les recherches faites sur l'Hydrographie et le plankton dans cette région sont de nature à aider à résoudre la question de la circulation de l'eau atlantique qui intéresse tous les pays faisant partie du Conseil International.

Il considère en outre que les recherches faites sur le plankton pourrait être complétés dans les mêmes moments par des observations sur les œufs flottants dans ces parages, ces dernières observations étant de nature à fournir de précieux renseignements notamment sur les bancs de merlus pouvant exister dans la région considérée. (Voir le rapport de la Commission A, vol. X des Rapports et Procès-Verbaux.)

En conséquence, le Sous-Comité a fait quelques propositions au Bureau du Conseil International, adoptées par le Conseil comme résolutions No. 20—23 pag. 34—35.

IX. Meeting of the Limnological Committee on Friday March 5.

Dr. Redeke in the chair.

Present: Messrs. Stanley Gardiner, Holt, Farran, Hefford, Ostenfeld, Johansen, Järvi, Rosén.

The Committee considered various problems connected with the fresh water fisheries and agreed upon some recommendations to be laid before the Council for adoption.

See the resolutions pag. 42—43.

X. Meeting of the Statistical Committee, held on Wednesday, 3rd March, 1920 at noon.

Professor d'Arcy W. Thompson, C. B., F. R. S., in the Chair.

Present: Dr. Andersson, Mr. J. M. Bottemanne, Mr. Hutchinson, Dr. Järvi, Mr. David, T. Jones, C. B. E., Fishery Inspector Rosén, Dr. Russell, Mr. Oscar Sund.

After some discussion various resolutions were agreed to for submission to the Council for approval: —

See the resolutions pag. 34—37.

(Signed) d'Arcy W. Thompson.

G.

APPENDICES.

Appendix I to Report of joint Meeting.

Proposals for Discussion at the Hydrographical Section of the International Council, 1920.

Plaice Programme.

1. Hydrographical contributions to the British Plaice Programme of 1920—21. The programme includes surface and subsurface observations of temperature and salinity and possibly the determination of Hydrogen Ion Concentration: the most important contribution is the proposal to liberate upwards of 20,000 drift bottles, both surface and bottom. The details of these proposals will be submitted for discussion. It is desirable to make this investigation on as broad an International basis as possible, commensurate with the complete fulfilment of the Resolutions.

Surface Observations.

2. The elaboration of an intensive surface salinity and temperature programme to extend over the whole area of the North Atlantic Ocean and its tributary waters.

Instruments.

3. Further elaboration of instruments of precision is desirable e. g., Hydrometers, Current Meters, Tidal Gauges. It is suggested that special Investigations be shared by individual countries and be reported on at the next Council Meeting.

Sub-Surface Observations.

4. Apart from investigations in connection with the Plaice programme, Great Britain will not be in a position to undertake subsurface observations during the year 1920—21, at any rate in the North Sea.

It is desirable however to discuss the two following propositions for future investigation: —

(a) To allocate the whole time services of one vessel for one complete year to the study of the hydrography and plankton of a chosen section or area to measure the fluctuations of the inflow of Atlantic water into the Northern North Sea.

(b) To allocate the whole time services of one vessel for one complete year to the study of the hydrography and plankton of the area off the mouth of the English Channel to include the Hake Grounds and the Areas of the pelagic fisheries. The scheme proposed will be shown on a Chart.

Both these schemes are to be regarded as preliminary to the possible laying down of a comprehensive programme for a period of years.

It is considered desirable to invite France to join with Ireland and England in a joint programme for the investigation of the S.W. Area so that a preliminary survey may be made of the area concerned at an early date.

Current Measurements.

5. A discussion will be invited as to the value of the methods so far used and the results of the current measurements hitherto obtained by the International Council. If agreed, a resolution can be framed that the Bureau should undertake a critical examination of existing material as a guide to further co-operation.

The following proposal is submitted for discussion: —

> "It is desirable that intensive current measurements lasting at least a full year be carried out with the object of tracing the monthly fluctuations of the Resultant current of the Channel Stream into the Flemish Bight, and that the Bureau be asked to report upon these observations."

A memorandum dealing with some preliminary results will be circulated for the consideration of the Section.

The Hydrographical Bulletin.

6. It is suggested that considerable cost of printing would be saved by adopting the principle of printing in detail only those surface observations of salinity and temperature which form part of a vertical series of sub-surface observations.

It is recommended that all surface routes to be sampled by each country be specified in the Hydrographical Resolutions, that the countries concerned should send duplicate copies of all observations to the Bureau for permanent record, that the Bureau should publish in the Hydrographical Bulletin a precis of the number of samples received for each route, and that the Bureau should be recommended to prepare for each International Meeting a summary showing the extent to which each resolution has been carried out by each participating country.

It is submitted that the presentation of the surface data in the form of monthly charts in the Hydrographical Bulletin is a matter for discussion.

(Signed) E. C. JEE.

Appendix II.

Hydrographical Memorandum for consideration at Hydrographical Section, International Council, 1920.

Current Measurements.

In considering the results of Mr. EDSER's Statistical examination of certain current measurements appended hereto the following factors must be reviewed: —

The instruments used and their probable errors of measurement; the nature of the observers; the conditions under which the instruments were employed; the nature of the sea area in which the observations were made.

The instruments employed on the English line were Ekman Meters; on Lightships the Jacobsen Meter was used. Both meters are fair weather instruments and cannot be employed in rough weather. It would be quite impossible to ensure hourly observations except in fair weather and probably few observations could be taken just when they would be most valuable i. e., in the winter months.

All Ekman Meter observations were taken by skilled observers. The smoothing necessary to get tidal ellipses must therefore be attributed to unperiodic swirls of water influenced by meter experimental errors and the motion of the vessel. The Jacobsen meter observations on the other hand have all been undertaken by Lightship crews and although every precaution has been taken to inform the observers fully of the method to be employed by demonstration on board ship and by supervision of the installation of the meter, errors have undoubtedly crept in which has necessitated extensive smoothing of the observations. It is impossible to gauge the influence of this smoothing on the magnitude of the resultant current.

According to the salinity observations in the English Channel the Atlantic water normally makes its influence most felt in November or December. It is therefore at this period that current measurements are most needed to measure the influx into the Southern North Sea of high salinity water. With Ekman or Jacobsen Meters it would be impossible to undertake the collection of the necessary data.

The existing records, at any rate those of the Varne L. V., may be substantially influenced by the presence of sand banks the extent of which influence it is impossible to estimate. If at any future date intensive current measurements be undertaken to form an estimate of the flooding of the Flemish Bight with high salinity water, the following conditions must be satisfied: —

(1) A position other than the Varne L. V. must be chosen as remote as possible from sandbanks.

(2) The meter must be self-recording and capable of sustained measurements for at least 2 months. It should give current velocity and direction at intervals not greater than half hourly.

(3) The point of support of the meter must be well submerged and the meter itself should be suspended to give as little "cant" as possible.

(4) Provision should be made for the simultaneous measurement of vertical water movements.

(5) Observations should be continued over at least one year.

Hydrographically speaking the waters of the English Channel and the Flemish Bight are in the "Doldrums" during the summer season at which period the Atlantic current is at minimal strength or ceases to flow. The fact that measurable results of resultant currents have been obtained under summer conditions is evidence of the possibility of securing satisfactory measurements to interpret the way in which the highly salt water is projected through the Straits of Dover into the Southern North Sea.

It is possible that an experiment extending over one year will indicate that it is only for a brief period during the waxing of the Atlantic Current that current measurements have adequate value to warrant repetition year by year as part of a general Hydrographical programme.

(Signed) E. C. Jee.
25.2.20.

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a. Resultant currents.

For details and diagrams see [Fishery Investigations, Series III, Vol. IV, Part I, 1920].

A preliminary examination of the current meter data for August 1914 shows that they consist mainly of observations worked up into vectors, spread more or less irregularly over about 13 hours on consecutive days at stations along the English line. The problem is to obtain resultant currents, i. e. drifts for each position.

At E 56, 33 readings were made at depths 10 and 65 metres and the cumulative vectors based upon all the observations worked out at: —

10 M — S. 87 E, 2.1. cm/sec; at 65 M — N 33 W, 3.2 cm/sec.

In order to compare with these results and also to bring the time factor more definitely into regularity, similar resultants were prepared taking account only of observations at hourly intervals. They gave —

At 10 M — N 30 E, 1.6 cm/sec; at 65 M — N 18 W, 5.2 cm/sec.

These variations are material, and in order to get a continuous series of observations at smaller intervals than 1 hour, it was necessary to devise means to interpolate vectors at times when no observation was taken. This was effected by plotting separately on a time basis the abscissae and ordinates of all the actual observation vectors, fitting curves to the two sets of points and reading off from the curves the components of the new vectors. These are marked A in the diagrams attached. By means of these curves, vectors at any given moment could be obtained, and resultants were worked out from the vectors at $^1/_4$ and $^1/_2$ hourly intervals over periods of $12^1/_2$ and 13 hours as far as the material allowed. They were: —

At 10 metres.	Starting at	5.45	6	6.15	6.30	6.45	7
$^1/_2$ hr. intervals covering	$12^1/_2$ hrs.	N42E	N33E	N45E	N35E	N50E	N40E
		1.8	2.1	1.6	2.0	1.5	1.7
$^1/_4$ - — —	—	N37E	N39E	N40E	N42E	N45E	
		1.9	1.9	1.8	1.7	1.6	
$^1/_2$ - — —	13 hrs.	N73E	N54E	N66E	N45E		
		1.7	1.8	1.5	1.8		
$^1/_4$ - — —	—	N64E	N59E	N55E			
		1.7	1.7	1.6			

At 65 metres	Starting at	6	6.15	6.30	6.45
$^1/_2$ hrs. intervals covering	$12^1/_2$ hrs.	N47W 5.1	N46W 4.5	N45W 4.6	N45W 4.2
$^1/_4$ - — —	—	N46W 4.9	N46W 4.6	N45W 4.4	
$^1/_2$ - — —	13 hrs.	N40W 4.4	N39W 4.2	N37W 4.3	
$^1/_4$ - — —	—	N39W 4.3	N38W 4.3		

These results differ materially from those previously found, and they show considerable variations according to whether $12^1/_2$ or 13 hours observations are compounded. In addition when the duration of the period is uniform, but the starting point is shifted, fairly material differences apparently in a definite direction are noticeable. This might have been due to faulty fitting of the curves at the ends of the series, and in order to test this point, a series covering 24 hours, taken at station H 2 off the Dutch coast, was chosen and resultant vectors were prepared so that each was compounded for a period commencing $^1/_2$ hour later than the previous one. The results so found varied as follows: —

For 12 hr. periods $^1/_2$ hr. observations — Range of directions over 46°; speed from $7^1/_2$ to 15 cm/sec.

For $12^1/_2$ hr. periods $^1/_2$ hr. observations — Range of directions over 59°; speed from $6^1/_2$ to 14 cm/sec.

For 13 hr. periods $^1/_2$ hr. observations — Range of directions over 70°; speed from $4^3/_4$ to 14 cm/sec.

The terminal points have been plotted and are marked B on attached diagrams.

A series covering from the evening of 1st August to the afternoon of the 4th August 1913, taken hourly, at the Varne lightship was next taken and resultant vectors were prepared for series of 12, $12^1/_2$, 13, 25, and $37^1/_2$ hours at $^1/_2$ hourly intervals.

These gave the following variations: —

For 12 hr. periods. Range of direction 137°. Speed range 12.5 cm/sec. from 3.1 to 15.6

For $12^1/_2$ hr. periods. Range of direction 111°. Speed range 12.6 cm/sec. from 2.6 to 15.2

For 13 hr. periods. Range of direction 106°. Speed range 14.5 cm/sec. from 1.9 to 16.4

For 25 hr. periods. Range of direction 37°. Speed range 5.9 cm/sec. from 3.7 to 9.6

For $37^1/_2$ hr. periods. Range of direction 34°. Speed range 2.3 cm/sec. from 5.5 to 7.8.

It is interesting to note that for the full 2 weeks observations of which these are a portion the resultant is given as about N 60 E, 4 cm/sec. whereas over the 3 tides taken it would appear to be between E and S 60 E and from $5^1/_2$ to $7^3/_4$ cm/sec. This rather points to some influence which was dominant at some considerable portion of the remainder of the 2 weeks period.

Turning now to the diagrams marked B for positions H 2 and Varne it will be seen that there is a tendency for the consecutive resultants to swing more or less in a spiral, but I am unable to account for this. It seems obvious that in working up resultants, just a full tide period should be taken, but as this period is variable, dependent upon moon, sun and wind, the latter cause makes it impossible to determine accurately the variability. Three periods, 12, $12^1/_2$ and 13 hours, were chosen and of the patterns made the $12^1/_2$ is perhaps the most regular, but the progressive spiral movement is distinctly traceable in all of them and even in the 25 and $37^1/_2$ hour periods. It seems probable, however, that after eliminating the swing of the tide the resultant tide is still in the nature of a spiral and if that is so it follows that any series of observations which does not allow for the waxing and waning of the spiral would be subject to very large probable errors. In order to determine the dimensions of the spiral it would be necessary to have continuous observations at a fixed spot for much longer periods.

To sum up, the resultant tides based upon a single day's observations are

quite valueless as they are subject to very great probable errors owing to the fact that the resultant tide is not a steady drift in a definite direction, but is subject to great alterations both in direction and also in speed, even after the elliptical movement of the daily tide has been eliminated. It is possible that if a fortnight's observations were worked up in a similar manner, the law governing this variation of the resultant tides might be apparent, but I am inclined to the belief that before we shall be able to do anything towards discovering the law a continuous series of observations taken on the same spot throughout the year is essential.

(Signed) T. Edser. 26.11.1919.

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b. Resultant currents.

Details and diagrams to be published in a forthcoming volume of [Fishery investigations, Series III, Vol. II, Part. II, 1920].

From work already done it has been established that as a result of working up resultant currents or drifts by a process of smoothing the curves of the N/S and E/W components of actual observations separately, and reading off from the smoothed curves the components at $^1/_2$ hourly intervals, and compounding them for periods of 12, $12^1/_2$ and 13 hours, the resultant currents of each period show very material differences, and apparently irregular variations occur according to the time of commencement of the period. Even such a short difference as half an hour shows frequently a considerable alteration in the resultant.

In order to throw further light upon this subject, a set of observations covering 14 days taken at the Varne lightship in August 1913 was examined, and for the tide at 10 m depth resultants covering various periods were compounded. The dots on the attached diagrams, which are all prepared on the same scale, show the ends of the vectors corresponding to these resultants. Each series was prepared by commencing at 12 midday on 31st July and compounding half hourly vectors to the end of the period for the first resultant. The next would commence at 12.30 p. m. on 31st July and extend $^1/_2$ hour later than the end of the previous period and so on.

Figure 1 shows the field covered by the 673 resultants of $12^1/_2$ hour periods and from it it will be seen that the variation possible during the fortnight was from practically nil to 25 cm/sec for speed and over the whole 360° for direction.

Figure 2 gives similar information for 623 periods of 25 hours, the range being from nil to 17 cm/sec and 360°.

Figure 3 shows 550 periods of 74 hours each the range being from nil to $12^1/_2$ cm/sec and practically 180°.

Figure 4 shows 549 periods of $74^1/_2$ hours the range being from nil to 12 cm/sec and 180°.

Figure 5 shows 548 periods of 95 hours the range being from nil to 12 cm/sec and 150°.

Figure 6 shows 48 periods of 325 hours the range being from 2.9 to 3.7 cm/sec and 17° in direction.

A consideration of Figure 1 shows that any resultant based upon observations over $12^1/_2$ hours i. e. 1 tide period will be liable to such large errors that it must be valueless; in fact the drift so determined may bear no relation whatever to the general drift.

In Figure 2 where 25 hours' observations are shown i. e. 2 tidal periods the pattern is tending towards a strip whose long axis is somewhat to the E. of the N/S line but here again any single resultant is subject to such large errors as to be valueless.

In Figures 3—5 the periods combined for the resultants are 74, $74^1/_2$ and 75 hours respectively, approximately around 6 tidal periods, but from the similarity of the patterns produced it would seem that such slight variations on the time period do not materially affect the resultants. In these 3 figures there is a distinct tendency for the pattern to take the form of a line inclined towards the N.W. From this it would be inferred that the drift at the Varne was generally easterly with very considerable N. and S. deflections. Any single resultant based upon these periods is not trustworthy.

In each of these figures well over 500 reusltants with $^1/_2$ hour intervals between their commending points have been calculated, but in Figure 6 the period taken was 325 hours, approximately equal to 26 tidal periods, and consequently the number of resultants is reduced to 48. The pattern now is distinctly easterly, but there are not sufficient points to determine what form it is tending towards. A single resultant based on this period would seem to be of general value.

It must however be remembered that in increasing the period dealt with, the effect is to smooth out the shorter pulsations of the drift, and it is possible that if the original duration of the experiment had been lengthened, the pattern produced by a larger number of resultants, than are here shown might have had a greater surface. This however is dependent upon possible fluctuations of longer cycle than can be detected in 2 week's observations.

(Signed) T. Edser. 24.2.20.

Appendix III to Plankton Section.

"The Physico-Chemical Conditions underlying Life in the Sea."

By Professor Stanley Gardiner.

The ultimate object of the research is to obtain a knowledge of the optimum conditions of growth, reproduction and distribution of the various economic species of marine animals.

The economic species is the final link in a chain of metabolism from the ultimate foodstuffs and energy of sunlight and each link has to be considered under two heads: —

1) the relation of the organism to sea-water, and

2) the relation of the organism to other organisms.

1) The sea-water contains the ultimate foodstuffs (ammonia, nitrate, carbon dioxide, oxygen, phosphates, inorganic ions such as Na', R', Ca'', Mg'', Cl', S04'' etc.), in respect to which we require to know how they are taken up under optimum conditions. The problem, however, is not limited to this, for inorganic ions play an essential role in vital processes apart from their necessity in the chemical composition of tissues. Indeed it would appear that many organisms can only maintain their normal conditions when the balance between the various ions lies between narrow limits. The growth of such organisms depends on a factor which has seemingly nothing whatever to do with the internal metabolism of the "cells."

The main problem hence divides further into,

A) the relation of plant life to the ultimate food stuffs,

B) the relation of every link in the chain to the ions of sea-water.

Under the latter head falls the consideration of the optimum conditions for fertilisation, growth and distribution.

The consideration of the ultimate food stuffs is important. Are they taken up by plants alone? The role of bacteria will require careful consideration. The possibilities suggested by the work of Putter and others as to sea-water containing soluble food substances (animo-acids, etc.) demands the most careful investigation.

2) Every organism is a link on some chain leading to economic species. Fishery naturalists are now studying the main organisms, their metabolism, growth, reproduction and distribution.

The following heads may be suggested in the research: —

(I) Pure Physical chemistry of sea-water.

How do such conditions as temperature, depth, nature of the bottom, currents, lack or abundance of plant or animal life etc. change the constituents of sea-water? Why and how do they act? A study of the various factors, the adjustment of which produced the physico-chemical equilibrium in the sea, is wanted in the hope of getting an adequate picture of this equilibrium.

(II) Applied physical chemistry of sea-water.

Much research requires the use of sea-water containing other chemicals and it is necessary to know exactly how these solutions differ from sea-water if the conclusions from this research are to be of value.

(III) Biochemistry.

A special point, besides the constitution of tissues, is the estimation of organic matter in solution.

(IV) Experimental Biology, based on the foregoing. The investigation of as many functions as possible in respect to their optimum conditions — from egg to sexual adult. Special problems would be as follows:

Fertilisation — conditions (Oxygen, OH) necessary for maturation, activity of sperm, entrance spermatozoa, etc.

Development — conditions (OH, etc.) necessary for segmentation.

Growth — foodstuffs, metabolism, vitamines, etc.

Distribution, General Vitality, etc. (Much information would in many problems be required from hydrography, statistics, etc.).

Appendix IV to the Plaice Committee.

II. Outline of the Investigations bearing on the Plaice Fisheries which the Three Fishery Departments of the United Kingdom undertake to carry out in the 12 months commencing April 1st, 1920.

(I). Work undertaken by the Ministry of Agriculture and Fisheries.

(1) Skeleton Programme of Sea Work for Research Vessel. April 1920—March 1921.

April.	Trawling (probable remainder also of trawling at fixed Stations in March).
May.	Otolith lines from Leman to Haaks; Transplantation from Dutch coast to S. W. Patch.
June.	Marking at Haaks. Trawling at fixed stations, Haaks, Leman, Flamboro' off Sandettie). Invertebrate gear tested etc., on Leman ground.
July.	Trawling.
August.	Marking on Leman Ground.
September.	Otolith lines as May. Fixed trawling stations.
October.	(Remainder of trawling at fixed stations). Trawling probably.
November.	Trawling.
December.	Trawling at fixed stations. Egg cruise in S. Bight.
January.	Egg cruises in S. Bight. Marking at Sandettie. Current work on spawning ground.

February. Egg cruise in S. Bight.
Egg cruise marking on Flamboro' off.
Current work on spawning ground.
March. Egg cruises on Flamboro'. off.
Trawling at fixed stations.

(Signed) J. O. Borley.

(2) Fuller Particulars as to statistics.

The English statistics of demersal fish from the North Sea will be tabulated in squares measuring 1° of longitude by $^1/_2$° latitude.

It is important that a Naturalist should study month by month the landings of plaice from all the fishing grounds, paying particular attention to the landings from the proposed closed areas on the Danish and Dutch coasts, vith a view to estimating what loss of catch, not only of plaice, but of other fish, would ensue to English fishing vessels if these areas were closed.

(Signed) E. S. Russell.

(3) Fuller particulars as to ichthyometrics.

(A) It will be necessary to obtain an accurate record of the size of the plaice caught on the principal fishing grounds in the North Sea in order that the effect of any proposed size limit may be estimated. A staff of ten measurers is at present engaged in ichthyometric work on plaice, haddock, and cod. It is proposed to retain this number during next financial year. The staff will be concentrated further south than in 1919, in order to give special attention to the plaice.

(B) As little or no information exists as to the size of the plaice landed at the smaller "inshore" ports, particularly on the South and West Coasts, and as these ports might be very seriously affected by the imposition of say a 25 cm limit, it is proposed to employ additional measurers to measure the fish at selected inshore ports.

(Signed) E. S. Russell.

(4) Fuller particulars as to plaice marking and transplantation.

On each of the occasions indicated in the skeleton programme it is intended to mark 1,000 plaice. Should Holland be in a position to undertake the Haaks experiment it is desirable that she should do so.

The marking is desired chiefly for a direct estimate of the intensity of fishing, but usual information as to growth rate and migration would be obtained from the records. The transplantation experiment is intended to determine whether the alteration in the fish population during the last 5 years has affected the peculiar acceleration of growth before the war effected by transplantation to the Dogger Bank.

(Signed) J. O. Borley.

(5) Fuller particulars of work on plaice eggs.

Southern Bight. 40 stations between Swarte Bank and Dover, all but 3 Haaks or southward. Chart will be produced.

Flamborough Off. 33 stations between Shields and Swarte Bank, English Coast and Dogger. Chart will be produced.

Estimating half hour per station and 8 knots, each cruise is allowed 5 days.

Southern Bight. 5 days between December 15th and 31st.
5 — — January 1st and 15th.
5 — — — 15th and 31st.
5 — — February 1st and 15th.

Flamborough Off. 5 days between February 1st and 15th.
5 — — — 15th and 29th.
5 — — March 1st and 15th.

At each station, 2 hauls with egg-net, also surface temperature and sample.

(Signed) H. J. Buchanan Wollaston.

Mr. Wollaston agreed that certain stations out of those chosen should have precedence in any case of difficulty in completing the work.

(6) Fuller particulars of hydrographic work in connection with plaice.

(A). Drift Bottle Operations.

(a) During spawning season from mid-December to end-April = 140 days, from selected Lightships: 4200 surface and 4200 bottom drifters.

(b) Throughout the year from Lightships at key positions. 4775 bottom drifters and 9550 surface drifters = 14325 drifters.

(c) Flamborough — Off Grounds.

1,000 drifters, surface and bottom in equal numbers, during the spawning season.

(B) Surface salinity and temperature.

The Research Ship to take surface temperatures and water samples at hourly intervals when at sea.

Lines of surface samples across the North Sea will also be arranged on commercial vessels as supplementary to the above. A number of Lightships will also be engaged in surface sampling on both sides of the North Sea.

(C) Sub-surface salinity and temperature.

The Research Ship will examine the vertical distribution of salinity and temperature: —

(a) at all Hensen net Stations.

(b) at all Trawling Stations.

(Signed) E. C. Jee.

(II). Programme of researches on the plaice, proposed to be undertaken by the Fishery Board for Scotland, as arranged at the departmental meetings in London, February 1920.

(1) Statistics.

(a) The Statistics of the Fish landed by Trawlers. Monthly and annual tables and charts to be prepared, with the usual particulars, showing the catch (and the average per 100 hours' fishing) of the various market classes, the precise place of capture to be marked on the charts.

(b) The statistics for all marketable fishes, as well as plaice, relating to the North Sea, to be tabulated in quarter squares, after the new English system, i. e., bounded by 1° of Long., and $^1/_2$° of Lat.

(2) Ichthyometry.

(a) Plaice, from the North Sea grounds in particular, to be measured in as large numbers as possible (the usual particulars of place of capture, etc., being procured) at Aberdeen, and if possible at Granton; the average weights to be ascertained and the condition as to spawning, of males and females, recorded. Similar information to be obtained at some ports in the Moray Firth and the Firth of Clyde, to be selected later.

(b) The measurements by Fish Measurers to be continued on board trawlers, with records as to the spawning males and females.

(3) Work of Research Vessels.

In addition to the trawling observations at the usual stations (including those in the Firth of Clyde), comprising the measurement of all the plaice caught, with records of the sex and sexual condition, it is proposed that the following work should be done: —

(a) Age determination by the otolith method, on a certain proportion of the plaice caught.

(b) Marking Experiments, to an extent, and that such places and times, as may be arranged with the English Department.

(c) Drift-bottles experiments, surface and bottom, especially on spawning areas, also to be arranged later in detail.

(d) The collection of the pelagic eggs in certain areas, as the Moray Firth, the East Coast and the Firth of Forth.

All the above to be done according to uniform methods and similar apparatus — tow-nets, drift-bottles, and fish-marks.

(Signed) T. Wemys Fulton.

Aberdeen, 25th February 1920.

(III). S.S. Helga Programme of scientific work to be done by the Irish Department (subject to modification if opportunities for co-operation with other countries should arise).

March 18—30.	Trawling in S. W. Bays. (if gear is ready.)
April 12—17.	Danish Seine Investigation, Dundrum Bay.
May 3—22.	Danish Seine, E. coast.
	Physical Observations, E. & S. W. coast.
	Trawling S. coast & S. W. Bays.
	Plankton Investigation on Mackerel grounds.
	Midwater trawling with Otter Trawl.
June	Trawling on numbered sections, Dublin and Skerries Bays.
	Danish Seine, E. coast.
July	Trawling, Donegal Bay.
August	Physical Observations on inshore stations E. & S. W. coast.
	Trawling on S. coast and in Clew Bay, Cleggan and Blacksod.
	Danish Seine, E. coast.
September	Trawling, Galway Bay.
October.	E. coast Trawling and Danish Seine fishing.
November.	Physical Observations on inshore stations. E. & S. W. coast.

Dates to be fixed in connection with Helga's Patrol duties.

Appendix V to the Herring Committee.

Investigations in the Norwegian Coastal Waters.

The plans for the State investigation in the Norwegian coastal waters in 1920 include the following items:

A. Biological statistics regarding the Cod and Herring fisheries.

These researches embrace especially investigations by means of samples from the fishermens catches of cod, saithe and haddock, and of large herrings and spring herrings. The work will have the character of a larger scale continuation of work done before and during the war.

The investigations regarding the Cod Fisheries have included observations on: the composition in point of size, age and growth of the spawning cod and the Finmark spring (young) cod, its weight and "qualities" (amount of liver, weight etc.), and similarly for saithe and haddock as far as conditions have permitted. A certain amount of data concerning morphological characters have also been procured.

In the case of the Herring investigations have, apart from observations as to length, weight, sex, maturity, age and growth, also in some cases included observations on number of vertebrae and similar morphological characters.

B. Special Investigations concerning Herring fry, small Herrings and fat Herrings.

This work was planned in order to procure a closer knowledge than is at present at hand concerning the natural history of the Norwegian herring as far as the younger stages are concerned. The investigations will partly consist in an analysis of the fishermen's catches (Biological Statistics) partly in investigations at sea by means of the new vessel which is going to be built for the marine investigations of the State. The work at sea will, to a large part, consist in a periodically reiterated exploration of a limited set of fjords in Northern Norway, especially regarding the occurrence of herring and their food and the physical conditions of the waters. The intention is to get observations which may serve to elucidate how a fjord gets its population of young herrings renewed — i. e. if a yearly recruiting is brought about by an influx from outside of all the age groups in question (1—5 years old fish) or whether it is effected by influx of very young herrings only. It is hoped that the solution of this question may be approached by a comparative analysis of samples, partly from the fishermen's catches, partly by catches made by the research vessel within and outside the fjords. Investigations as to plankton and hydrography will be executed in connection with the work referred to.

C. Investigations on the Biology of the Sprat.

"De Norske Hermetikfabrikanters Landsforening" (Norwegian Canners National Association) has expressed its willingness to place at the disposal of the Government a suitable vessel and accommodation for a laboratory in Stavanger for investigations on the Biology of the sprat, to be carried out by the Norwegian Government.

Preliminary investigations will be initiated in 1920, mainly in the Ryfylke fjords, and will be carried on as a continuation of the work done during the years

1908—10 about which a report has been prepared by Oscar Sund in 1910*). Observations as to age, size, and sexual development will be gathered, relating to the commercial catches, and fishery experiments with different sorts of gear will be carried out with the object of creating a technique suitable for obtaining samples for scientific examination.

It is presumed that investigations on the sprat will be continued from year to year.

D. Investigations in connection with the work at Floedeviken sea fish hatchery.

At the Floedeviken Hatchery, belonging now to the Norwegian Government, the following work will be done apart from hatching of cod eggs (according to the budget proposed by the director, Mr. Dannevig, for the financial term July 1920 to June 1921.

1. Lobster culture experiments and investigations.
2. Young fish investigations at the south coast of Norway (presumably in connection with the liberation of artificially hatched cod eggs.)
3. Researches as to age of fish at the south coast of Norway.

E. Work relating to the methods.

Special researches will be carried out in order to develop further the technique of age estimates and growth measurements.

Owing to certain pecularities in the age distribution of the stock of grown herring belonging to the Norwegian tribe, the samples of herring scales collected during a series of years are especially suited for the elucidation of certain details in regard to the errors involved in the age estimates and growth calculations.

During the coming year these questions will be subjected to a closer analysis, and at the same time attempts will be made to obtain a better sampling of the observations, based upon the experiences made during the last seasons with respect to the stability of the age distribution of the different samples.

Appendix VI to the Protocol of the Herring Committee.

To the Delegates of the international Council for the Exploration of the Sea.

(By Dr. Andersson, Stockholm).

The investigations carried out in recent years with respect to the herring have yielded results that at all events give some indication of the direction in which

*) Undersøgelser over Brislingen i Norske Farvande. Aarsberetning vedk. Norges Fiskerier for 1910.

we ought to look to discover the cause of the great variations occurring from time to time in the harvest of the herring fishery pursued by the inhabitants of various countries, it being apparently probable that they are connected with the great variations in the numerical strength of the year classes of herring.

The idea that formerly prevailed, however, was that the variations in the catches of herrings from time to time were due to the migrations of the fish. It was maintained that, when the supply of fish off one particular line of coast was exhausted, the explanation was that the herrings had migrated from that neighbourhood to another and that the yield of fish in the latter locality was thereby proportionately increased. In that way periods of plentiful yield of fish were supposed to have occurred alternately off various coasts, for instance the West Coasts of Norway and Sweden.

It would seem to be a matter of great interest to endeavour to ascertain for certain periods what actual variations have occurred in past times with regard to the yield of herrings secured by the fishermen of those various countries bordering on the North Sea and adjacent waters that carry on a herring fishery on at any rate large scale. It is evident that light upon that point would furnish valuable material for solving the problem of the causes of the variations in the harvests yielded by the herring fishery.

Now as this question of the herring fishery and its variations may be looked upon as one of the principal subjects of inquiry for those engaged in the International Fishery Investigations, it is earnestly to be wished that the International Council for the exploration of the sea should decide upon preparing a Statistical Abstract of the Herring Fishery as pursued in times past by the inhabitants of those countries bordering on the North Sea and adjacent waters that have undertaken to participate in the international fishery investigations. In certain of those countries a satisfactory series of statistics in all probability already exists, while in others it will doubtless be a matter of difficulty to procure any very complete or reliable figures, at any rate for any length of time back. Even in those cases, however, it will probably be possible to ascertain the periods during which herring fishing was carried on, even if statements as to the volume of the annual catches are not available.

The statements actually existing in the publications of the various countries are, it may be feared, somewhat inaccessible, and hence for that reason alone, there would seem to be good cause for collecting the figures relating to the question in a publication.

As regards the length of time that the statistics given in a publication of the kind indicated should embrace, that would probably have to depend on the ease or otherwise with which moderately reliable data were obtainable respecting the herring fishery in former days. Doubtless experience in that respect would

differ in different countries. A decision on the point would have to be arrived at by the Council.

Thus we take the liberty of suggesting that the Council should take up this question for consideration.

(Signed) K. A. Andersson.

Appendix VII.

Report on the Eel Investigations.

(By the Danish Commission).

Since the last Report on Eel Investigations (Second Report on Eel Investigations, Vol. XXIII Rapp. et Procès-Verbaux, December 1915), a large amount of material has been collected in order to elucidate the age and growth of the fresh water eel (Anguilla vulgaris). This material is till now only partly examined.

Moreover, investigations of the occurrence of the eel larvae in the Atlantic have been continued from various Danish vessels of the Royal Navy as well as of the commercial fleet. A report (Stations in the Atlantic 1911—1915), with a map, gives the situation of the stations. Dr. Schmidt's publication ("On the early larval stages of the Fresh-water Eels (Anguilla vulgaris)") has been based on these observations. It gives the series of development of the larvae of the European and American Eel. From this and the accompanying plates it will be seen that we have succeeded in tracing the development of these two species so far back as to be able now to place before you a complete series of the development of the eel from the size of 8—9 m/m to the full grown larvae of 75 m/m and their metamorphosis stages to elvers.

Of this new material, collected from Merchant ships, however, till now only the description of the developmental history and the aspect of the larvae has been published. A more detailed report regarding the appearance of the larvae in the Atlantic and conclusions as to the destination of the breeding places of the eel has been deferred till the results of a new Atlantic expedition are to hand.

The object of this expedition is to carry out a systematic oceanographical research of the North Atlantic, with special regard to hydrographical as well as biological research of the various water layers from the surface to the bottom. The research of the bottom fauna will only be held in second rank.

Originally our idea was to carry out the expedition as a continual cruise of one year's duration. Various circumstances, however, have entailed the desira-

bility of doing it in two cruises, the first one to be started in this spring from Gibraltar as a transatlantic cruise of three months' duration, and mainly of preparatory and reconnoitring nature. Various biological problems will be dealt with, and care will be taken to find out the most adequate form and size of the implements to be used on the main cruise.

Based on the results of the first minor cruise, the routes of the main cruise will be finally laid. This cruise is expected to be started in 1921. The lines to be explored are thought to be laid with the object of having the scheme carried out in several sections of the large anticyclonic current of the North Atlantic, the sections radiating from a centre situated in about the middle of the Sargasso Sea. Our object will then be to procure a complete figure, physico-chemical as well as biological investigations being made in close connection with the hydrographical. A staff of older and younger scientists and experts are prepared to take part in the expedition, which will be given a character as versatile as possible. The scientists will try to examine the material on board, and will not be restricted to collect material, as on several previous expeditions. The expedition is expected to be carried through in one year.

After this Report had been given Mr. MAURICE proposed that Resolution 10 of the Procès-Verbaux of 1912, Volume 15, page 62, be confirmed in respect of the present year, and that the programme be carried out in the countries concerned as far as present circumstances permit.

This was agreed to.

See the resolution pag. 40—41.

Appendix VIII.

Regarding an International Size-limit etc. for the Plaice in the North Sea, the Skagerak, and the Kattegat.

By C. F. DRECHSEL and A. C. JOHANSEN.

At the meeting of neutral delegates of the International Council, in Copenhagen, in May 1918, the General Secretary placed before the delegates a letter in which it was stated that, before the present war, the scientific fishery experts of the countries participating in the international investigation had come to the result that the intense fishery in the North Sea had rather seriously affected the stock of several species of food fishes in the North Sea and adjacent waters. Indications of so-called overfishing had occurred, as, for instance, evidences of an increased preponderance of young and small fishes over the older and larger ones and the absolute scarcity of large and old individuals.

In view thereof it was urged that, immediately after the war, it would be necessary to resume international scientific investigations in the North Sea and adjacent waters. A proposition to this effect was unanimously adopted by the meeting, and it was resolved to send copies of this proposition to all Delegates of the Council, requesting a reply after consultation with their respective Governments.

From Holland and Denmark replies have been received to the effect that these countries are prepared to continue the said investigations during and after the war.

The aforesaid view as to the reduction of the stock of fish in the North Sea was based upon elaborate investigations carried on during several years by the participating countries, and in particular by those bordering on the North Sea.

The results were laid down in reports from the various countries interested in the Plaice fishery in the North Sea, and were assembled in a "General Report" by Professor Heincke, of which, until now, a "preliminary brief summary" and the "first part" of the main report have appeared (in Vol. XVI. and Vol. XVII. A, respectively, of Rapports et Procès-Verbaux. Cons. perm. internat. pour l'exploration de la mer).

HEINCKE sums up the main results of the plaice investigations in the following way: (Rapports et Procès-Verb. Vol. XVI., 1913, p. 56).

"1. It is very probable that the density of the plaice shoals of the North Sea has, with the introduction of intensive trawl fishing, remarkably decreased, the absolute size of the plaice stock being also thereby reduced.

"2. The reduction in the stock of plaice has not affected all size-classes in equal degree, but chiefly the larger and older plaice. This is shown in the catches and landings by a relative decrease in weight and number of the large plaice and increase of the small, as well as in the reduced average size of the plaice. The larger and older males especially have decreased greatly in numbers, and the point of intersection of the curves of frequency of the sexes has fallen to a lower length."

Regarding the question of international protective measures, Prof. HEINCKE arrives at the following conclusion (Rapports et Procès-Verb. Vol. XVI. p. 67):

"These results of our investigations seem to indicate that a really effective protection against the enormous, and for the most part useless destruction of the young of the plaice by the large steam and sailing trawlers can only be attained by means of an international size-limit of 25 to 26 cm. Such size-limit is therefore extremely desirable, and an endeavour must in any case be made to introduce same. On the other hand, it is impossible to overlook the fact that the introduction of so high a size-limit to be enforced in all the North Sea countries, would in the first instance be productive of so heavy a loss to the plaice fishery of certain countries, e. g., Germany and Holland, that these fisheries would be dangerously injured, and their very existence, upon present lines, seriously threatened. In the interest of these fisheries it would be desirable, in the general opinion, to fix for them at first — during a certain period of transition — a lower size-limit. As the

fisheries with which we are here concerned bring a great part of their plaice to market alive, and in order to avoid, as far as possible, the difficulties which must arise, with locally varying size-limits, in connection with the enforcement of same, and the really effective protection of the young plaice, it would be advisable to allow such lower size-limit only for such plaice as are brought to market alive. Such a size-limit for live plaice would perhaps be sufficiently high when fixed at 22 or 23 cm."

Since the forthcoming of the above cited parts of the "General Report" of Professor HEINCKE, in 1913, a series of publications dealing with the Plaice and Plaice-fisheries in the North Sea has appeared. Three of these papers will be briefly mentioned here, as they concern the aforesaid main results of Professor HEINCKE. These papers are the following:

1. D'ARCY WENTWORTH THOMPSON: "Observations on the Plaice from the "Goldseeker" Experiments, and from the Statistics of the Aberdeen Market". Fishery Board for Scotland. Fifth Report (Northern Area) on Fishery and Hydrographical Investigations in the North Sea and adjacent Waters. 1908—1911. 1913.
2. T. WEMYSS FULTON: "On the distribution and seasonal abundance of Flatfishes (Pleuronectidæ) in the North Sea and the fluctuations in their abundance during the years 1901—1910". — ibid.
3. A. T. MASTERMAN: "Report on the Plaice Fisheries of the North Sea" (Parts I. and II.). Board of Agriculture and Fisheries. Fishery Investigations. Series II. Sea Fisheries. Vol. II. No. 1. 1915.

The results arrived at by Professor D'ARCY THOMPSON confirm the aforesaid results of Professor HEINCKE. D'ARCY THOMPSON sums up some of these conclusions in the following way (l. c. p. 66, Point 19 and 20).

"The Aberdeen Statistics show, since 1903, with a few unimportant exceptions, a great and steady decrease from year to year in the catch of Large and Medium Plaice on all the principal fishing grounds. On the other hand, the landings of Small and Extra Small Plaice have increased greatly. The total catch of Plaice has greatly diminished".

"In spite of the general expansion of the trawling fishery the total landings of Plaice at Aberdeen were less than two thirds as large in 1911 as in 1905. The catch of Large Plaice had fallen to nearly a fifth of its amount in 1905, that of Medium Plaice to two-thirds, while the landings of Small (including Extra Small) Plaice had trebled in amount".

Also the results arrived at by Dr. FULTON agree with the above cited main conclusions of Prof. HEINCKE. Fulton writes as follows (l. c. p. 93): . . . "while the large plaice and the medium plaice in almost all the squares referred to[1]) have decreased

[1]) The squares are situated in the northern part of the North Sea.

in relation to the other class in the second period [1906—1910] compared with the first [1901—1905] the small plaice have increased in proportion in each of them, that which has taken place in square XXIII., off the coast of Aberdeenshire being especially noteworthy.

The statistics above discussed show that the plaice as a species has diminished in abundance, or at all events in weight landed per unit of fishing, during the ten years over which the statistics extend [1901—1910], and this conclusion is in agreement with the opinions so often and strongly expressed by the practical men".

Dr. MASTERMAN, in his aforesaid paper, deals especially with English Plaice-Statistics for the years 1906—1912. He arrives here at the following results (l. c. p. 114):

"In the whole catch for the North Sea there is a reduction of the proportion of large plaice from 36.0 per cent. to 19.0 per cent., an increase of medium plaice from 25.0 per cent. to 32.6 per cent., and an increase in relative proportion of small plaice from 31.5 per cent. to 41.5 per cent. These summary figures are of limited application, and an analysis into areas and methods of capture has shown that the increase in small plaice on the grounds, both relative and absolute, is much greater than this, as the figures are affected by an abandonment of fishing in recent years in the chief nursery areas. In any case, it is evident that there has been since 1906 a large increase, both relatively to total catch of plaice and absolutely, in the catch of small plaice in the North Sea, and a large decrease in that of large plaice.

As to the causes of this phenomenon, there can be little doubt that the latter is due to excessive fishing by man. In other words, the destruction by man is of sufficient intensity to reduce materially the probability of life of the plaice in the North Sea; this is shown in the greatest degree on the southern grounds where the intensity of fishing is greatest. Whether it can be regarded as in any degree a misfortune or as endangering the future supply of plaice is a question that need not be discussed here".

It will be seen that Dr. MASTERMAN's results confirm the results of Prof. HEINCKE, as far as the large plaice are concerned. The increase in relative proportion of medium plaice, which MASTERMAN has noticed in the period 1906—1912, is a very noteworthy phenomenon, but it must be remembered, firstly, that an evidence of this kind among a great series of observations from various countries stands very isolated, secondly — (what MASTERMAN himself regards as a possibility) — that "the increase in small and medium plaice may be a natural phenomenon of the same nature as the yearly fluctuations which it has been suggested are due to variations in the abundance of each year-brood. Certain very favourable physical conditions may conduce to the production of a large brood of fish in any one year, and behind the fluctuations in these conditions there may be some general cyclic change in physical conditions which may have an amplitude of several years. The period of

1906—1912 would, according to this suggestion, be contained within the upward phase favourable to plaice propagation, and the gradual increase of young plaice may owe its origin to some such phenomenon". (MASTERMAN l. c. p. 114—115).

It should be mentioned that the Plaice-Committee at the meeting in London, in June 1913, unanimously recommended a size-limit for the plaice in the North Sea, of 20 cm for the period October 1 to March 31 and of 22 cm from April 1 to September 30, and that the Council at a meeting in Copenhagen, in September 1913, unanimously accepted the proposal of such a size-limit.

The strong and continued restriction of the North Sea fishery caused by the war has, in all probability, affected the stock of plaice in the North Sea considerably. The evidence from the various countries which have dealt with measurements and weighings of plaice during the war seems to show that the relative proportion of large plaice has again increased considerably. The plaice and other important flat fishes, as well as the haddock, seem to be very abundant and of considerable sizes in the North Sea. Even from distant fishing grounds, such as Iceland and the Faroes, the abundance of fish is reported to be very large now.

Very likely, the plaice fishery in the North Sea will before long be carried on very intensively and probably more intensively than before the war.

Now if it is true that the stock of fish has increased and improved during the five years of the war, it may also be expected that very soon, and most likely before investigations can be made to any great extent, and laws made, the stock of fish will again become seriously reduced by intense fishing. The Council will then have to face the same difficulties as before the war in carrying through effective restrictions of the fisheries.

It therefore seems to be advisable not to wait for further results of investigations and not to adhere to the low size-limit of the plaice accepted by the Council in 1913, but to try, as soon as possible, to carry through, by intermediation of the Council, a size-limit for plaice high enough to give an effective protection against the destruction of young, undersized plaice on those grounds of the North Saa, the Skagerak, and the Kattegat where plaice are most abundant. According to the investigations at hand from the specialists in the various countries, such a protection could be obtained by an international size-limit of 25—26 cm. total length.

Against the introduction of such a size-limit for plaice it might be urged that we do not need any size-limit for the present, since plaice is very abundant just now. This is assuredly right. The stock of plaice is undoubtedly so large that it is not necessary to protect it for the present. The size-limit should, however, be introduced as a provision for the future, and it seems possible to introduce it now with considerably less harm to fishing in shallow waters than formerly, when the stock of plaice was probably much smaller.

An introduction of a size-limit in such large waters as the North Sea and ad-

jacent waters will, to some degree, have the character of an experiment. The effects of the measure introduced cannot fully be foreseen or realized. It is therefore of great importance to continue the study of the stock of plaice in the waters here dealt with and to report on the results as to the effect of the size-limit. Carefully collected statistics on the yield of plaice fishing in future, with information as to the size of the plaice landed, will probably enable us to see whether the size-limit introduced has had a favourable effect or not, and whether it should be raised or lowered.

It should be added that even a size-limit, as here proposed, would not protect the stock of young plaice on the nursery grounds in a fully satisfactory manner. In our opinion, a quite satisfactory protection will not be attained, unless the chief nursery grounds are closed to steam trawlers, and a size-limit is imposed on all sorts of fishing vessels.

In our opinion it would be worth while now to discuss the question whether it is not now the right time for experiments with closed areas, in connection with a size-limit.

We think that the aforesaid measures would not only be in the immediate interest of the fisheries, but even for the very important question of a general understanding of the influence of fishing on the stock of fish. It has now, for many years, been the object of the Council to solve these questions, but it has not been possible to arrive at absolute and definite results without varying the conditions under which fishing has taken place. We fear that, if the present situation should not be utilized, great difficulties may arise in future for an introduction of closed areas and an effective international size-limit.

We therefore propose the said regulations to be adopted by the Council, and suggest that an energetic and systematic investigation as to their effect on the stock of fish should be carried out. This will undoubtedly be the best way for the realization of the Council's great object: to give the fisheries a firm basis for future regulations. It follows from this that it should be the Council's duty from time to time to report to the Governments concerned on the results obtained and the conclusions as to the maintenance or the modifications of the measures which future experience might involve.

Appendix IX.

Brief summary regarding the Plaice question.

(By J. M. Bottemanne).

A report on the plaice, which report was prepared just before outbreak of the war, in July 1914, on behalf of the proposals of the Plaice Commission, was submitted to the Council by Mr. J. M. Bottemanne, Chief Inspector of Fisheries in the Netherlands, and delegated by the Dutch government to the meeting. In this report it was extensively pointed out that by fixing a size limit for plaice as proposed by the Plaice Commission the object in view would not be attained, but that the closing of certain areas of the North Sea would not be attained, but that the closing of certain areas of the North Sea would be necessary for it. The following is a brief summary of the results arrived at in the report.

I. In the first chapter the conclusions of the Plaice Commission regarding protection of plaice in the North Sea and the Skagerrak are mentioned, and statistical tables are given of landings of plaice in the various North Sea countries from 1907 to 1912; they show that since the publication of Dr. Heincke's well known report on the plaice question (which report covers the period up to 1908), the catch, though as a whole not really decreasing, continues to exhibit signs of a gradual impoverishment of the fishing-grounds by the increase of the smallest kinds of plaice landed in Holland and England and by a decline in the total weight of plaice per day's absence. These tables induce the author to become fully convinced of the urgent character of protective measures.

II. In the second chapter the proposals of the Plaice Commission are discussed. It is shown that the proposed uniform size limits of 20—22 cm are really useless, that the minute loss for steam-trawlers (1,2 % of the total return with a size limit of 22 cm) will not prevent them from visiting the young plaice grounds, so that they will continue fishing on these very grounds and simply will throw overboard the undersized plaice, which practically will altogether die. The case is different for sailing craft, but such vessels being mostly confined to the vicinity of the shore, it is evident that they will scarcely have any profit of the proposed size limit, as the larger plaice, by moving into deeper and farther off waters, will gradually get out of their reach. So sailing vessels will not only be deprived of an eventual profit of the proposed size limit, but will also endure a not inconsiderable loss (about 5 % of their return) quite from the beginning of the experiment.

III. The third chapter is devoted to the discussion of other measures as are proposed by the Plaice Commission. Much stress is laid upon the question of closed grounds where trawling should be altogether prohibited. The author remarks that Heincke himself, at several times, considers a reasonable size limit

only effective if trawlers are induced by this limit to keep aloft from certain young plaice grounds, as fishing there would no longer be profitable to them. Heincke, however, though trying to arrive at an indirect closing of certain grounds by a size limit, seems not disposed to take the next step and to recommend the direct closing of these grounds, chiefly on behalf of the difficulties entailed by maintaining such a measure. But why, asks the present author, not take to the most effective and definite closing of certain areas? The difficulties will presumably not be so numerous and insurmountable as is feared. Why will the various North Sea countries not be willing to place the needed craft like torpedoboats at disposal to carry out the guarding of any closed area, if they are convinced of the necessity to take such measure. Grounds which first of all would need to be closed for steam trawlers are the areas A_2, A_3 and A_4, where young plaice abound.

Practical considerations, however, prevent the applying of the measure with regard to sailing craft which are bound to coast waters, so that in this case a size limit is the only practicable measure. Moreover these vessels do not do so much harm to the young plaice stock as they keep their catch as much as possible alive by means of a well, and so are able to return the undersized plaice in good condition to the sea.

Only if no general agreement about the direct closing of certain areas would be arrived at, the author is willing to comply with a size limit which, however, should be instituted at 26 cm for steam-trawlers and all other craft with mechanical power whilst for sailing craft only the proposals of the Plaice Commission (20 cm from October to March, 22 cm for the other months) can be agreed upon. Even if the direct closing of areas would be rejected the author proposes the closing of Dutch territorial waters to all trawlfishing except to those sailing crafts which are provided with a well.

Appendix X.

Report of the Editorial Committee regarding the Publications issued and cost of same during the 5 financial years from 1914—1919.

(See last Report in Rapp. & Proc. Verb. XXI, page 52.)

1914—1915.

			Estimate	Expenses
VIII. 25—31. Printing.				
25. Reports and Proceedings of Meetings, Vol. XXI for 1913—14	Kr.		1600.00	1012.60
26. Hydrographical Bulletin for 1913—14 (besides this amount was in last year already paid 2000 Kr. on this Bulletin)	-		4000.00	3667.75
27. Statistical Bulletin	-		2000.00	0.00
28. Occasional papers, Publ. de Circonstance Nr. 67, by Prof. Nansen	-		2500.00	75.00
29. Miscellaneous (circulars, programmes, etc.)	-		300.00	7.35
30. Reports of Reporters:				
1. H. C. Redeke: Ueber den gegenwaertigen Stand unserer Kenntnis von den Rassen der wichtigsten Nutzfische. 34 pp. & II tables. (Rapp. Vol. XXII)	Kr.	283.00		
2. A. C. Johansen: Fünfter Bericht über die Pleuronectiden in der Ostsee. 104 pp, 1 plate & 20 fig. (Vol. XXII)	-	1654.89		
3. Johs. Schmidt: Second Report on eel investigations 1915. 26 pp, 7 tables & 4 fig. (Vol. XXIII)	-	261.96		
4. H. Henking: Berichterstatter der Lachskommission für die Ostsee: Die Lachsfrage im Ostseegebiet. II. Tätigkeitsbericht, Teil 1. 116 pp. with tables, figures, and VII plates (Vol. XXIII)	-	1722.20		
Remaining book-binding of Prof. Ehrenbaum's last Report	-	65.75	5000.00	3987.80
31 Distribution of Publications			2000.00	1580.15
	Kr.		17400.00	10330.65
Balance				7069.35
	Kr.		17400.00	17400.00
VII. 22. Plankton (Publications).				
Plankton Bulletin for 1912, Kr. 3442.32 ÷ paid $^{17}/_{7}$ 1914 Kr. 3000.00 ÷ $^{5}/_{9}$ 1914 Kr. 374.00 = Kr. 68.32, and further Kr. 193,13	Kr.		7000.00	261.45

1915—1916.

VII. **18—24. Expenses in accordance with special Resolutions of the Council** (see letter of $^{26}/_{4}$ 1916 from the General Secretary to the Delegates).

(25). Printing.	Estimate	Expenses
Reports of Reporters, Rapports Vol. XXII, title-page and book-binding etc.		137.00
Rapports Vol. XXIII, book-binding etc.		105.60
Rapports Vol. XXIII, extra copies, plates etc. (Salmon Report)		269.00
Distribution of Publications		432.47
		944.07
Balance		55.93
	Kr. 1000.00	1000.00

For Plankton Publications no payment during this year.

1916—1917.

VII. **20—24. Printing.**		Estimate	Expenses
20. Annual Report, Rapports et Procès-Verbaux XXIV	Kr.	1000.00	215.50
21. Hydrographical Bulletin, for 1914—15	-	2500.00	1396.34
22. Statistical Bulletin, Vol. VIII for 1911—12	-	3400.00	3244.00
23. Occasional Papers, Publ. de Circ. Nr. 70, edited by Dr. Ostenfeld, and published by the Bureau	Kr. 600.00		
Miscellaneous	- 82.75	2400.00	682.75
24. Distribution of Publications		1200.00	353.09
	Kr.	10500.00	5891.68
Balance	-		4608.32
	Kr.	10500.00	10500.00

For Plankton Publications no payment during this year.

1917—1918.

VII. 20—25. Printing.		Estimate	Expenses
20. Annual Report	Kr.	0.00	0.00
21. Hydrographical Bulletin	-	2500.00	0.00
22. Statistical Bulletin	-	2500.00	0.00
23. Plankton Bulletin	-	1500.00	0.00
24. Occasional Papers, Miscellaneous	-	2000.00	11.25
25. Distribution of Publications	-	1200.00	15.40
	Kr.	9700.00	26.65
Balance	-		9673.35
	Kr.	9700.00	9700.00

1918—1919.

VII. 20—25. Printing.		Estimate	Expenses
20. Annual Report, Rapports et Procès-Verbaux XXV	Kr.	0.00	979.75
21. Hydrographical Bulletin, Bulletin Atlantique (Charts 1699.00 + Printing 2098.20)	-	3300.00	3797.20
22. Statistical Bulletin, Vol. IX for 1913, revision of material and manuscript	-	2500.00	400.00
23. Plankton Bulletin	-	1500.00	0.00
24. Occasional Papers, Publ. de Circ. Nr. 71, by H. H. GRAN and TORBJØRN GAARDER	-	2000.00	638.00
25. Distribution of Publications	-	1200.00	319.69
	Kr.	10500.00	6134.64
Balance	-		4365.36
	Kr.	10500.00	10500.00

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