FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

INDO-PACIFIC FISHERIES COUNCIL

PROCEEDINGS

4TH MEETING

QUEZON CITY
REPUBLIC OF THE PHILIPPINES

23rd October—7th November, 1952

SECTION I

QUEZON CITY
NOVEMBER, 1952

OFFICE-BEARERS

of the

INDO-PACIFIC FISHERIES COUNCIL, 1952/53

Chairman . . . . . RAOUL SERENE

Vice-Chairman . . . . . NAI BOON INDRAMBARYA

Retiring Chairman . . . DEOGRACIAS V. VILLADOLID

Secretary * . . . . . CECIL MILES

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Australia	Mr. D. J. Rochford (Chairman)	Mr. H. W. Bullock
Burma	Mr. U Ba Kyaw	Mr. U Ba Kyaw
Cambodia	M. Dom-Saveun	M. Dom-Saveun
France	Mons. R. Serene	Mons. R. Serene
India	Dr. N. K. Panikkar	Dr. D. R. Bhatia
Indonesia	Dr. J. D. F. Hardenberg (Rapporteur)	Mr. G. M. Charidjie Kasuma
Japan	Mr. M. Fujinaga	Mr. K. Kuronuma
Korea	Mr. Chee Choul Keun	Mr. Nam Sang Kyu
Netherlands	Mr. D. C. Zwollo	Dr. C. J. Bottemanne
Pakistan	Mr. Nazir Ahmad	Dr. M. R. Qureshi (Chairman)
Philippines	Mr. H. R. Montalban	Mr. C. Martin
Thailand	Mr. Boon Indrambarya	Mr. Boon Indrambarya
United Kingdom	Mr. M. L. Parry	Mr. T. Gorazdowski
United States of America .	Dr. W. F. Royce	Mr. W. C. Neville
Vietnam	Mons. Le Huu Ky	Mons. Tran Van Tri (Rapporteur)

* The Office of Secretary of the Council is currently discharged by the F.A.O. Regional Fisheries Officer for Asia and the Far East.

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2

WELCOME ADDRESS OF THE HONORABLE, THE SECRETARY OF FOREIGN AFFAIRS, JOAQUIN M. ELIZALDE

Excellencies, Mr. Chairman, Delegates to the Indo-Pacific Fisheries Council, Ladies and Gentlemen:

In the name of the Philippine Government, I extend to all of you a most cordial welcome. The Philippines is indeed fortunate that you have honored her with a visit for the purpose of discussing a subject of vital economic significance to the peoples in this region. We shall all, I am certain, benefit greatly by the knowledge, training and experience that you bring to this meeting.

It is with particular pleasure that I address you on this occasion for I was present, as Chief Delegate of the Philippine Government, when the idea of forming the Indo-Pacific Fisheries Council was first conceived at the Conference of the Food and Agriculture Organization in Baguio in 1948. I am, therefore, most happy to officiate at this meeting of the Council which is the fruition of our earlier efforts.

The establishment of the Indo-Pacific Fisheries Council is a recognition of the need for a concerted and systematic study of the fishery resources in this area with the end in view of increasing the production of fish as a source of badly-needed food for its teeming millions. The Council has a difficult task ahead of it and fully deserves the support and encouragement of every Government concerned.

This Fourth Meeting of the Council is held at a time when the food problem of the populous Indo-Pacific countries is as pressing as ever. Much is to be done yet in the resolution of this important economic question which has engaged the attention of statesmen and economists for a long time. An important phase of this problem is the development and exploitation of the aquatic resources. In most countries of the Indo-Pacific region, fisheries are still in an infant stage. With proper technical and financial assistance, fisheries in the area could attain full development. It is hoped that the Council, in due time, will succeed in bringing about a widespread improvement in fishery technology which will increase the production of fish for the inhabitants in the area.

Many of the countries represented at this meeting have attained their political independence only in recent years. The exercise of sovereignty meant the assumption of responsibility for multifarious problems many of which are the concern of more than one nation. It is heartening to note that these new states are approaching their common problems such as fisheries not only in the light of self-interest but also with due regard to the welfare of the whole Indo-Pacific community.

We should all take pride in the wide representation of the Indo-Pacific countries in this Council which is evidence enough that purely technical considerations entered into its organization and composition. This is a significant fact that augurs well for the future peace and prosperity of this part of the world. Collaboration on a higher plane is often predicated upon cooperation in scientific and economic matters. It is

my firm conviction that frequent meetings like this one help create a friendly atmosphere in which problems of a different nature might be better resolved. A feeling of mutual amity and goodwill, built up over a series of friendly gatherings, is most conducive to the attainment of international understanding.

Aside from the technical objectives which the Council may accomplish at this meeting, I am certain that there will also emerge from it an increased awareness of our problems in common and a stronger feeling of cooperation in their solution. I trust that you will take back to your respective lands and peoples a renewed spirit of friendship and understanding engendered at this meeting.

I wish you success in your deliberations and a pleasant sojourn in the Philippines.

AGENDA

(As approved at Second Session, October 27th, 1952)

A. PROCEDURAL ITEMS:

1. Adoption of the Agenda
2. Report on Credentials
3. Statement of Delegations
4. Election of Chairman and Vice-Chairman
5. Executive Committee Report
6. Secretary's Report on the Financial Affairs of the Council
7. Budget
8. Proposals for Amendments to the Agreement and Rules
   - 8.1. Status of Council's Resolution 51/22.1(1) passed at Third Meeting
   - 8.2. Proposal of Government of Philippines for amendment of Paragraph 2, Article VI of ment
   - 8.3. Executive Committee's proposal for amendment to Section X of Rules of Procedure
9. Membership and Liaison
   - 9.1. Membership
   - 9.2. Liaison
     - 9.21. with F.A.O.
       - a. Interim Committee on Fish Handling and Processing
       - b. Conference and Pre-Conference Meetings
     - 9.22. With UNESCO
     - 9.23. Other
10. Nomination of Technical Committees and Working Groups
11. Council Correspondents
12. Time and Place of next Meeting

B. GENERAL TECHNICAL ITEMS:

13. Reports of Committees
14. Review of Programmes
15. Annual Report to FAO
16. Bibliographic work
17. Publications
    - 17.1. Preparation
    - 17.2. Editorial Work
    - 17.3. Distribution and Exchange
18. Films
19. Expanded Programme of Technical Assistance for Economic Development and Technical Instruction
20. Subject of the Symposium of the 5th Meeting
21. Regionalization
22. Fishing on the High Seas
23. Proposed Indo-Pacific Oceanographic Institute

C. TECHNICAL ITEMS FOR TECHNICAL COMMITTEES:

24. Technical Committee I
    - 24.1. Hydrology
    - 24.2. Planktology
    - 24.3. Biology
25. Technical Committee II
    - 25.1. Gear Technology
    - 25.2. Food Technology
    - 25.3. Socio-Economics
    - 25.4. Statistics
26. Inter-Committee Working Groups

D. MISCELLANEOUS ITEMS:

27. Any other business

PROCEEDINGS

The Meeting was formally opened by the Chairman on Thursday, October 23rd, 1952 at 4 p.m. at the College of Liberal Arts, University of the Philippines, Quezon City. An address of welcome was given by the Hon. Joaquin M. Elizalde, Secretary for Foreign Affairs of the Republic of the Philippines. Subsequent sessions were held in the Social Hall of the same University.

The Meeting was attended by 40 representatives of 15 Member Governments of the Council. Nominations of Observers were received from 4 International Organizations.

The Meeting was serviced by the Secretary and assistant staff from the Bangkok Regional Office, assisted by Dr. G. L. Kesteven and Mr. G. M. Gerhardsen from the Rome Headquarters of the Organization, acting as technical secretaries. The Meeting was also attended by Mr. W. H. Cummings, Regional Representative of the Director General and Dr. D. B. Finn, Director of Fisheries, on behalf of the Food and Agriculture Organization of the United Nations.

The Meeting consisted of 14 full Council Sessions and numerous Committee Sessions. Three evening symposium sessions were held and technical films were projected which had been brought to the Meeting from Bangkok and Rome by the Secretariat, and from India by the Delegate from that country. Films were also available from the United States.

The Delegates attended receptions given by the President of the Philippines, the Mayor of Quezon City, the Secretary for Foreign Affairs, the Acting Secretary of Agriculture and Natural Resources, the President of the University of the Philippines, the Director of Fisheries of the Philippines and several others. Several excursions were organized to points of interest by land and water.

Item 1.—Adoption of Agenda: The Agenda was adopted as presented by the Secretariat.

Item 2.—Credentials: Credentials were received as presented by fifteen delegations of Member Countries, the Delegate for Burma having arrived in time for the Seventh Session. It was reported to the Council by a special Committee that in most cases the intent of the credentials was clear and acceptable to the Council although it was noted that in two cases an alternate had not been named. Nominations for Chairman and Vice-Chairman can only fall on Delegates or Alternates. The Council accepted that in the case of the U. K. and the U. S. the Chief Delegate should be invited to nominate his Alternate. At the same time, the Council recommends to Member Governments that when a delegation attending a Council Meeting consists of more than one representative, an Alternate be specified. Many credentials were only presented to the Secretariat after the commencement of the Meeting and it was resolved that at future Meetings the presentation of credentials should be a pre-requisite to registration of the delegations. Credentials were also received from Observers on behalf of the United Nations, UNESCO, the Pacific Science Association and the South Pacific Commission.

Item 3.—Statements by Delegations: Delegations, at the invitation of the Chair, made short statements on behalf of their Governments.

Item 4.—Election of Chairman and Vice-Chairman: Mons. R. Serene (France) was elected Chairman, and Mr. Boon Indrambarya (Thailand) was elected Vice-Chairman, for 1952-53.

Item 5.—Executive Committee Reports: The report of the Executive Committee for 1951-52, (Appendix I) was adopted. The submissions of the Committee regarding the Council's responsibilities and their discharge were considered at great length and the Council's study of this problem is presented as Appendix 2. In adopting this, the Council RESOLVED:

That the Secretariat be directed to consider the implications of the proposals made by the Council in connection with the conduct of Council work and make its recommendations to the Council's Fifth Meeting.

Item 6.—Secretary's Report on Financial Affairs: The Secretary's Report on the Financial Affairs of the Council, attached to the Executive Committee's Report, was adopted.

Item 7.—Budget: The Secretary's Report on the Budget was considered and approved as appended to the Executive Committee's report. It was considered that, there being no Council Meeting scheduled for the calendar year 1953, the Executive Committee might seek authority from

the Organization to transfer the sum of $750 corresponding to the item "Meetings" to the item "Travel", which would permit the holding of two full Executive Committee meetings in case the expenses of the immediately retired Chairman were to be covered by this budget item. The Council gave attention to the increasing amount of work required of the Secretariat and felt that means might be sought of reducing the heavy burden placed on the permanent staff, with a corresponding reduction in expenditure on supplies, stationery, temporary services, etc. It was also suggested that it might be found possible to effect a considerable saving along these lines if Parts II and III of the Proceedings could be printed in time for distribution at the Council's Meetings, and that the system of Assignment Notes might be in some degree consolidated.

Item 8.—Agreement and Rules

Item 8.1.—Resolution 51/22.1(1): The Council unanimously RESOLVED:

That the statement of the Director General to the effect that the Council is empowered to change the Membership of its Executive Committee without reference to him shall be deemed to be equivalent to such approval by the Director General and that Paragraph 1, Section X of the Rules of Procedure shall read as amended by Resolution No. 22.1(1) of the Third Meeting.

Item 8.2.—Amendment to the Agreement: By the unanimous vote of 14 delegations present at the time, a motion of the Delegate for the Philippines was approved whereby it was RESOLVED:

That Paragraph 2, Article VI of the Council's Agreement be amended as follows:

Replace the word 'and' between the words 'Chairman' and 'Vice-Chairman' by a comma and insert after the word 'Vice-Chairman' the words 'and immediately retired Chairman'.

It was recorded that proposals for the amendment of the Agreement which extend the power of the Council to incur expense to be borne by FAO require, besides a two-thirds majority of all the Members of the Council, the approval of the Director-General and the Secretary was instructed to solicit such approval.

The Delegate for the United Kingdom placed on record that his Government desired an explanation as to the necessity for such a change, which might increase the expenses of the Council, and it was explained that for some time past it had been felt that the inclusion of the immediately retired Chairman in the regular meetings of the Executive Committee was called for in order to achieve continuity of action and so that the Council might benefit from his administrative experience over a period of two or three years. It was further stated that an amendment to the Agreement was necessary in addition to the action taken at the Third Meeting and recorded in Resolution 8.1 of this Meeting, in order that the Director General of the Organization might consider authorizing payment of the expenses of the immediately retired Chairman when performing duties connected with the Council's work during intervals between its Meetings, within the limits of the annual budget prepared and approved in accordance with the current regulations of the Organization.

Item 8.3.—Amendment to Rules: By the unanimous vote of 14 Delegates present at the time, it was agreed that it was desirable that the conduct of such of the Council's administrative and technical affairs as may not fall within the competence of its two Technical Committees should be facilitated and it was RESOLVED:

That the following paragraph be added to Section X of the Council's Rules of Procedure:

3. The Council may establish at a regular meeting such other *ad hoc* Committees and/or Working Groups as may be necessary to consider such matters as may not fall within the terms of reference of its Technical Committees, or which may be common to more than one of them.

(a) The terms of reference of such Committees and Working Groups shall be laid down by the Council at the time of their establishment.

(b) Each Committee or Working Group shall select a Chairman from among its members who shall act as Rapporteur.

(c) The Committees and Working Groups shall report to the Council through the Executive Committee either at the meeting at which they were appointed or

at the next regular meeting, or both, according to their terms of reference and the Council shall then decide whether or not they shall continue to operate during the ensuing period.

(d) The Committees and Working Groups may from time to time set up such Sub-Committees as may be required to comply effectively with their terms of reference as laid down by the Council.

Item 9.—Membership and Liaison:

Item 9.1.—Membership: The withdrawal of the Government of the Republic of China from the Food and Agriculture Organization was recorded, as was the acceptance by the Government of Japan of the Council's Agreement under the terms of Articles VIII and IX thereof .

Item 9.2—Liaison:

(A) *General Fisheries Council for the Mediterranean:* The Council, on being apprised of the formation of this Council, RESOLVED:

(1) Whereas the Representatives of the Member Governments of the Indo-Pacific Fisheries Council are apprised at the Fourth Meeting of the Council at Quezon City, Republic of the Philippines, of the establishment of the General Fisheries Council for the Mediterranean which came into being on the 21st of February, 1952, the Council RESOLVES: That this meeting records with satisfaction the formation of the General Fisheries Council for the Mediterranean and that the Chairman be requested to communicate to the Chairman of the G. F. C. M. the pleasure and good wishes of the Indo-Pacific Fisheries Council on learning of the inception of the General Fisheries Council for the Mediterranean under the aegis of the Food and Agriculture Organization of the United Nations.

Although the Council presumed that continuing liaison between the I.P.F.C. and the General Fisheries Council for the Mediterranean will be effected through F.A.O., the Council, feeling that a more direct liaison would be desirable, requested the Executive Committee to develop direct contact with the Executive Committee of its sister organization and that no opportunity be lost to utilize the presence of members of the two Councils in an area for personal exchange of ideas regarding organization and functioning of the respective Councils.

(B) *UNESCO:* Considering the services which UNESCO might be able to offer the I.P.F.C. on its technical programme, the Council RESOLVED:

(2) That Correspondents to maintain liaison between UNESCO Science Cooperation Offices and the I. P. F. C. be appointed in Delhi, Djakarta and Manila, that these Correspondents should be the members of the Executive Committee if any of them reside in the city in which such offices exist, and that where this is impossible the Executive Committee be authorized to nominate such Correspondents.

It was recommended that these Correspondents give particular attention to the following aspects of UNESCO's activities which could be of immediate interest to I. P. F. C.

(a) The bibliographic documentation work of the UNESCO Science Cooperation Offices. (To avoid possible duplication of effort).

(b) The microfilming and photocopying services of the Science Cooperative Offices.

(c) The arranging of regional symposia on hydrobiology.

(d) The UNESCO education programmes in the region such as might be oriented to I.P.F.C. technical needs.

(C) *Pacific Science Congress:* Considering the importance to the proposed symposium on physical and biological oceanography at the Manila meeting of the P.S.C. it was RESOLVED:

(3) That as soon as the General Assembly of the UNESCO has given approval to a financial contribution for this symposium, the Executive Committee of the I. P. F. C. should contact the P. S. C. Organizing Committee regarding the manner in which I. P. F. C. interests might be given particular attention in its subject matter.

(D) *Food and Agriculture Organization:* The Director, Fisheries Division, FAO, informed the Council of the Organization's wish to avail itself of the expert advice of the Council in its consideration of food and agriculture problems of the region at its Pre-Conference Meetings. He said that the Organization proposed to issue an invi-

tation to the Council to be represented at the Meeting for Asia and the Far East to be convened in 1953. It was therefore RESOLVED:

(4) That the Council authorizes the Executive Committee to represent it at such Pre-Conference or other Meetings as may be convened by the Food and Agriculture Organization and at which the representation of the Council is invited and that such authority shall include the faculty of the Executive Committee to nominate a suitable delegate or delegates to the said Meetings.

(E) *F.A.O. Interim Committee on Fish Handling and Processing:* The Council, having been apprised of the establishment of an Interim Committee on Fish Handling and Processing serviced by the Technology Branch of the Organization's Fisheries Division and the desire of the Interim Committee to establish contact with persons actively engaged in work in its field, and being convinced that such a contact would be mutually beneficial to the Organization and to the Council, RESOLVED:

(5) That the Rapporteur of the Council's Sub-Committee on Food Technology be assigned as the Council's liaison with the FAO Interim Committee on Fish Handling and Processing and that the Secretariat be kept informed as to the progress of such liaison.

Item 10.—Nomination of Technical Committees and Working Groups: Delegates upon being canvassed by the Chairman nominated the persons to serve on the Council's Technical Committees I and II during the coming year. These Committees in turn nominated the members of their respective Sub-Committees. Lists of persons serving on Technical Committees and Sub-Committees are given elsewhere in the Proceedings. Working groups were appointed for the duration of the Meeting to consider several problems.

The Council agreed that the holding of separate sessions at the Meetings of all the numerous Sub-Committees of Technical Committee I tended to hold up the Council's business owing to the fact that some persons served on more than one Sub-Committee. It was therefore RESOLVED:

That for the conduct of the Council's meetings Technical Committee I should split into three panels to consider matters falling into the following groups:

A) Physico-Chemical Aquatic Environment

B) Biotic-Aquatic Environment

C) General Fisheries Biology

It was stressed that this procedure to be adopted at Meetings would not affect the working of the different Sub-Committees between Meetings.

Item 11.—Council Correspondents: The Council assumed, in the absence of directions from Member Governments to the contrary, that the nominations of Administrative and Bibliographic Correspondents were of a permanent nature and did not require ratification from year to year. Member Governments were urged, when present correspondents are transferred or for other reasons are unable to continue to act in this capacity, to name suitable replacements. Changes in nominations of Council Correspondents were communicated by the delegates for Cambodia, Korea and Japan.

Item 12.—Next Council Meeting: Mr. Boon Indrambarya stated that the Government of Thailand would be happy if the Council's Fifth Meeting were held in Bangkok. The Council thereupon RESOLVED:

That the Council's thanks be conveyed to the Government of Thailand for its gracious invitation to hold the Council's Fifth Meeting in Bangkok and that, in accordance with the indications given by the delegate of Thailand, the time of the Fifth Meeting be January, 1954.

Item 13.—Reports of Committees: The reports of Technical Committees I and II were received for the period 1951-52 with a record of thanks to the Committees and Sub-Committees for their work on these reports and were then referred to the new Technical Committees for study. The Technical Committees for 1952-54 used these reports as bases for the preparation of the reports which are referred to under Items 24 and 25.

Item 14.—Review of Programmes: Cognizance was taken of the fact that the preparation of a Register of Institutions, Projects, Vessels and Personnel of the region represented a laborious and time-consuming task for Member Governments of the Council and for the Secretariat. It was further recognized that most Member Gov-

ernments had insufficient personnel to assign to the compilation of information on this topic. It was noted that the usefulness of a Register of each of the four topics namely Institutions, Projects, Vessels and Personnel had been questioned in view of the time and labor consumed. Also there was evidence that Member Governments desired that requests for this type of information should be confined to simplified questionnaires and that Governments would furnish information on only the more important Institutions, Projects, Vessels and Personnel. Such selection of information would, therefore, not comprise a complete coverage of all the units in the four categories, but it was considered that the principal work in fisheries would in any case be conducted or coordinated by the principal units from which information is furnished.

It was noted that the Fisheries Division, FAO, was planning two Registers, one on Institutions and another on Personnel, and that plans were indefinite for Registers on Projects and Vessels. A simplified questionnaire with appropriate, brief but concise explanation had been prepared by the Fisheries Division to obtain information for these Registers (Institutions and Personnel). This questionnaire consisted of eleven (11) items on which a minimum of information is requested. Much of this information was believed to be readily available, not requiring extensive work on the part of the contributor. The Fisheries Division was engaged on a register for Europe, Middle East and Africa. A preliminary institutions register had been issued for the Americas.

The Council therefore RESOLVED:

(i) That a Register of Institutions of the Indo-Pacific region be prepared on the basis of material available in the Secretariat office, Bangkok, supplemented by such additional material which may be deemed necessary, and made available on request of Member Governments concerned;

(ii) That the questionnaire developed by the Fisheries Division, Rome, be used for the above purpose;

(iii) That the Fisheries Division, FAO, be requested to assist in the development, publication and keeping up-to-date of the Register on Institutions for the Indo-Pacific region;

(iv) That a Register of Projects be prepared following the completion of the Register of Institutions by the same arrangements;

(v) That the preparation of a Register of Vessels be held in abeyance until some time when the Council may decide to proceed with or drop plans for this Register. Alternatively, that since the number of research vessels is relatively small, the Council might collaborate with the Fisheries Division in the preparation of a single consolidated World Register to be published in Rome;

(vi) That plans for a Register of Personnel be dropped.

Item 15.—Annual Report to F.A.O.: The Council considered a proposal from the Executive Committee on the content of the Annual Report to the Organization and the method of its presentation. In adopting the Committee's suggestion, the Council

(1) RESOLVED: That the reports to the Organization should be prepared by the Secretariat and forwarded to the Organization after approval by the Executive Committee.

The Council received a working paper describing the status of fishing industries of the region and, whilst recording its wish that in the future such working papers should be circulated by the Executive Committee at least one month before the Council meeting,

(2) RESOLVED: That this report be adopted subject to such minor changes and additions as might be requested by delegations;

(3) And RESOLVED: That the Executive Committee be authorized to expand this report as adopted by the Council, in conformity with any additional information which the Secretariat may receive, and to include this material in the report to the Pre-Conference Meeting as presented to the Organization.

Item 16.—Bibliographic Work: The Council received a report from the Executive Committee on the bibliographic work which had been done.

Item 17.—Publications: The Council received a report from the Executive Committee in regard to the publications work which had been accomplished. The Council directed its attention to the project for the publication of a series of handbooks and recognized the urgent need and potential value thereof in bringing about the standardization of techniques within the area. The principal utility of the handbooks was considered to be for use by fishery inspection officers and junior assistants without university training and *vice versa,* by those with university training but with little field experience. They should also be of great value to administrators in designing fisheries programmes. It seemed unlikely, however, that all these needs could be satisfied with a single volume and if a choice had to be made it was probably better to write the handbooks primarily for use by administrators and junior scientific officers, since assistants and inspection officers might have those small parts applicable to their work extracted for them by their respective administrative superiors.

The Council felt that it was most important that an editor be carefully selected for each handbook before any large scale accumulation of data was attempted and before a complete prospectus was decided upon since the editor should clearly have a considerable voice in the contents of the handbook and the compilation and preparation of the material.

The Council recognized the immediate need, by many workers in the area, for exchange of information on and standardization of field procedures. This might be accomplished by a handbook which would include field survey methods applying to gear classification, food technology, fish culture, fishery statistics and field and laboratory practices applicable to hydrology and fishery biology. The Council, being of the opinion that this task might be undertaken immediately by the Secretariat using as a guide the field manual now in use by the Pacific Ocean Fishery Investigations of the United States of America, therefore

(1) RESOLVED:

(a) That technical editors for the handbooks be found as soon as possible and large scale collection of data and detailed consideration of prospectuses be postponed until such editors are available;

(b) That the Secretariat be requested to proceed with the preparation of a handbook of field procedures which may make available immediately some of the material expected to be included in the other handbooks and to seek such assistance from F.A.O. as may be available.

(c) That the handbooks be given the following priority:

1. Fish Culture
2. Food Technology.
3. Administration and Development
4. Fishery Statistics
5. Gear Classification
6. Food Processing
7. Fishery Biology
9. Marine Biology and Limnology
10. General Introduction to Fishery Science

(d) That the availability of an author or editor should determine the actual order of the preparation of the handbooks.

In connection with the proposed handbook on Food Technology, the Council believes that it would serve a useful purpose if it were designed for use as a guide for governmental fisheries administrators and as a reference for students of fisheries vocational schools.

The matters to be considered in the handbook can be treated only in general terms since the size limitation of a handbook precludes the use of comprehensive descriptions of the problems in food technology. The Council considers that the proposed prospectus requires revision in order to serve the purpose suggested in this report and therefore adopted a new prospectus.

(1) The Council therefore RESOLVED:

(a) To adopt the prospectus attached hereto (Appendix 5).

(b) That the Prospectus be used as a basis for a questionnaire to be sent to Member Governments in order to obtain sufficient information to prepare the handbook.

(c) That Member Governments be requested to direct the information in reply to the questionnaire to the Secretariat for forwarding to the Executive Committee.

(d) That the Executive Committee invite competent workers to prepare the handbook based on the information supplied by the Member Governments.

(e) That Fishery Division, Rome, be requested to assist in the development of the handbook on food technology.

The Council considers that the publication of a handbook containing descriptions of processing employed in and suitable for the Indo-Pacific region would be extremely useful to the Member Governments.

At its Third Meeting the Council recognized the importance of such a publication and recommended that a classification of fish processing be devised and submitted at the Fourth Meeting. M. Lafont of the Fisheries Research Institute, Phnom-Penh, was invited to devise the classification scheme. Inasmuch as only two member governments submitted information to M. Lafont he was unable to complete the work. The Council felt that the reason for the delay on the part of other Member Governments in submitting the material to M. Lafont for classification was that they did not have the information available in published form. Accordingly it will probably be necessary for staff members of fisheries departments of Member Governments to investigate the processing methods in use and write descriptive statements. While it is recognized that this may be rather laborious it is necessary that this work should be completed if the classification scheme begun by M. Lafont is to be carried through.

It was resolved also at the Third Meeting that a handbook describing processing, equipment, methods, and procedures employed in and suitable for the Indo-Pacific region should be prepared. The material required for the preparation of the handbook will necessarily be more comprehensive than that required for a classification .

(3) The Council therefore RESOLVED:

(a) That Member Governments be requested to submit through administrative correspondents concise but complete descriptions of essential features of processing methods in use in the Indo-Pacific region, for their respective countries. These should include descriptions of raw material, equipment, processing procedures, and of the finished product. The material should be submitted at as early a date as possible.

(b) That the information be received by the Secretariat and forwarded to the Executive Committee.

(c) That the Executive Committee invite competent workers to prepare the handbook based on the information supplied by Member Governments.

(d) That copies of the information be supplied to M. Lafont so that he can complete the work of preparing a classification scheme for consideration of the Council.

Item 18.—Films: The Council received from the Fisheries Division of the Organization an annotated and indexed list of documentary films relating to fisheries and

RESOLVED: That the Fisheries Division of the Organization be informed of the Council's keen appreciation of this extremely useful list.

Item 19.—Technical Instruction Projects:

The Council, having reviewed the working paper on the subject of technical instruction centres reporting on the fish-culture seminar at Bogor and the Indo-Pacific Fisheries Statistics Training Centre at Bangkok and dealing with proposed other training centres within the region, regretted to learn that the proposed centre for the technical instruction for master-fishermen at Singapore had to be abandoned owing to the fact that the Singapore Government was unable, for the time being, to undertake responsibility as host Government.

(1) The Council RESOLVED that it was of the opinion that other ways should be found to continue the program in respect of instruction for fishing operators.

The Council noted that the second fish culture seminar at Bogor had proved a success and

(2) RESOLVED to recommend to the Organization that steps should be taken to find out whether there would be sufficient applicants to warrant the holding of a further session of this seminar, preferably not before 1954.

The Council also noted that the Indo-Pacific Fisheries Statistics Training Centre at Bangkok was a success.

(3) The Council RESOLVED that an expression of appreciation and congratulations be extended to the organizers and teaching group which conducted the Fisheries Statistics Training Centre held at Bangkok in 1952.

The Council noted that information and instruction obtained by attendance of that school was already being applied to the development and improvement of Fisheries Statistical Services in Member Governments.

(4) The Council RESOLVED to recommend to the organization that a Fisheries Statistics Training Centre be continued in 1953 for instruction in the field collection of fisheries statistics, which was the basic idea of the courses given in 1952, and advanced courses in the field of compilation and presentation of fisheries statistics be organized and presented possibly in 1953, and that the statistical handbook for fishery workers be completed and published subject to budget considerations and made available for reference especially for the use of the students of statistical training centres.

(5) The Council RESOLVED to record its hope that the plans for a Technical Instruction Centre for Fisheries Administrators in India would be brought to fruition in the near future.

Discussion took place as to whether separate centres should be conducted specializing in Fresh Water and Marine fisheries administration respectively, the view of the Delegate for India being that it was preferable to hold one centre only, since many of the purely administrative problems were common to both fields and that administrators who would be called upon to carry on a combined administration would not be able to profit from both courses.

In respect of the proposed technical instruction centre in the Philippines for administrators concerned with gear technology the Council

(6) RESOLVED to recommend to the Organization the desirability of developing at an early date the training centre for fishery administrators concerned with gear technology which has been proposed to be located in the Philippines and at the same time suggests that consideration be given to the advantages of combining this centre with the proposed school for leading fishermen.

The Council's view on this matter was that the gear technologists, being better educated than fishermen could probably act as interpreters, and that the fishermen's school would furnish much demonstration equipment for the gear technologists and thus permit more effective instruction, probably with economy.

(7) The Council RESOLVED to recommend that the Organization be requested to explore the possibility of establishing a technical instruction centre in fish marketing at Hongkong or such other place as may be considered suitable.

(8) And RESOLVED to request the executive committee to continue its efforts along the lines of its activities during the past few years, in promoting the development of these centres.

The Council also recorded its thanks for the announcement made on behalf of the Government of Japan that it would be glad to be host to technical instruction centres promoted by the Council.

Item 20.—Subject for Fifth Meeting Symposia:

(1) RESOLVED: That Planktonology should form the subject of the symposium with the emphasis on the ecology of the Plankton, its role in productivity and the use of planktonological results in connection with fisheries development and that the Secretariat be instructed to communicate with UNESCO with the object of combining the UNESCO project for a regional symposium on this subject with the Council's own arrangements, especially to secure, if possible, UNESCO financial assistance for travel to the meeting of Planktonological workers of the region, who without such aid would be unable to attend the meeting.

(2) It was further RESOLVED: That fisheries marketing and financing should be a second symposium subject at the fifth meeting.

Item 21.—*Regionalization:* The subject of Regionalization having been included on the Agenda under a directive from the Third Meeting, this matter was discussed at length in the light of considerable information received regarding the functioning of regional committees in other Councils and the Council RESOLVED:

That no formal organization of the IPFC into regional groupings should be contemplated at present.

The Council felt furthermore that the success of the Hilsa Meeting in Calcutta, 4-7th September, 1952, illustrated how opportunities should be seized to arrange subject meetings within a region and that the Secretariat be requested to promote such meetings in the future whenever possible.

Item 22.—*High Seas Fishing:* The Council gave consideration to the general question of oceanic fisheries and felt that the work of the Tuna Sub-Committee had covered this subject as fully as could be done at this stage. It recorded its intention, however, to create additional Sub-Committees to deal with other important demersal and pelagic groups of oceanic species at a later date, as might be necessary.

Item 23.—*Proposed Indo-Pacific Oceanographic Institute:* The Council studied this project exhaustively and arrived at the conclusions reported in Appendix 6. Accordingly, the Council considered the following points:

a. Oceanographic studies when intimately associated with biological and technological studies on fisheries are essential to the full economic utilization of Marine Fishery Resources;

b. Nearly all other countries of the area have recognized the need of oceanographic studies and are making such studies, but in most instances, the programmes are so small as to be of doubtful benefit in the immediate production of food;

c. It is desirable for the countries to strengthen the oceanographic programmes and to better correlate them with the needs of the fisheries;

d. These National Programmes may best be assisted by international work of the following kinds:

(i) The establishment of a complete and reliable register of the institutions, vessels, and projects concerned with oceanography within the region;

(ii) The establishment of a file of all oceanographic data collected in the area and its subsequent reduction to a form in which it could be published and made available to workers of the area by whom it could be used in their own programmes;

(iii) The establishment of a special documentation and bibliographic service in oceanography for the region;

(iv) The establishment of a consultative service to be made use of by Member Governments in the planning and execution of their oceanographic programmes and in the interpretation of oceanographic results for the purpose of making these available to industry;

(v) The establishment of a service to promote the local manufacture of oceanographic equipment;

(vi) The provision of training opportunities in oceanogrphy;

(vii) The establishment of arrangements whereby the national programmes will be coordinated and methods and equipment will be standardized.

e. UNESCO has a role in the development of fundamental knowledge concerned in oceanography and FAO has an interest in the application of this fundamental knowledge to particular fisheries situations.

The Council therefore RESOLVED that:

(a) A copy of the Committee's report on Oceanography be transmitted to the Director General of FAO with this resolution with a request that he transmit it to the director of UNESCO as a contribution to the discussion of the UNESCO programme for 1953-54 on natural sciences at the forthcoming Seventh Session of UNESCO.

(b) The Executive Committee be requested to consult the Director General of FAO on the implementation of the services listed above, having recourse, if necessary and possible, to technical assistance funds for this purpose, and to assist the Director General and the Secretariat in the Development of such work as far as possible.

(c) Technical committee I be requested to undertake meanwhile, with the assistance of the Secretariat, further examination of the needs for International Oceanographic projects:

(i) by direct collaboration between national institutions,

(ii) by the creation of an international institution,

(iii) by the appointment of highly qualified specialist personnel attached to the Secretariat.

And that it report on the result of the study at the next meeting of the Council.

(d) Copies of the Committee's report on Oceanography and this resolution be transmitted to Member Governments, for information and further study of this problem.

(e) The Secretariat maintain the closest possible liaison, in this work, with UNESCO, whose assistance should be sought in promoting the conduct of fundamental research in physical and biological Oceanography within the region, and in encouraging universities and other educational institutions to expand and develop their curricula to provide basic education for those who might intend to make a career of Oceanography .

Item 24.—*Technical Committee I.*

Item 24.1.—*Hydrology:* The Council believed that the collection of surface temperature and salinity data should be accelerated in the central region of the Indo-Pacific area. Since Mr. P. Ch. Veen of Indonesia is carrying out this type of work at the present time, it was felt that his assistance would facilitate and simplify the work. It therefore agreed to instruct the Secretariat to request the Indonesian Government to allow Mr. Veen to accept responsibility for making a survey of the existing oceanographic stations within the central region which possess the necessary facilities for the analysis of water samples. On the basis of the results of such a survey Mr. Veen should contact shipping lines in the area who would be willing and able to undertake the collection of temperature and salinity data in the central region, and Mr. Veen should be asked to incorporate all the salinity and temperature data collected in this region into his standard monthly charts. The Secretariat should also, if necessary, afford him assistance in the publication of such charts for IPFC distribution.

It was also thought that, whenever possible, analytical methods for the determination of salinty should be patterned upon the recommendations given in Technical Committee's Report for 1951-1952, Appendix I.

It was reiterated that the conduct of estuarine and neritic hydrological investigations was desirable and the Council noted with interest the continuation of such studies in the Straits of Malacca, Singapore.

It was found extremely difficult and inconvenient in spite of discussions with delegations to obtain a fully documented account of the hydrological programmes of all member countries.

The Council therefore RESOLVED:

That the Secretariat be directed to collaborate with Mr. P. Ch. Veen along the lines described above and that the attention of Member Governments be drawn to the recommendations in connection with analytical methods for the determination of salinity given in the report of Technical Committee I; that the attention of Member Governments be drawn to the desirability of conducting estuarine and neritic hydrological investigations and, finally, that Member Countries be requested to furnish papers for the next meeting of the Council giving full details of their hydrological programmes, including, wherever possible, descriptions of analytical procedures and equipment.

Item 24.2—*Planktonology:* Because few plankton workers were present at the Meeting, the Council was unable to develop work on this subject. Plankton workers in the area are referred to the papers presented at the Meeting. The Council hopes that the choice of planktonology as subject matter for a Symposium at the Fifth Meeting will ensure a more representative gathering of plankton specialists of the Indo-Pacific area. The Council RESOLVED:

That the raporteurs, Dr. K. F. Vaas (fresh water) and Mr. R. S. Esquerra (marine) be requested to continue correspondence with Plankton Workers of the

region and that every effort be made to present at the next Council meeting a report on (a) standardization of methods of Plankton collection, etc., (b) the types of planktonological programmes suitable for the region.

Item 24.3.—*Biology.*

GENERAL BIOLOGY: In discussion of work in general biology, the opinion was expressed that the scope of work assigned to the Committee was too wide and that a clearer formulation of its problems would be necessary. The Council therefore RESOLVED:

(1) That methodological problems should be handled by a separate Working Group and that problems relating to shell fisheries (Mollusca and Crustacea) and to minor fisheries such as sponges, beche-de-mer, turtles and commercial corals should be the topics dealt with by the committee as opportunity and necessity arose and that every year one of the above indicated fisheries should be taken for study and that the Secretariat should request Member Governments to present at the next Council meeting technical papers dealing with the Prawn (Shrimp) fiisheries in their various aspects.

CHANOS: The Council examined the problems of *Chanos chanos* referred to in a letter received from the Fisheries Division of the Organization and adopted a report which is presented as Appendix 7, and the Council RESOLVED:

(2) That the attention of Member Governments should be drawn to the necessity for the exchange of all information relating to the cultivation and biology of *Chanos chanos,* including information contained in unpublished government reports.

TUNA: The Council noted that the collection of data for the major racial studies of yellowfin, bigeye, albacore, and skipjack had been satisfactorily accomplished for the Pacific Ocean area. Publication of the results are under way with a preliminary report on yellowfin available at the present meeting and expanded reports on yellowfin and the other three species expected from the United States.

The Council noted that there remained a need for morphometric data from the Indian and Atlantic Oceans, and RESOLVED:

(3) That Member Countries which adjoin the Indian Ocean especially Indonesia, Ceylon, United Kingdom and France make an effort to obtain the necessary data for completing the study on the principal species.

The Council considered that the next most urgent problem requiring international cooperation was the summarizing and exchange of information on the ecology of tuna, i.e., the occurrence of tuna in relation to water temperature, salinity, currents, other species of fish, etc.

The Council therefore RESOLVED:

(4) That Member Governments be requested to provide the Secretariat for transmission to the rapporteur of the Tuna Sub-Committee data or summaries of such data concerning the ecology of Tuna prior to the next meeting of the Council.

It was further RESOLVED:

(5) That the Council recognizes the need for standardization of observations of the biology of Tunas and directs that instructions for such standardization shall be included in a handbook of field procedures.

SEAWEEDS: The Council reviewed its work in connection with seaweeds, as reported in Appendix 8 and RESOLVED:

(6) That Mr. Zaveneld be requested to undertake a revision of his paper "The Economic Marine Algae of Malaysia and Their Application" with a view to its republication in consolidated form, and that Member Governments be requested to direct their Seaweed Research Workers to collaborate with Mr. Zaneveld in this work, especially in the compilation of vernacular names of seaweeds, and that upon completion of the revision the paper shall be reprinted.

and the Council RESOLVED:

(7) That Member Governments be requested to furnish the Secretariat with information on methods of seaweed re-

sources survey employed in their countries; that the Fisheries Division of FAO be requested to direct similar enquiries to countries outside the region, and that the results of these enquiries be made available to Member Governments and that if further development of such survey techniques seem necessary the Sub-Committee for seaweeds be authorized to examine the means whereby experimental work for this purpose might be undertaken .

PELAGIC NERITIC FISHERIES: The Council reviewed its work in connection with pelagic-neritic fisheries, as reported in Appendix 9, and RESOLVED:

(8) That in view of the importance of the Pelagic Neritic Fisheries of the region, efforts should be exerted to establish a complete picture of the biology of the stocks on which these fisheries operate, and that the Secretariat should issue the questionnaires prepared at this meeting.

And that the problem of methodology of investigation of these fisheries should receive close attention and be given special consideration at the Council's Fifth Meeting, when the replies to the questionaires will be presented in consolidated form.

Further, the Council RESOLVED:

(9) To recommend to the attention of Member Governments the importance of the Pelagic Neritic Fisheries, and to record its belief that certain Member Governments might find it desirable to solicit technical assistance in the conduct of technical investigations of the distribution of these stocks, especially of *Sardinella longiceps*, particularly taking into account that in some years local fisheries of that species fail.

TAXONOMY: The Council considered it highly desirable that field keys of common groups of species should be prepared by competent workers for the use of field officers not trained in biology. The Council felt that these keys should refer to a common standard using one kind of nomenclature, preferably the one used by Weber and de Beaufort, regardless of later changes and synonomy, and that a standard list of English names to be used in the whole region should be prepared at the same time.

The Council considered the Executive Committee's proposal for the preparation of a handbook on the 15 most important groups of fishes in the region and in view of the enthusiastic reply from many workers within the region RESOLVED:

(10) To request the executive committee to take action for the preparation of such a special handbook.

The Council, having considered the great lack of trained taxonomists in the region (ichtyologists, carcinologists, conchologists and algologists) RESOLVED:

(11) That Executive Committee be asked to take up contact with UNESCO to ascertain whether scholarships could be made available for promising young men in this region to be sent overseas to get adequate training at well known museums of institutions.

FISH CULTURE: The Council noted that the Fish-Culture Sub-Committee was not in a position as yet to present a handbook on vegetation control due to lack of basic information. It was apparent that very little work if any had been done in this field although it might be a problem common to the countries within the area.

The Council having reviewed the recent publication of a paper on the control of noxious weeds, particularly water hyacinths (*Eichornia crassipes*) by K. F. Vaas in Indonesia, hoped that copies of this paper, if not already available, should be obtained as a contributed publication of the Council.

The Council was aware of the extensive work on herbicides for the control of noxious weeds which had been and was still being undertaken in some countries, particularly the United States, and RESOLVED:

(12) To request that the United States furnish the council with a bibliography of the publications available.

The Council was anxious to have a review made of the replies to date on the questionnaire regarding pollution. It therefore RESOLVED:

(13) That the Secretariat contact those countries which to date have furnished no

replies and that, on the basis of all such material, a summary of this information be prepared by the Sub-Committee for representation at the next IPFC meeting.

In the field of fish culture the Council also considered the problem of determination of the quality and quantity of fish food organisms in the different types of waters with reference to their physico-chemical conditions and the variations thereof, and noted that studies on fish food organisms had been and were still being conducted within the area but there seemed to be no standardized methodology for such studies specially to answer specifically the needs in fish culture work. Such standard method of work should be formulated and an attempt should be made to determine the relationship between the abundance of fish food organisms and productivity.

The rich store of information from different member countries now available should be assembled and analyzed. The delegation from Japan called the Council's attention to a recent work entitled "Distribution of Plankton and Benthos in Lake Sagami, a Reservoir", by K. Kuronuma and Y. Shiraishi, Fisheries Agency, Japanese Government, 1952, which has an important bearing on the subject.

The Council also considered the problem of studying fish associations and the determination of the optimum densities of compatible combinations of different age-groups for stocking operations. There are only very few studies made on fish associations and optimum densities for stocking operations, which need to be assembled to determine the extent of work unfinished in this field.

The Council RESOLVED:

(14) To request Member Governments to report work being undertaken or proposed work to be undertaken on this problem.

The Council, being aware of the work along this line of Mr. S. Y. Lin in Hongkong and the New Territories of China before his assignment in the Fisheries Division, FAO, RESOLVED:

(15) To request Mr. Lin to prepare a summary of this paper and of such other works along this line within the area.

After examination of the working papers relating to international aspects of the supply of fish fry, the Council RESOLVED:

(16) That a copy of the paper relating to an International Fishery Fry Exchange be circulated to Member Countries for consideration with a request that full and sympathetic consideration be given to the recommendations contained therein.

The data so far obtained in the table Appended to the Technical Committee report are encouraging, although incomplete, and the Council reiterates its desire to obtain information from those Member Governments—Burma, Korea, Dutch New Guinea and Vietnam, which have not as yet submitted their reports, and from other countries whose data have yet to be completed and brought up-to-date.

It therefore RESOLVED:

(17) That the IPFC Secretariat be authorized to circulate a tabular request for information, similar to that in the table of the Committee's report, for completion of the governments concerned.

In the event of the lack of data or the difficulty of obtaining the same from the fisheries department of each country concerned,

The Council RESOLVED:

(18) That the Secretariat be authorized to circulate National Survey entities through administrative correspondents, and to seek the help of the Bureau of Flood Control in ECAFE in gathering such information.

HILSA: Considering the great economic importance of Hilsa to Burma, Pakistan and India it was resolved at the Madras meeting of the Council in 1952 to form a Sub-Committee on Hilsa consisting of Dr. Hora (India), Dr. Nazir Ahmad (Pakistan) and a representative from Burma. Later a meeting of this Sub-Committee was held at Calcutta in September 1952 which was also attended by Dr. M. R. Qureshi (Pakistan) as observer, an officer of the Embassy of U.S.A. in Burma as an unofficial observer and Dr. Cecil Miles, Secretary, IPFC. The proceedings are contained in the report of the Sub-Committee. This meeting has achieved good progress in coordinating the study of Hilsa and the Committee urges that additional meetings be held as often as practicable.

However the Council felt that the study now should be redirected to obtain adequate knowl-

edge of the fish populations. Fundamental to this are accurate data on the total catch from each population unit.

(19) Therefore the Council RESOLVED that the Governments of India, Pakistan and Burma be recommended to develop programmes for the collection of accurate catch statistics from each unit of the Hilsa populations.

It is understood that Burma may not be in a position to commence work at present but India and Pakistan will be in a position to initiate at least part of the programmes. The Council recognizes the difficulty of this task when the fishery is conducted by many thousands of small fishing units but suggests that suitable sampling techniques be adopted.

(20) The Council further recommended that the Member Governments concerned be invited to consider the proposal for the establishment of a small regional unit at which the research work on this species might be planned and results compiled and to discuss with F.A.O. the ways in which technical and other assistance might be made available to the Member Governments for the staffing and operation of such a unit.

Item 25.—Technical Committee II

GENERAL: Having considered the problems of the seaweed industry of the region, from technological viewpoints,

(1) The council RESOLVED:

(a) That the Sub-Committee for Food Technology and Statistics be requested to give attention to the seaweed industries in the course of their work;

(b) That the Governments of Japan and Korea be requested to furnish information on seaweed as requested at the Madras meeting and that the Scottish Seaweed Research Association be asked to furnish information.

In connection with technical aspects of fish trade in the region concerning which resolutions were adopted at the third meeting, the Council noted that abstracts of International Fisheries Trade Statistics in the Indo-Pacific region are included in a report on World Trade being prepared by the Fisheries Division of the Organization. This report includes statistics giving quantity and value of various types of fisheries products by countries of origin (in imports satistics) and destination (in export statistics). Published information on this subject for 1938 and the period 1947 to 1951 will be available in the FAO Yearbook of Fisheries Statistics 1950-51 to be published by January, 1953. Copies of this report will automatically be sent to Member Governments of the Council.

In view of the above information,

(2) The Council RESOLVED:

That the same Working Committee named at the Third meeting, consisting of Mr. Lafont, Mr. Ranganathan, and a representative of the United Kingdom continue to be available for consultation with the Secretariat in determining whether the work of the Fisheries Division should be directed to other aspects of International Trade thus meeting the requirements of the members of the Indo-Pacific region.

Item 25.1.—Gear Technology: The Council, having reviewed the papers and reports submitted in connection with this subject, considered that the work on a Catalogue of fishing gear with a simplified key should be continued. In expectation that Mr. T. W. Burdon will not be able to continue his work on this project,

(1) The Council RESOLVED that Mr. Tran Van Tri and Mr. Umali be requested to collaborate in continuing the work on classification of gear especially in testing the application of the key developed by Mr. Burdon.

Messrs. Tran Van Tri, Bottemanne, Kuronuma and Umali have agreed to form a working group to examine the possibility of revising and simplifying the method of classification developed by Mr. Burdon. In this connection, Mr. Kuronuma offered his assistance in making available to the working group through the Secretariat English translations of material in Japanese on method of classifying and describing fishing gear. The suggestion was made that material relating to this subject should not be confined to published matter, but should include any form of information which contributors have ready and available.

(2) The Council RESOLVED that plans for a catalogue of fishing boats be dropped, but that a brief description of fishing boats in use for particular types of fishing gear be included in the classification of gear.

This appears logical because development and improvement of fishing gear involves in most cases the use of special types of boats.

(3) The Council RESOLVED to record its appreciation of the work done by Dr. C. A. Gibson-Hill in preparing his paper on "A Proposed System For Cataloguing the Boats Used in the Fishing Industries of South and East Asia".

(4) The Council RESOLVED to request Member Governments once more, to furnish information on preservation of fishing gear.

It is noted there was little or no response to the last request for this information.

(5) The Council RESOLVED to direct the Secretariat to take appropriate action to contact FAO and other sources of technical assistance as to the availability of the services of fisheries engineers to assist in improving fishing gear and methods including the mechanization of boats to effect increases in fisheries production in the Indo-Pacific region, and to forward such information to Member Governments.

This section contemplates close cooperation between IPFC and Technical Assistance Agencies which are engaged in procuring fishing gear and fisheries technicians for the development of the fisheries of several Member Governments of this Council.

(6) The Council RESOLVED to thank Mr. Chidambaram for his report, "The Experimental Introduction of Powered Fishing Vessels within India and Ceylon."

(7) The Council RESOLVED that plans for a handbook on Gear Technology should be postponed.

This decision was deemed appropriate because (a) the expected classification of gear to be available sometime in the near future should largely meet the need for which the handbook was proposed; (b) information on methods of fisheries survey classification contained in contributed publication No. 2 "An Introduction to the Fisheries Survey of the Colony of Singapore, with a Consideration of the Methodology Employed" by Dr. G. L. Kesteven and Mr. T. W. Burdon gives guidance in such work; (c) of the need for information on the operations of high seas fisheries.

Item 25.2—Food Technology: The Council's work in this subject relates chiefly to the project for preparation of handbooks in respect of which resolutions were adopted (see Item 17), and to technical instruction (see Item 19).

Item 25.3.—Socio-Economics: Upon full consideration of its previous recommendations, of papers submitted at this Meeting, and of supplementary statements from the delegates about conditions in their countries, the Council recognized the need for priorities and

(1) RESOLVED that its effort in the Socio-Economic field during the next year or so should be concentrated on the improvement of marketing.

It believed that the initial effort should be to improve marketing by group formation (including cooperatives) with credit functions to be initiated, financed and supervised by the Government; provision to be made for gradual withdrawal of Government from these activities as industry demonstrated its ability to assume full responsibility for this undertaking.

The Council considered that the services of a marketing specialist are necessary for this type of development, and

(2) RESOLVED that appropriate action should be taken by the Secretariat to contact the appropriate units in FAO or other bodies to determine whether a marketing specialist could be provided from such sources.

Item 25.4.—Statistics: After reviewing the report of the statistics working group for 1951-52, together with the report on the Indo-Pacific Fisheries Statistics Training Centre, and other material made available by the Secretariat and considering the importance of statistics in Fisheries Services, the Council adopted a resolution concerning technical instruction relating to fisheries statistics (see Item 19).

The Council further called special attention of Member Governments to Contributed Bulletin "An Introduction to the Fisheries Survey of the Colony of Singapore, with a Consideration of the Methodology Employed," as an example of useful information in the development and improvement of Fisheries Statistics Services and in the planning and conduct of Fisheries Surveys.

Item 26.—Inter-Committee Working Groups: No permanent Inter-Committee Working Groups were constituted.

Item 27.—Other Business:

(1) The Delegate for Cambodia proposed and the Delegate for Indonesia seconded:

(1) That the Indo-Pacific Fisheries Council expresses its sincere thanks to his excellency the President of the Republic of the Philippines and to his Government for the kind hospitality and for the many facilities extended to the council and to the delegates of Member Governments of the Council during its Fourth Meeting in the Philippines

Carried unanimously.

(2) The Delegate for the United Kingdom proposed, and the Delegate for Thailand seconded, the following Resolution:

Whereas the Indo-Pacific Fisheries Council has, at the invitation of the Government of the Republic of the Phiippines, held its Fourth Meeting at Quezon City in the said Republic,

Whereas the delegates and representatives of Member Governments of the Council have at all times during the conference been the object of the utmost deference and attention on the part of the mayor, Council and citizens of Quezon City and

Whereas the Council of Quezon City on the 24th of October, 1952 passed a formal resolution No. 1108 welcoming the Indo-Pacific Council and the delegates of Member Governments with the assurance of the spontaneous cooperation and friendship of the Philippine people;

The Council therefore RESOLVES to extend its sincere thanks for the true courtesy and traditional hospitality extended to the Council in general, and to the representatives of Member Governments in particular by the Mayor, Council and citizens of Quezon City and expresses its appreciation of the friendship and international cooperation extended to it at all times;

And RESOLVES moreover that this resolution be included in the permanent records of the Council and that it be communicated to the Council and citizens of Quezon City through His Honor the Mayor, Ignacio Santos Diaz.

(3) The Delegate for India moved and the Delegate for Pakistan seconded a vote of thanks to the President and Officials of the University of the Philippines for courtesies extended and for the use of the University Social Hall.

(4) The Delegate for Burma moved and the Delegate for the United States seconded, a hearty vote of thanks to Dr. D. V. Villadolid, Director of the Bureau of Fisheries for his whole-hearted cooperation in making the meeting a success and for the facilities extended to Delegations for the inspection of Philippines Fisheries. It was resolved that Dr. Villadolid be asked also to transmit to the staff of the Fisheries Division the Council's thanks for the untiring assistance rendered to the Secretariat and for the cheerful manner in which the arduous duties assigned to them were carried out.

(5) The Delegate for Australia moved and the Delegate for Vietnam seconded a vote of thanks to Dr. G. L. Kesteven for the invaluable services performed by him over a period of many years and for his untiring efforts since before the Council's foundation to place it on a firm basis.

(6) The Delegate for France moved and the Delegate for Cambodia seconded a motion of thanks to the Secretariat staff attached to the Regional Office of the Organization at Bangkok for their collaboration with Dr. Kesteven in this task; to the Chairmen and Rapporteurs of the Technical Committees and Sub-Committees for the valuable assistance rendered in channeling the conduct of their respective Committees and for their energy and example to the members of the Committees in carrying out the tasks undertaken.

Quezon City, November 7, 1952.

APPENDIX 1

EXECUTIVE COMMITTEE'S REPORT TO THE COUNCIL AT ITS FOURTH MEETING *

The Executive Committee has met on five occasions since the last Meeting at the following times and places:

1) At Senate House, Madras, South India (February 16-17, 1951)

2) In the Office of the Commissioner-General for the United Kingdom in Southeast Asia, Singapore (July 16-17, 1951)

3) At the Oceanographic Institute, Nha Trang, Vietnam (February 4-8, 1952)

4) At the F.A.O. Regional Office for Asia and the Far East, Bangkok (July 28–August 2, 1952)

5) At Social Hall, University of the Philippines (October 18-23, 1952)

IMPLEMENTATION OF COUNCIL'S DIRECTIONS AT ITS THIRD MEETING:

The Committee presents, and recommends for approval and adoption, the printed Proceedings of the Third Meeting. In accordance with Article III (i) of the Council's Agreement, a copy of Section I of the Proceedings was transmitted to the Director General of the Food and Agriculture Organization as the Annual Report of the Council, and 200 copies were furnished for distribution at the last conference of the Organization.

The Committee reports that the following action has been taken in regard to the decisions of the Council at its Third Meeting. IPFC/C52/2 (AP1) gives a list of the documents issued by the Secretariat in the course of this work.

a) *The Amendment of Rules of Procedure* [Resolution 51/22.1 (1)] was communicated to the Food and Agriculture Organization and the Director-General's recommendations are submitted for discussion at the Fourth Meeting.

b) *Liaison* [Resolution 51/9.2(1 & 2)]: The intent of the Council has been constantly kept in mind by the Executive Committee. An account of the principal contacts maintained is given in IPFC/C52/8-9-10-11. The Council is apprised of the establishment of the General Fisheries Council for the Mediterranean as from February 20, 1952 and an effective liaison will be entered into with this new Sister Council.

c) *Council Correspondents* [Agenda Item 51/11]: The view recorded by the Council was communicated to Governments and all member countries have now named Administrative and Bibliographic Correspondents.

d) *Bibliographic Work* [Resolution 51/15]: The policies laid down in Resolution 51/15 have been adhered to and Governments have been circularized. The bibliographic work of the Secretariat is reported in IPFC/C52/17. It should be noted that technical and financial considerations made it impossible to follow the direction contained in paragraph 6 of the Council's Resolution.

e) *Handbooks* [Resolution 51/16.1 (1)]: Draft prospectuses have been studied by the Committee, appointments made to the Editorial Committee on Handbooks and a tentative list of authors drawn up. The Organization is arranging for the compilation of a handbook on Pond Culture in Tropical and Semi-tropical waters by Dr. S. L. Hora.

f) *Current Affairs Bulletin:* In accordance with Resolution 51/16.1 (2), this Bulletin has been regularly published.

g) *Films* [Resolution 51/17]: Administrative Correspondents were asked to give information regarding films available, and the information received has been summarized. A list of motion pictures in the film library of the United States Fish and Wildlife Service has been received. The Organization has at the Committee's request furnished a list of available films which is given as IPFC/C52/20.

h) *Technical Instruction* [Resolution 51/18]: The plan to run schools and training centres has been given high priority. Several invitations were received from Member Governments. A Seminar on Brackish-water Fish Culture and a Fisheries Statistics Training Centre have been held in Indonesia and in Thailand respectively

* In accordance with Resolution 5.1 passed by the Council at its Third (Madras) Meeting, the present Report of the Executive Committee also incorporates the Report on the activities of the Secretariat.

and arrangements are well advanced for further training centres. This work is fully reported in IPFC/C52/22.

i) *Symposia* [Resolution No. 5119] have been arranged for the Fourth Meeting.

j) *Collection of Hydrological Data* [Resolution 51/20.1]: Active hydrological programmes are in progress in several countries and are reported on by the Hydrology Sub-Committee of Technical Committee II. Conversations were had by the Secretariat and members of the Executive Committee with the Royal Netherlands Meteorological Institute at de Bilt regarding the possibility of co-operative and complementary compilation of data. Quotations were obtained from the Institute for the complication of data in the area, but this appeared to be beyond the present budget possibilities of the Council. A proposal for the establishment of an International Oceanographical Institute has been tentatively under discussion at different times during the year and is reported on elsewhere. The working paper on the availability of hydrographic data in Japan was circulated to Member Governments. Governments were recommended to initiate hydro-biological investigations in estuarine waters and such investigations are in progress in Australia, India, Indonesia, Philippines and Japan. The programme of Vietnam is in the course of reorientation.

k) *Planktonological Investigations* [Resolution 51/20.2]: The Planktonological Sub-Committee of Technical Committee I was charged with the compilation of information to be obtained from Member Governments and this will be incorporated in the report of Technical Committee I. A bibliography of the plankton work in the Western Sector was prepared by the Central Marine Fisheries Research Station at Mandapam, India and was distributed as Occasional Paper 51/3.

l) *Information on Fishery Projects* [Resolution 51/20.3 (1)]: Some information has been received during the year by the Secretariat from certain Member Governments. These data together with information obtained from other sources are summarized in the report on the Status of the Industry (IPFC/C52/27).

m) *Pamphlets on Statistical Methodology* [Resolution 51/20.3(2)]: The Statistical Working Group has been unable to give attention to the preparation of these pamphlets but states that being aware of the importance of this problem, it will deal with the matter during the ensuing period.

n) *Hilsa Investigations* [Resolution 51/20.3 (3)]: A bibliography on the Hilsa Fish has been prepared by Mr. S. Jones of India and has been published. The Hilsa Sub-Committee has been active throughout the year and a special Meeting and Symposium held in Calcutta is reported on elsewhere.

o) *Fish Culture* [Resolution 51/20.3 (4)]: In response to the Secretariat's communication of the Council's recommendation to Member Governments, information has been received which is incorporated in the report of Technical Committee I.

p) *Hormonic Herbicides* [Resolution 51/20.3 (5)]: Experience reports have been received from India and the Philippines on the use of 2.4-D and will be referred to in the appropriate report to the Fourth Meeting.

q) *Pollution* [Resolution 51/20.3 (6)]: Reports were received by the Secretariat from India, Indonesia and the Philippines and passed on to the appropriate Sub-Committee.

r) *Tuna* [Resolution 51/20.3 (7)]: Information has been forthcoming from several Governments in response to the Secretariat's requests and suggestions.

s) *Taxonomy* [Resolution 51/20.3 (8)]: The Taxonomy Sub-Committee was requested to obtain check lists of local common fish with their vernacular names and lists have been received from several countries in the area. The Executive Committee has also had under consideration a proposal for the preparation of a handbook on the fifteen commercially most important groups of fish.

t) *Pelagic Neritic Fisheries* [Resolution 51/20.3 (9)]: The Council's recommendations were circulated. Detailed measurements regarding *Rastrelliger kanagurta* have been initiated in India and Indonesia, and a new classification has been formulated in the latter country. The chairman of this Sub-Committee reports that he has prepared for local use a questionnaire in connection with sardine with a view to its wider application.

u) *Seaweeds* [Resolution 51/20.3 (10)]: In response to the Secretariat's requests information has been furnished to the Sub-Committee from Japan, Australia, Philippines and the United States.

v) *Survey of Fishing Gear* [Resolution 51/21.1 (1)]: Mr. Burdon's tentative classification of fishing gear was circulated on a world-wide basis

by the F. A. O. and numerous comments were forthcoming. The work on the catalogue of gear is proceeding but opinions have been expressed that it is not feasible to complete this work on a voluntary part-time basis. A preliminary bibliography has however been prepared and is submitted to the Council. Member Governments are requested to supply additional information of existing literature.

w) *Survey and Classification of Fishing Craft* [Resolution 51/21.1 (2)]: Dr. Gibson Hill has not been able to present the completed Survey and Classification requested by the Council, owing to other commitments. Information has however been collected and the provisional classification revised. It is hoped that the Organization will shortly come to an arrangement with Dr. Gibson Hill enabling him to proceed with this work.

x) *Preservation of Fishing Gear* [Resolution 51/21.1 (3)]: The response to the request for published information on the subject has on the whole been disappointing. A bibliography has however been prepared and presented by Technical Committee II.

y) *Non-Indigenous Gear* [Resolution 51/21.1 (4)]: Member Governments were circularized by the Secretariat and the information received is summarized in an attachment to the Report of Technical Committee II. A paper from Korea is submitted to the Meeting.

z) *Powered Fishing Vessels in India and Ceylon* [Resolution 51/21.1 (5)]: Mr. Chidambaram's paper is presented to the Meeting (IPFC/C52/TECH 1).

aa) *Processing Methods* [Resolution 51/21.2 (1)]: Some information on this subject was received in response to the Secretariat's request and is summarized in Monsieur Lafont's classification, presented to the Meeting (IPFC/C52/TECH 19).

bb) *Handbook on Processing Equipment and Methods* [Resolution 51/21.2 (2)]: Although certain nominations have been made as requested, no progress has been reported in the preparation of the plans for this handbook.

cc) *Survey of Fish Trade of the Indo-Pacific Region* [Resolution 51/21.2 (3)]: Although no progress has been reported to the Executive Committee of work by the persons named in the Council's resolution, Mr. L. P. D. Gertenbach of the Economics Branch of the Fisheries Division of FAO was able, during a tour of the region in 1951, to make a study of the statistical records of fish trade. This survey has enabled the Division to build up the Indo-Pacific section of the Fisheries Yearbook, so far as trade is concerned, and the Branch is interested in the further progress which might be possible in developing this study.

dd) *Socio-economic Papers* [Resolution 51/21.3 (1)]: The Council will have noted the substantial group of socio-economic papers which have been submitted in response to this resolution. Occasional paper 52/5 presents a preliminary study in this field made by the Secretariat.

ee) *Statistical Programme* [Resolution 51/21.3 (2)]: Considerable progress has been accomplished in this field, as reported by Technical Committee II.

ff) *Statistics as Separate Agenda Item* [Resolution 51/21.3 (3)]: This has been done.

gg) *Scientific Equipment* [Resolution 51/22.3]: The Secretariat has been able to render some small assistance in this matter and issued an occasional paper (52/4) giving information.

General Review of Council's Responsibilities and of Present Arrangements for Their Discharge

The Executive Committee believes that the work of the Council has developed to a stage which warrants the Committee making a review of the Council's functions, the procedures which have been built up to enable the Council (and its Committees) to discharge these functions, and the progress which is being made to enable the Council to achieve its principal objective, namely, a contribution to the overall objectives of the Food and Agriculture Organization for increased food production, improved nutritional standards, and improved living conditions for those concerned with food and agricultural industries.

The Council's functions, as set out in Article III of the Baguio Agreement, may be summarized as follows:

1. To formulate problems,
2. To recommend research and developmental projects,
3. To encourage and co-ordinate research,
4. To effect standardization,
5. To undertake research and developmental projects,
6. To assist in the procurement of essential materials,
7. To publish,
8. To report on particular problems,
9. To report to F.A.O.

To facilitate its handling of work in respect of these functions, by effecting a natural classification of its materials, the Council has established two Committees and under these committees has developed further subject subdivision so that the Council's work, in the technical sense, is divided into seven headings:

Biology and Hydrology:

1. Hydrology
2. Planktology
3. Biology

Technology and Statistics

4. Gear Technology
5. Food Technology
6. Socio-Economics
7. Statistics.

Probably the most important of the Council's functions is the formulation of the problems with which the industries of the region are confronted. The term problem may be taken to signify the existence of situations which operate to cause an industry to function inefficiently or inadequately or to be unable to develop. Such situations would include *inter alia* those in which the information on the resources was inadequate, those where the industry possessed inadequate and inappropriate equipment, those situations where the fishermen suffered disabilities which rendered them incapable of performing their work to the most desirable level of efficiency, and those where the marketing arrangements were inefficient in the sense of equipment for handling and disposition of catch or in the sense of institutional forms under which the market was conducted. The Committee assumes that it is the function of the Council to advise member governments on the collection of information about the industry and to assist them in recognizing and analyzing problem situations, and measuring the influence of various factors contributing to those situations.

After this first function, other functions constitute a sequence to enable the Council to advise action which should lead to the eventual improvement and development of the industry. In almost every case, research work is required, and because of its importance, research appears directly, or by implication, in most of the Council's functions. The Council should consider the research requirements of the region in all aspects both generally and in respect of particular situations. In general, the Council has a responsibility to encourage and coordinate research and should, especially, promote standardization of method, equipment and language. In respect of particular research requirements, the Council has a responsibility to recommend research projects and, when necessary, to undertake joint projects of research. The research function of government is a fact-finding function and each phase of administrative work must be preceded by research of some kind. The Council must pursue its work at two levels; promoting fact-finding studies in order to inform itself in respect of the field within which it must work and, on the result of these studies, pointing the way to the research activities to be recommended to member governments. Results of these research activities undertaken by member governments then furnish the material which, so far as the Council is concerned may be used as basis, first for advice on further research and second, for advice on developmental and administrative activities. It is specifically indicated in the Council's function that it should recommend developmental projects and when necessary should itself, on request from member governments, undertake such projects.

Finally, the Council has an obligation to secure the presentation of its work in appropriate quarters. The general discharge of this responsibility is referred to under the function to publish, whilst the last two functions provide for appropriate reporting in proper quarters.

Whilst the scope of the Council's work is indicated in subject and geographic sense by the preamble ("development and proper utilization of the living aquatic resources of the Indo-Pacific Areas") the actual range of matter taken under consideration by the Council must be determined by what the Governments bring to the Council or ask it to consider. In this connection reference may be made to the Resolution 51/20.3 (1) adopted at the Third Meeting. Conversely, it may be assumed that the Council will consider any matter within this scope which any Member Government might ask it to consider and, equally, will refrain from discussing any matter which any Government might ask, and secure concurrence, that it should not discuss. Nevertheless, it must be assumed that the Council must exercise a corporate judgment in this matter and decide (seeking approval of the Governments where necessary) the subjects and areas which should receive consideration and the relative importance which should attach to each. In this connection reference may be made to the Resolution [Proc. 2(1):8] adopted at the Second (Cronulla) Meeting *"that the Council in plenary session decide which problems demand priority attention and design a programme to achieve sound application of results."*

At its first two meetings the Council concerned itself chiefly with an effort to determine the nature and the limits of the field within which it must work and its resolutions recommended, chiefly, the prosecution of surveys of gear, craft, methods in secondary and tertiary industry, and of the work being done in certain biological fields (tuna, neritic pelagic groups).

At its third meeting the Council endeavoured to carry its activities closer to the working face of its problems. In the general aspect it established the practice of preparing a short report on the status of the industries of the Indo-Pacific region as a means of assisting the identification of problem situations. In the particular aspect the Council adopted resolutions, submitted by the Technical Committees, relating generally to subjects such as planktology, and in a rather general way, to certain sections of material such as seaweeds, and the pelagic-neritic group. There were also recommendations relating to specifically identified problems such as the Hilsa, the use of hormonic herbicides and populations of tuna.

The work has thus now developed to the stage where serious consideration should be given to the manner in which the work should be developed in future years. It may be said that the efforts in the past four years have succeeded in effecting a separation between those activities which are essentially national and might be influenced by advices from the Council and by the results of its work and those activities which are essentially international and are to be determined by the status and rate of progress of the national activities. Whereas the Council in the past has for the second type of work relied to a very great extent on the efforts of national personnel, it may now be considered whether the nature and volume of such work has not become such that it cannot be expected to continue by such methods.

It does appear that the Council at this stage needs to give consideration to the type and amount of work which it can expect to have done for it by its Committees, Sub-Committees, and Working Groups and to the degree to which its work needs to be assigned to international personnel appointed for such work.

In connection with Committee work the Council should attempt to assay the amount and value of work which can be accomplished by such Committees during intervals between meetings by correspondence alone and that which can be made in the short period of the Council's meeting and the Council should particularly consider to what extent it should resort to special meetings of such Committees similar to the highly successful meeting of the Hilsa Sub-Committee.

In respect of work which may be assigned to international personnel, the controlling factor at this stage is of course the availability of funds, as a consequence of which the Council may not expect any great advances in this direction within the immediate future. This is especially true because the Council believes that such especially assigned personnel should remain within the region for extended periods covering at least a couple of years in order that they should fully assimilate the problems of the region. This, therefore, means that the Council would need to determine the priority which should be assigned to needs of this kind.

To summarize the problems to which the Committee has drawn attention it recommends that the Council consider the following matters:

(1) What procedures should be employed to improve the identification and analysis of problems?

(2) What matters should continue to hold a place on the Council's worksheet and what relative importance should be alloted to each?

(3) What type and extent of work should be expected of the Council's Committee (a) by correspondence, (b) by meetings during the Council Meeting, (c) by special meetings?

(4) To what extent the Council should seek to have special technical personnel assigned to work full time for extended periods on international aspects of the work and by what means and through what agencies should such personnel be employed?

ACTIVITIES OF THE SECRETARIAT.—

The activities of the Secretariat staff as part of the continuing programme of the Organization are here considered.

In the interval which has elapsed since the Third (Madras) Council Meeting the time of the Secretariat has been taken up largely with the activities of the Council both in following up the Third Meeting and in preparation of the Fourth Meeting and with extensive travel and as a result there has not been the opportunity for the consultative work which figured largely in the work of the previous years. On the other hand, much time was spent in connection with technical assistance and with the Indo-Pacific Fisheries Training Centre.

Tours and Conferences: Both the present and the previous Secretary undertook extensive travel in this period. Besides his initial visit to

Rome for briefing the present Secretary made visits to Singapore, Rangcon and Calcutta. The previous Secretary made two visits to Rome and on the first of these he visited also Holland, Denmark and the United Kingdom. Several visits were made to Singapore, to that city alone and in the course of travel to other countries. During these visits there was discussion in connection with the proposed Fishermen's School and also the work on the first report of Singapore Fisheries Survey was completed. Visits were made in connection with technical assistance work to Vietnam (Saigon), Cambodia (Phnom Penh), Indonesia (Jakarta), India (New Delhi) and Ceylon (Colombo). At the time of the attendance at the South Pacific Commission Fisheries Conference, New Zealand and Fiji were also visited in order to establish contact with fisheries workers in those countries and in the case of New Zealand to make representations for New Zealand's membership in the Council.

The previous Secretary attended the FAO conference in Rome, November 1951, Indian Science Congress, January 1952, an ECAFE International Trade Statistics meeting in January 1952, and the South Pacific Commission Fisheries Conference in May 1952. At the Science Congress the Secretary presented a paper on the fisheries in South East Asia.

TECHNICAL ASSISTANCE: The principal commitment in this field was the Indo-Pacific Fisheries Statistics Training Centre; the course lasted six weeks, but preparations for it, and various clearing-up activities afterwards, made this a time-consuming task. In addition it was found desirable to give two brief, ten-day preliminary courses to Thai officers. Apart from this the staff participated in discussions, prepared documentation, or gave field supervision, concerning technical assistance projects in Vietnam, Cambodia, Thailand, Ceylon, India, Burma, Pakistan and the Philippines.

LIAISON

FOOD AND AGRICULTURE ORGANIZATION

At the Third (Madras) Meeting of the Council in February, 1951, a report was received from a Special Committee which had met to consider the question of relationship with other International Organizations and a Resolution was passed, among others, to the effect that:

> "When a number of Councils is set up a plan or scheme of coordinating the development and research programmes of mutual interest will be highly desirable, if not absolutely essential. The F.A.O. might be apprised of the opinion at this stage."

The Executive Committee has accordingly given consideration to the question of the relationship of the Council with other organizations and, particularly, with its own parent Organization and a submission was made to the Director of Fisheries Division, F.A.O., that, in the light of the Council's Agreement and history, the Committee believed that the intention had been to create an instrument for the effective expression of technical opinion on fishery problems in the region, not only for the benefit of the fishery personnel and the governments of the area, but also as a part of the general programme of international collaboration in respect of the general food problems of the world. The opinion was expressed that the mere submission of the Council's reports to the Conference was not in itself sufficient and that it was also important that the opportunity should be given to the Council for representations to be made on its behalf in the deliberations which involved technical fisheries problems. Attention was drawn to the fact that the former Standing Advisory Committees no longer existed and it was suggested that such a method as the above would fill the gap thus created.

A reply was received from the Director, Fisheries Division, to the effect that, the Governments who make up the IPFC being already represented at Sessions of the FAO Conference, the IPFC can offer advice to its Member Governments as to what, in its opinion, would best be included in the FAO program for the development of aquatic resources in the Indo-Pacific region and it can offer the same advice to the Director-General.

It was moreover suggested that steps might be taken to place upon the agenda of the FAO Conference an item providing for the consideration of the IPFC Annual Report. Section I of the IPFC Proceedings or a summary of it could then be presented to the Conference as a Conference Document. This would have the advantage of giving more opportunity to the FAO delegations, previously briefed by their respective Fisheries experts, to bring the resolutions and advice of IPFC to bear upon their deliberations.

In February, 1952, the Chairman was advised of the establishment, under the auspices of the Organization, of an Interim Committee on Fish Handling and Processing, consisting of the representatives of several Member Governments.

The Secretariat of this Interim Committee is serviced by the Chief of the Technology Branch, FAO Fisheries Division.

It was requested that the Council assist the Interim Committee with information regarding its Working Group on Fisheries Products for Tropical Consumption and, if possible, nominate some persons who are actively engaged in work in this field to assist the Interim Committee.

The request was circularized to members of the Sub-Committee on Fish Processing and Marketing but the replies received have not been encouraging. The Executive Committee feels that an active liaison between the Rapporteur of the IPFC Sub-Committee and the FAO Interim Committee would be highly profitable and would form the logical contact between the Interim Committee and the Council's Sub-Committee. It has unfortunately not been possible to establish this liaison, owing to the Secretariat having no information as to the nomination of a Chairman of the Sub-Committee; moreover, Monsieur Lafont of the Fisheries Research Institute, Phnom Penh, Cambodia, who had been given a specific assignment in this connection, was absent from the Region during the greater part of 1952.

On August 29, 1952, the Secretary of the Interim Committee again asked the Secretariat for the nomination of one or several fishery products Technologists who could co-operate in this work, and the Executive Committee suggests, upon the appointment of the corresponding Sub-Committee for the ensuing period, it be given the special assignment of maintaining liaison with the Secretary of the Committee on Fish Processing and Handling.

The Secretariat was further apprised of the arrangements being made for the holding of F.A.O. Regional Pre-Conference Meetings, that for Asia and the Far East being planned for early July, 1953, the venue depending on invitations from host Governments. The purpose of the Pre-Conference Meetings is to discuss targets in overall agricultural policy and the approach to specific problems. It has been sugested by the Fisheries Division, F.A.O., that steps be taken to have included in the Agenda of the Pre-Conference Meetings a discussion on Processing, Distribution and Marketing of fish, and that the Regional Councils give consideration to this proposal.

The Executive Committee, while not underestimating the importance of fish handling and processing as one of the possible major solutions to world food distribution, still feels that comprehensive discussions of all aspects of the fishery industries should take place at the Pre-Conference Meetings.

The Executive Committee further feels that representation of the Regional Fisheries Councils at the Pre-Conference Meetings is within the terms of reference of the Council and that such representation would contribute in some measure in preparing the ground for discussion of Regional and Inter-regional fisheries problems at the Conference level.

It is sugested therefore that the Council may desire to authorize the Executive Committee to represent it at such Pre-Conference or other Meetings as may be convened by the Food and Agriculture Organization and at which the representation of the Council is invited, and that such authority should include the faculty of the Committee to nominate a suitable delegate or delegates to the said Meetings.

General Fisheries Council for The Mediterranean

The Director General of FAO, in his monthly letter for September, 1952, calls attention to the fact that the valuable work already accomplished by the Indo-Pacific Fisheries Council has made the organization eager, for a long time, to establish similar Councils in other parts of the world. It was felt that only through such an instrument as a Regional Fisheries Council could the most progress be made in training, technique and production problems peculiar to the various regions of the world.

One of the areas where it was believed that a Council could be of particular help is the Mediterranean. Here, although the general productivity is much lower than that of many other seas, fishing is bound to provide a substantial part of the animal protein food for many of the neighboring countries. In recent years, many Mediterranean countries have considerably developed their marine fisheries and fish culture, and increased their production. To ensure and to develop further this production, however, it will be necessary to use new fishing methods and improved gear and to find new fishing grounds. Also necessary are research, experimentation, expert advice and technical training through the provision of scholarships and the establishment of training centers.

With a view, therefore, to bringing into being a General Fisheries Council for the Mediterranean, based on the experience gained in the operation of the I.P.F.C., the Director General called together at Rome in September, 1949, a Meeting of the Member Governments of the Organization in the Mediterranean area. A Constitution was drafted for the formation of the G.F.C.M. This Constitution was in due course ratified by five Governments and came into operation as from 20th February, 1952. The General Fisheries Council for the Mediterranean held its first meeting at Rhodes, 21-24 July. The meeting was attended by delegates from France, Greece, Israel, Italy, United Kingdom and Yugoslavia, and observers from Monaco, the U.N., the International Council for the Exploration of the Sea and the International Commission for the Scientific Exploration of the Mediterranean Sea. It was agreed that the Council's programme of work would include such topics as exploration of new fishing grounds, research on tuna and sardines (new gear and methods), factors hampering the fisheries (pollution of waters, maintenance of boats and gear), fisheries biology problems, establishment of statistics and collection of information, and vocational training.

The Council elected as officers, Mr. Jean Le Gall of France, Chairman; Mr. C. Serbetis of Greece, 1st Vice Chairman, and Mr. T. Soljan of Yugoslavia, 2nd Vice Chairman. These gentlemen will also serve as chairmen of three technical committees established by the Council on exploration, production and utilization. In addition to these Committees, working groups will be created in each country for the study of specific questions.

United Nations Educational, Scientific and Cultural Organization

The activities of the Indo-Pacific Fisheries Council include a number of subjects in which UNESCO is also actively interested. Such "borderline subjects" come both under the heading of "education" and "science", both of which UNESCO is the recognized competent Agency of the United Nations. In the field of education UNESCO's competence in general is hardly challenged but when it comes to such specific problems as technical and vocational training, other Agencies also claim a measure of competence, as for example the International Labour Organization (ILO), while FAO (and consequently IPFC), WHO, ICAO and others maintain their interest as far as education and training in their special fields (agriculture and fisheries, medicine, aviation, etc.) are concerned. Similarly, in the field of science it is agreed that the scientific aspects of the activities of Specialized Agencies, i.e., the sciences strictly applied to the practical requirements of agriculture, fisheries, hygiene, aviation etc. lie within the competence of the respective Agencies, such as FAO, WHO, ICAO, etc.; but here again, it is impossible to draw a sharp dividing line between the various applied sciences and the fundamental sciences on which they are based and for which UNESCO is undoubtedly the competent agency of the United Nations.

In view of these interrelations a cooperation of the various sister Agencies with UNESCO in matters of common interest is an obvious necessity recognized from the beginning. This applies also for the IPFC. Liaison with UNESCO has, in fact, existed since the establishment of the Council, UNESCO was represent by observers at the FAO meeting in Baguio in March 1948 at which establishment of IPFC was decided and UNESCO observers have participated in all meetings of the Council. However, in the intervals between these meetings there was relatively little contact, at least at official level and the outcome of occasional contacts was not followed up systematically.

In the period since the last meeting the necessity of a closer and permanent cooperation has become gradually more and more apparent. The present meeting of the IPFC has on its Agenda a proposal for the establishment of an oceanographic institute for the Indo-Pacific region in which proposal UNESCO is deeply interested. In formal talks it took an active part in the formulation of this proposal. In other matters too, the contacts grew more frequent and more systematic. It is proposed now to endeavour to establish the cooperation on a firm permanent basis.

The activities of UNESCO are carried out partly at their central Secretariat in Paris which has six main Departments (Education, Natural Sciences, Social Sciences, Cultural Activities, Mass Communications and Technical Assistance) and a number of regional Science Cooperation Offices. These Offices belong to the Department of Natural Sciences but as UNESCO has no full-fledged regional offices, like FAO, WHO and others (except one for the Western Hemisphere which is just taking shape) the Science Cooperation Offices carry out activities also on behalf of the other Departments (with the probable exception of Technical Assistance in countries where UNESCO has missions under this programme). In the Indo-Pacific region UNESCO has three Science Cooperation Offices, namely:

(1) S.C.O. for South Asia
University Buildings,
Delhi 8, India

(2) S.C.O. for South East Asia,
Dj. Diponegoro 66,
Djakarta, Indonesia

(3) S.C.O. for East Asia,
United Nations Building,
Padre Faura,
Manila, Philippines.

(For practical reasons the two latter form one unit for the time being while the original seat of the East Asia Office in Shanghai, China is reduced to routine activities under a local clerk).

It is suggested that the IPFC's liaison with UNESCO should be maintained through these Offices. Members of the Executive Committee residing in cities where UNESCO maintains such Offices should act as liaison officers and should keep regular contacts with the Heads of the Offices or with officers specially delegated for that purpose. They should convey from time to time information about the activities of the IPFC which are likely to have a bearing on the work of UNESCO. *Vice versa,* UNESCO should be requested to keep the IPFC regularly informed through its Science Cooperation Offices about the activities of the Organization which may interest the Council.

It should be also agreed that whenever officers of the UNESCO Science Cooperation Offices visit on official tours the seat of the IPFC Secretariat, or members of the IPFC Secretariat are visiting seats of UNESCO Science Cooperation Offices, they should take up personal contacts with each other to make the liaison as active and up-to-date as possible. Documents should be regularly exchanged to give sufficient background material to the exchange of information.

Where no Executive Committe member resides at the seat of a Science Cooperation Office of UNESCO, it might be advisable to nominate an IPFC correspondent to maintain effective contac with UNESCO.

As to the subject and extent of cooperation, only a few general suggestion are given at this stage.

(1) Reference has already been made to the proposal to establish an Oceanographic Institute for the Indo-Pacific region. This proposal envisages a close cooperation between IPFC and UNESCO in order to ensure a firm basis of the operations on a purely scientific level (recruitment and training of scientists, scientific advice, documentation, etc.)

(2) The UNESCO Science Offices are especially devoted to bibliographical and documentation work in their region. This, if properly coordinated with the similar activities of the IPFC may lead to avoiding duplications, making the services more efficient and relieve the IPFC from some of its burdens.

(3) The UNESCO Offices also act as scientific information centers and for that purpose run microfilming, photocopying services and are specialized in tracing out-of-print, rare documents published in the region which they are serving. These services might be utilized by the IPFC and its correspondents in the member states.

(4) It is understood that the UNESCO Offices have a certain budget allocation to facilitate the travel of scientists within the region they are serving and they also arrange from time to time regional conferences, meetings or symposia on subjects which have a special interest for the region (and are not covered by other Specialized Agencies). These activities of UNESCO might also be coordinated with the activities of IPFC which may benefit from the projects of UNESCO or even make suggestions for better utilization of the available resources. For example, the following subjects may be considered for forthcoming UNESCO-sponsored regional Symposia:

(a) Ecology and Physiology of the Marine Plankton in the Central Sector of the Indo-Pacific region,
(b) A similar Symposium on freshwater plankton,
(c) The Physiological Basis of Fish Migration.

(5) In addition to the specific activities of the Science Cooperation Offices, the Central Secretariat of UNESCO has also a number of projects and activities in progress which may closely interest the IPFC. In these activities too, cooperation and coordination may be of advantage to the Council. Two examples are only given here.

(a) The forthcoming General Conference of UNESCO will have a proposition before it that a sum of $9,000 should be given to the 8th Pacific Science Congress (Manila, October 1953) in order to arrange a Symposium on physical biological oceanography. The IPFC may like to cooperate with UNESCO in advising the Pacific Science Congress about the Symposium.

(b) An earlier proposal to reproduce some diagrams of Dr. Tweedie of the Raffles Museum, Singapore for use in fisheries educational schools, is still under consideration by UNESCO. Cooperation with IPFC may give additional weight to this proposal.

The Executive Committee therefore proposes to the Council the following Resolution:

"That the Indo-Pacific Fisheries Council—having read IPFC/C52/28 prepared in collaboration with Dr. Wolsky, Field Science Liaison Officer for South East Asia, approves the steps which have been taken towards a closer liaison with UNESCO in general;

"That in particular it recommends to UNESCO that it prepare, published and make available to fisheries workers and suitable educational institutions the taxonomic charts produced by Raffles Museaum, and

"That the Council expresses its great interest in the regional hydrobiological Symposia and considering that it is within the Council in terms of reference to make a significant contribution to these Symposia, requests Technical Committee I to suggest subjects for discussion thereat."

Pacific Science Congress

From its inception the Indo-Pacific Fisheries Council has continually maintained close liaison with International Science Organization working in similar or affiliated research fields. The Pacific Science Congress was formed soon after the end of World War I as a coordinating and advisory body established by the nations of the countries bordering the Pacific Ocean. Its responsibility is related to research in many fields of science which would have received little attention in the area if there has not been international support. Among the fields of science in which the Congress has been interested, oceanography is one which is of direct interest to the Indo-Pacific Fisheries Council, and which has received especial attention from the Pacific Science Congress.

In view of the strength of the Congress interest in this field the Secretariat has maintained close contact with the Secretariat of the Pacific Congress by means of correspondence, exchange of information bulletins and literature and, where possible, by personal contact. The Council was represented by Mr. M. Tweedie as Observer at the 7th Meeting of the Congress. At the Madras meeting of the Council Dr. Villadolid was observer on behalf of the Pacific Science Congress. At its present meeting Mr. Rochford is the observer.

Within the field of oceanography the Pacific Science Congress has its standing committee with a number of sub-committees, each of which is composed of technically qualified persons. Certain personnel of the Indo-Pacific Fisheries Council (either officers of the Council or officers of member governments) are members of the committee. Mr. Rochford is member of the standing committee on oceanography, while Drs. Villadolid, Hardenberg and Kesteven are members of the standing committee on fisheries.

The Pacific Science Congress will next meet in Manila in 1953 and in addition to the sessions on oceanography to which undoubtedly the members of the Council will contribute materially, preparations have been made for a symposium on "The Physical and Biological Oceanography of the Pacific." This symposium will be financially subsidized by UNESCO. Dr. Villadolid, as chairman of the fisheries committee, is organizer of this symposium and has given to the local chairman of the national committee of the Philippines a list of the overseas experts which could contribute to the symposium. Dr. Villadolid has also recommended that the subject matter of the symposium should be developed along the following lines:

1. Marine provinces within the Pacific region.
2. Water masses and circulation in the Pacific.
3. Plankton in the Pacific.
4. Fresh water pond culture.

Since this symposium could be of great benefit to the IPFC the Council should seek ways and means of obtaining the closest possible collaboration with the Pacific Science Congress in the planning, development and delivery of the symposium in its technical aspects.

Other International Organizations

Resolution No. 9.2(1) passed by the Council at its Third (Madras) Meeting calls for the establishment of a courtesy liaison and exchange of publications with those international organizations having common interests with the Council.

During the year it has been the policy of both the Executive Committee and the Secretariat to

establish liaison with as many international organizations as possible and to develop those contacts already existing.

Relations with the Council's parent Organization is reported on above as is also that with another United Nations Organizations (UNESCO). The formation of the Regional Council for the Mediterranean, recently established under the auspices of the F.A.O. is also dealt with separately.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA.—The Vice-Chairman and the Chairman of Technical Committee I who were in Europe at the time, attended the 39th Meeting of the ICES held at Amsterdam from 1st-9th October 1951, together with observers from F.A.O. One of the principal conclusions of the Meeting was that the stocks of the most important commercial species have declined after a temporary war-time increase.

A Resolution was passed requesting the Food and Agriculture Organization to prepare annually a list of names and addresses of the Institutions engaged in work on marine cultures together with results and programmes. The system of Regional Committees as in use in the I.C.E.S. is discussed elsewhere.

As regards the 50th Anniversary Meeting of the ICES held at Copenhagen from 29th September to 7th October 1952, Dr. H. Thompson and Mr. I.S.R. Mundo were requested to act as IPFC observers and Dr. Finn, Director, Fisheries Division, attended the Meeting on behalf of the Food and Agriculture Organization.

JOINT COMMISSION FOR OCEANOGRAPHY.—The Chairman of Technical Committee II attended the Meeting at Brussels in August, 1951.

SOUTH PACIFIC COMMISSION.—The SPC held a Fisheries Conference at Noumea, New Caledonia, from 14th-22nd May, 1952, at which Dr. G. L. Kesteven, Secretary, I.P.F.C., was present as an Observer. A copy of the Commission's Report on the Fisheries Conference may be consulted in the office of the Secretariat and copies may be requested from the Secretary, South Pacific Commission, Pentagon Building, Noumea, New Celedonia.

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST.—A permanent liaison has been maintained with this specialized agency of the United Nations with headquarters in Bangkok. The principal activities of ECAFE which are of interest to the Council are as follows:

Bureau of Flood Control: An important decision taken by the Economic Commission at its eighth session was the shift of emphasis of the Bureau's work from flood control to the wider aspects of water resource development. With a view to promoting multiple-purpose river basin development in the region, the Bureau has undertaken a programme of work which inclues:

(i) A country-by-country survey of water resources, present status and future plans of development, and a study and analysis of problems and difficulties encountered in water resource development. Country surveys for China (Taiwan), India, the Philippines, and Laos have been completed and surveys for Ceylon, Burma, Indonesia, Japan, Pakistan and Thailand are under preparation.

(ii) A "handbook" giving the general principles and detailed methods of planning multiple-purpose river basin development for the use of engineers of the region is under preparation, and the F.A.O. has been asked to contribute a chapter on watershed management.

(iii) Preparatory work, in cooperation with TAA, for the organization of a training center on water resource development, proposed to be convened in 1953.

(iv) Preparation for a regional technical conference on water resource development, proposed to be convened in 1953-54.

In the course of the Secretariat's contacts with this Bureau, the question has been stressed of giving adequate study to fish passes, where called for, around dams and weirs planned in connection with multiple-purpose river basin development schemes and the importance of this phase has been accepted in principle by the Bureau of Flood Control.

Sub-Committee of Inland Waterways: Although the Organization had been invited to send an Observer to the Meeting of the Sub-Committee which was to have been held at Saigon late in September, 1952, this meeting was potponed until January, 1953, when it will most probably take place at Bandung. The matters coming under the Sub-Committee which are most likely to interest the Council and the Organization are:

(1) Methods of River and Canal Conservancy.

(2) Improved Designs and Operations of Craft.

(3) Uniform craft Measurement Plan.

(4) Comparative Study of Steam and Diesel Propulsion.

(5) Standardization of Schedules for Preventive Maintenance of Marine Engines.

(6) Training Centre for Inland Waterway Personnel.

The Secretariat, in its contacts with Mr. Van der Oord, Chief of the Inland Waterways Section of ECAFE, has stressed that the uncontrolled use of explosives in canalization projects in a danger to aquatic life which should be guarded against.

UNITED STATES TECHNICAL AID.—Although the Technical Aid projects in the countries of the Region under different agencies of the United States Government do not strictly come under the heading of International Organizations, it may be mentioned here that contact has been maintained wherever possible with the Agencies responsible. It is encouraging to learn from FAO and other sources that the mutual policy which already existed for cooperation between MSA, TCA and STEM, on the one hand, and UN specialized agencies on the other, has recently received considerable impetus from the fact that concrete directives have been issued by the makers of high policy on both sides to the effect that the utmost collaboration between the respective agencies should be sought.

Delegates are reminded that Governments entering into Basic Agreements with the Food and Agriculture Organization for Technical Assistance are called upon to inform the Organization regarding all technical assistance projects developed in their respective countries and it would be of considerable benefit to the Council if the Secretariat could be informed of all Technical Assistance Programmes related to Fisheries under way in the area, from whatever source.

PUBLICATIONS

The Council's Publications now comprise:

1. Proceedings of the Meetings
2. Special Publications
3. Handbooks
4. Occasional Papers
5. Accession Lists
6. List of Periodicals
7. Bibliographies
8. Current Affairs Bulletin

The present status regarding these is as follows:

1. *Proceedings of the Council's 3rd Meeting:* The authors of papers accepted by the Editorial Committee for inclusion in the printed proceedings were duly advised. The manuscript of Section I of the Proceedings was delivered to the printer (Madras) in February, 1951, and the bulk of the MSS. of the other two sections was delivered by July-October. The printing of Section I was completed in September, 1951, and that of Sections II and III in September 1952. With a view to avoiding the delay which occurred in the case of Sections II and III, it is proposed that in future authors furnish clear and finalised copies of papers at the time of submission so that printing may not be held up for author's corrections.

2. *Special Publications:*

No. 1—Fish Culture in Brackish-water Ponds in Java, by W. H. Schuster, English edition. The material for this was delivered to the Press (Madras) in Nov. 1951-January, 1952, and the printing was completed in September 1952.

No. 2—Fish Culture in Indonesia, by A. E. Hofstede, R. O. Ardiwinata and F. Botke. The material of this book consisting of the papers of the Seminar on Brackish-water Fish-Culture held in Indonesia in 1951 with the blocks loaned from the Indonesian Government, were delivered to the Press (Delhi) in February, 1952. A provisional issue was prepared in May, 1952, for the 2nd Seminar in Bogor, and the final printing of the book is expected to be completed shortly.

3. *Occasional Papers:* Since the last Meeting seventeen Occasional Papers of topical interest have been issued by the Secretariat as listed in Section C of Annexure I to IPFC/C52/2.

4. *Accession Lists:* The Secretariat has issued sixteen monthly lists of accessions to the library (See IPFC/C52/2 Annexure I). This service has proved to be of value, as is observed from the responses from various quarters. It has also provided a stimulus to other scientific institutions in the area to bring out similar accession lists of their libraries.

5. *List of Periodicals:* The list has been revised by the Secretariat with the assistance of Dr. S. Jones, and the new edition is under print.

6. *Bibliographies:* These are dealt with in a separate section of this report.

7. *Current Affairs Bulletin:* In accordance with the directive contained in Resolution No. 51/16.1 (2) passed at the Third (Madras) Meeting of the Council, this Bulletin has been issued bimonthly, commencing from July, 1951. Eight numbers have appeared (see IPFC/C52/2—An-

nex). The Bulletin consists essentially of new items of fishery interest mainly in the area and is based on material received from the Administrative Correspondents of Member Countries and other authentic sources. Started in mimeographed form, it has been found possible to print this Bulletin economically commencing with issue No. 5 corresponding to March, 1952.

8. *Handbooks:*

At its third meeting the Council adopted resolution 51/16.1(1) concerning the preparation of a series of handbooks on fisheries subjects. Acting on this resolution the Executive Committee has drafted a prospectus for this work as set out below: This prospectus has not yet been circularized among competent workers as requested, nor has it yet been submitted to the Editorial Committee chiefly for the reason that there had been delay in the establishment of the Editorial Committee. However, the Executive Committee has the intention to circularize this prospectus in the near future but in connection with the selection of authors for this work the Committee wishes to draw attention to certain developments which may modify the approach to the question. Firstly, the Fisheries Division at head office has felt the need for a fish culture handbook to be so urgent that it has itself embarked on the preparation of such a book, which will, however, be for the entire world. Nevertheless, the Division has arranged that the work should be prepared by sections of which one would deal with the Indo-Pacific region and would be made available to the Council to be published as one of the Council's series. The Division has announced that it conceives the possibility that there may arise similar needs in respect of other subjects and that probably similar arrangements could be made for coordination with the Council's work.

A second point is that there appears to be a likelihood that at least some of these works can best be developed by Committee activities. As an example, the statistics working group has given considerable thought to the contents of a statistical handbook and proposes that the material delivered at the IPFC fisheries statistics training centre should form the basis to the first half of this handbook. The working group has already laid down plans for the necessary revision of this material and has sketched the possible contents of two other sections of the book. Again, the Council remember its resolution No. 51/21.2(2) in which it recommended that a group of people should be responsible for a handbook describing processing equipment, methods and procedures employed and suitable for this region.

The Executive Committee therefore recommends that this question should now be referred through the technical committee to the subject sub-committees with a request that each subject sub-committee should consider the prospectus prepared by the Executive Committee and the method by which the text might be prepared and make recommendations or these points, and the Executive Committee further suggests that the whole question, including the future of the editorial committee, should be reviewed by the Council as a whole.

It is to be stressed that the series will not present reports on the results of these methods, and would describe phenomena only in so far as much description may be required for the clear exposition of the method. It would be assumed that the results of application of these methods would be published in national publications and, in special form, in the Council's Proceedings; whether a special series of publications summarising such results on a broad basis, might be undertaken by the Council, could be considered at some later stage.

In volumes V, VI and VII there will be a problem of distinguishing between the methodology of technique employed by the operative, and the methodology of research and administration to be employed by the official to whom the operative technique is itself a phenomenon.

Principal Volumes.

I. General Introduction to Fishery Science.
II. Hydrology.
III. Marine Biology and Limnology.
IV. Fisheries Biology.
V. Food Technology.
VI. Gear Technology.
VII. Fish-Culture.
VIII. Socio-economics.
IX. Statistics.
X. Administration and Development of Fisheries.
XI. Dictionary and General Index.

The outline of the principal contents of these volumes is submitted to the Council in a working paper.

REGISTER OF PROJECTS, INSTITUTIONS, VESSELS AND PERSONNEL

One of the first tasks undertaken by the Council was the preparation of a register of projects, institutions, vessels and personnel. This register was issued in two mimeographed editions, at the 1st and 2nd Meetings of the Council and it

was intended that it should be re-issued, after revision, in printed from. However, various factors have intervened to prevent the Secretariat, firstly from revising the register to incorporate new materials which had been furnished, especially from Japan, and secondly, from seeking information on the more recent changes which have taken place since the second mimeographed edition was prepared. It will be recognized, of course, that the latter difficulty will have become progressively more serious as time has elapsed. Although no detailed survey has been made of the value of the register to fishery workers, there is evidence that it has proved moderately useful and that it would be of still greater value if revised and printed. The Secretariat has occasion to refer to the work from time to time and has found that its present incomplete condition is a most serious defect: completed, it would be extremely useful. The Secretariat has been informed of the interest of Head Office in the contents of this register and of its desire to be able to use it as an authoritative source of information. Furthermore the importance of proceeding with this work is emphasized by the development of plans in the Fisheries Division, Head Office for similar work in respect of further regions of the world. The Executive Committee, after consideration of the problem, is disposed to accept the recommendation described below, which had been made by the Secretariat, for the revision of this plan of work.

The Secretariat points out that the project in its original form was intended to be all embracing and whilst the method of gathering information should undoubtedly be of this character the publication of data within one cover is likely to lead to the preparation of a volume of unweildy proportions. Again, the data of the different sections will be of varying life expectancy, that is to say, whilst information on institutions may be expected to be more or less up-to-date for a number of years, the information on personnel will change within shorter intervals, whilst that on projects will change annually. The Secretariat states that on the basis of recognition of this definition, the Head Office plans for this type of work, which relate only to institutions and personnel, propose the issue of two separate publications and different techniques for each in respect of maintaining these publications in up-to-date status. The Secretariat recommends that this project now be revised and brought into line with the project of the Fisheries Division at headquarters and that a special committee be established at the present meeting to discuss with the Secretariat the manner in which this should be done. This proposal is endorsed by the Executive Committee and now submitted for Council approval.

FISHERIES BIBLIOGRAPHY OF THE AREA

According to Article III of the IPFC Agreement, one of the functions of the Council is "to assemble, publish or otherwise disseminate oceanographical, biological and other technical information relating to living aquatic reasources", and all the four continuing committees appointed at Baguio in 1948 stressed the need for the compilation of reference to all available literature relating to the fishery problems of the Indo-Pacific Area as a primary step for co-ordinated research and development work. The Report of the Survey of the Existing Fishery Programmes and on the Collection of Special Information submitted to the first regular Meeting of the Council at Singapore in 1949 further recommended that "consideration may be given to the desirability of classification of the references and preparation of abstracts and even review of the listed works." At the Cronulla Meeting in 1950 the Committee which reviewed the Bibliographic work, Register, etc., observed that the preparation of Sector Bibliography lists as made for the Western Sector and commenced for the Central Sector by the Secretariat should be continued. The Bibliographies were to be in the form as published in the Journal of the International Council for the Exploration of the Sea, and were to be reviewed and indexed also by a band of experts to be appointed.

The work moves along two distinct lines. The first is concerned with drawing attention of workers to the information available in their field of activity, and is bibliographic work in the more usual sense. The second is concerned with informing workers on the availability of publications (journals and definitive texts) within the

region, and may be referred to as the cataloguing task.

BIBLIOGRAPHIC WORK

This work is based on what might be called a general stock-taking in the form of broad sector bibliographies which then is to be kept up-to-date by current bibliographies and supplemented by subject bibliographies in appropriate form.

Sector Bibliographies: The draft of the bibliography for the western sector is in the hands of a panel nominated by the Member Governments concerned and it is their task to review this systematically, to add to or delete references from the main body (which is arranged alphabetically and chronologically) and to provide a thorough subject index.

Dr. Westberg has continued his task of compiling references for the Central Sector, but the Secretariat has been unable to carry out its share of the task, in preparing the first mimeograph draft for the use of a panel to be appointed.

No arrangements have yet been made for bibliographies for the other sectors of the Council's area.

Current Bibliography: Pursuant to the Council's action on the same Committee's recommendation regarding Current Bibliography, Bibliographic Correspondents have been appointed by the Member Governments, and current country bibliographies have been received from three of them, viz., one for Australia from CSIRO, one for India and one for Indonesia. The first has been published in the Council Current Affairs Bulletin No. 5 and the second issued as Occosional Paper No. 52/11.

The Council may wish to give consideration to recommending to member Governments that efforts should be increased to furnish the Secretariat regularly with bibliographic lists for inclusion in the current bibliography of the Current Affairs Bulletin.

Subject Bibliographies: Bibliographies prepared by Messrs. W. H. Schuster, T. W. Burden and Dr. N. K. Pannikar *et al* on *Chanos chanos*, on the Plankton of the Western Sector and on Fishing Gear, respectively, have been issued as occasional papers in mimeographed form. The first of these is being reissued in printed form by the Rome Headquarters of the Food and Agriculture Organization. The bibliography of the Pacific Tunas by Mr. B. M. Shimada published in the U.S. Fish and Wildlife Service Fishery Bulletin No. 58 will, in accordance with the suggestion received from the Council's U.S.A. Bibliographic Correspondent be available to serve the Council's purpose. Other recent subject bibliographies of interest are the published bibliographies on Hilsa by Dr. S. Jones and on Fish-Culture in India by Mr. T. V. R. Pillay, and those under preparation on Socio-Economics by Mr. L. P. D. Gertenbach, on the Food and Feeding of Indian Fishes by Dr. T. J. Job and on Fisheries Products, Processing etc. by Mr. K. Chidambaram.

The Executive Committee wishes to recommend to the Council that the Council should adopt the policy that in future subject bibliographies should be in the form only of Mr. Schuster's bibliography on *Chanos chanos*, accompanied if possible by a review article. The Committee points out that in so far as the Sector bibliographies are to be indexed in subject fashion, and that similar cumulative indexes would be made of current bibliographies, Subject bibliographies, which are simply lists of references, cannot be considered as being anything more than a reprinting of selected parts of sector and current bibliographies and therefore are unnecessary. Bibliographies such as the *Chanos chanos* bibliography are informative, and if accompanied by a review article would also be discriminating and a useful guide to beginners in the subjects.

CATALOGUES

Following a plan similar to that in the bibliographic field this work should be based upon a definitive catalogue of literature relating to fisheries and of interest to fisheries workers held in institutional libraries of the region, and should be kept up-to-date by accessions lists and supplemented by the special list of periodicals of this nature published within the region.

Institutional catalogue: Some institutions have already furnished lists of relevant literature held in their libraries: Bibliotheca Bogeriensis from Indonesia (Occasional Paper No. 52/10 B), a list of Periodical and Serial Holdings, etc., of the Pacific Oceanic Fishery Investigations Library, Honolulu, from the U.S.A. and Accession Lists (a) of the POFI Library, Honolulu; (b) of the Library of the Fisheries Division, Commonwealth Scientific and Research Organization, Australia; (c) of the Central Marine Fisheries Research Station Library, India and (d) of the Library of the Faculty of Medicine, University of Malaya. Considerations should now be given to the means whereby this work may be brought to completion.

Accession Lists: Certain institutions of the region have been issuing lists of accessions to their libraries for a number of years. The Executive Committee during 1950 recommended to institutions generally that this practice should be extended. This recommendation has been acted upon by certain institutions. On the directive of the Executive Committee the Secretariat has now for some time been issuing a list of accessions to the library of the regional office. A comprehensive list was issued in April, 1951 and 15 other lists have been issued monthly since then. It is hoped that in time it may be possible for the Secretariat to issue a consolidated accession list for the region.

Periodical List: In pursuance of instructions given to the Secretariat by the Executive Committee, a revised edition of the List of Scientific and other Periodicals dealing with fisheries published in the Indo-Pacific Area in 1951 is now in the course of printing. Mention may be made here of the general Lists of Scientific and Technical Journals published in South East Asia (Philippines, Indonesia, Malaya, Thailand, Indo-China and Hongkong) published by UNESCO.

DISTRIBUTION AND EXCHANGE.—A revised distribution and exchange list is being maintained by the Secretariat and publications are being despatched to the persons and institutions named thereon.

CONCLUSION

It will be recognized that this program has developed substantially and is likely to develop much further. Consideration will soon have to be given to the means whereby the program may be maintained.

SECRETARY'S REPORT ON THE FINANCIAL AFFAIRS OF THE COUNCIL

1951

		Expenditure U.S. $	*Budget Allocation in U.S. $*	*Revised (f) Allocation in U.S. $*
A. EXECUTIVE COMMITTEE TRAVEL: (a)			2,000.00	1,000.00
IPFC 1st (1951/52) Executive Committee Meeting, Madras, February, 1951. Expenses of Chairman, Vice Chairman, and Member		—		
IPFC 2nd (1951/52) Executive Committee Meeting, Singapore, July, 1951. Expenses of Chairman, Vice Chairman, and Member		806.50		
B. PRINTING: (b)			2,000.00	2,500.00
Temporary typing services and overtime	66.38			
Air freight & postage of MS	51.20			
Miscellaneous printing	10.69			
Printing of Section I of Proceedings (c)	259.82			
Paper supplies	214.47			
IPFC Special Publication No. 1 (d) ..	680.00			
Printing of Sections II and III of Proceedings (d)	1,000.00	2,282.56		
C. MEETING:			750.00	750.00
Expenditure for the 3rd IPFC Meeting, Madras, India, February, 1951. Interpretation services, postage and telegrams, publicity, films and incidental secretariat expenses		687.20		
D. MISCELLANEOUS EXPENSES: (e)			500.00	1,000.00
Overtime	1.38			
Office equipment	138.35			
Shipping and freight	1.51			
Stationery & supplies	295.51			
Telegram & postage	437.81			
Temporary typing services	116.71	991.27		
Total		4,667.62	5,250.00	

(a) Of the original budget allocation of U.S. $2,000, the sum of $1,000 was subsequently tranaferred to Printing and Miscellaneous Items.

(b) In addition to the original budget items of $2,000.00, an additional $500 was transferred from Travel Item.

(c) Payment made in February, 1952, and charged to 1951 budget item.

(d) Approximate figures only.

(e) In addition to the original budget item of U.S. $500, an additional $500 was subsequently transferred from Travel Item.

1952 (to 30 September)		*Expenditure U.S. $*	*Budget Allocation in U.S. $*	*Revised*(f) *Allocation in U.S. $*
A. EXECUTIVE COMMITTEE TRAVEL: (a)			2,000.00	2,250.00
IPFC 3rd (1951/52) Executive Committee Meeting, Nha-Trang, Vietnam, February, 1952. Expenses of Chairman and Member		1,068.21		
IPFC 4th (1951/52) Executive Committee Meeting, Bangkok, Thailand, July, 1952. Expenses of Chairman, Vice-Chairman and Member ...		1,063.83		
		2,132.04 (g)		
B. PRINTING: (b)			2,000.00	1,500.00
Current Affairs Bulletins No. 5, 6, & 7 .	57.14			
Library cards	25.35			
Letter head	3.81			
IPFC List of Scientific Periodicals (h)	140.00	226.30		
C. MEETING:			750.00	750.00
The Meeting expenditure for the 4th IPFC Meeting, Quezon City, Philippines, Oct./Nov., 1952, has still to be met		56.00		
D. MISCELLANEOUS EXPENSES: (e)			1,000.00	1,250.00
Office equipment	247.17			
Shipping and freight	13.31			
Stationery and supplies	196.44			
Telegrams and postage	526.89			
Bibliographic services	16.78			
		1,000.59		
Total		3,414.93	5,750.00	5,750.00

(f) An adjustment of the allocation as between item has been made by head office on representation from the Secretariat.

(g) There is an additional commitment of approximately $50 in respect of travel by the Executive Committee for the 4th Executive Committee Meeting, 1952

(h) Approximate figure only.

It is to be pointed out that these figures are subject to confirmation by the Budget and Finance Section of the Administrative Division of FAO, Rome, by whom the expenditures have been authorized in appropriate form for payment through the FAO Regional Office Administrative Division, Bangkok.

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STATEMENT OF THE I.P.F.C. BUDGET PROVIDED BY F.A.O. FOR 1952/53

It is provided in Article VI, paragraph 2 of the I.P.F.C. Agreement that certain expenses of the Council shall be determined and paid for by the Food and Agriculture Organization of the United Nations within the limits of an annual budget prepared and approved in accordance with the current regulations of the Organization.

The Council recorded, at its Third (Madras) Meeting, its belief that the I.P.F.C. Budget for 1952 should be increased for printing and other purposes by about $500 to $1,000 U.S., and cognisance of this request was taken by the Director General when presenting his Program of Work for 1952/53 to the Sixth Conference of F.A.O. which took place at Rome between 19th November 7th, December, 1951, as will be seen from the special I.P.F.C. budget figures given in that document as follows:

	1951 *U.S. $*	1952 *U.S. $*
Travel	2,000	2,000
Meetings	750	750
Equipment	500	1,000
Documents	2,023	2,000
	5,273	5,750

Other expenses, including the salaries of the regular staff of the Secretariat, will continue to be paid from the budget of the Fisheries Division of F.A.O. through the Far Eastern Regional Office in Bangkok.

As regards 1953, since the Council did not meet in the early part of the present year, the Executive Committee instructed the Secretariat to approach the Director of the Fisheries Division of the Organization apprising him for expansion of the budget be considered. A reply has

been received to the effect that, while the Division is sympathetic to the aims of the Council, its own budget has been cut back on most items and it is therefore only possible to maintain the special IPFC budget at the 1952 level. It is however stated that it may be possible to give extra financial assistance for specific projects through the Expanded Technical Assistance Programme.

The Division has, nevertheless, again been approached with the request that some increase in the funds allocated to cover the working expenses of the I.P.F.C. be contemplated when the estimates for 1954 are being prepared and that the comparatively large proportion of the earth's surface and inhabitants within the region be taken into account, together with the fact that the area is *par excellence* one which calls for such developmental and extension work as is contemplated by the Programmes of the Organization and of the Council.

STATUS OF THE FISHERY INDUSTRIES OF THE INDO-PACIFIC REGION DURING THE PERIOD 1951-1952

The quickening interest in these industries, noted in the first of these reports, has been maintained during the period under review. The operatives have become extremely active in effecting the change in their methods and their organization, and in consequence important developments have taken place in mechanization of fishing operations and in the formation of fishermen's associations. National and international programmes have contributed substantially toward this development; these contributions have included the provision of equipment, funds, and personnel for the industry and for governmental programmes of research; they have also included various projects in technical instruction. There are good reasons therefore for continuing to be optimistic about the future of these industries.

The Council believes that it is appropriate at this stage to lay down plans for a tentative appraisal of the fishery resources of the region together with an indication of the degree at which the resources are exploited. Such a summary may lead to an examination of the developments which have taken place recently in this industry and to an attempt to indicate the lines along which the industry might be expected to develop in the near future and the levels to which it might be expected that the developments should lead.

RESOURCES

A distinction may conveniently be made between inland and marine resources.

The inland resources consist of those of freshwater and those of brackish water. The assessment of these may be approached first by a measurement of the water areas within each country. The fish culture sub-committee of the Council has gathered data on these areas and Table I of this report contains the latest estimates. It will be seen that although this table is incomplete, it quite clearly shows that the area of inland waters is very considerable, in excess of 36 million hectares, and forms at least 5% of the total area of the countries for which there are estimates. This total area of inland waters includes fishponds, natural lakes, artificial lakes, etc. It does not include any estimate of the area of the river systems and other waterways with moving water. The fish production potential of these waters is of two kinds, firstly, that which is obtained by simple capture of wild stocks of fish, secondly, that which is to be obtained by fish culture practices. The first kind of yield can be increased by stocking and in some cases by conservational practices. The second type depends entirely upon human activity. The capture of wild stocks takes place almost wherever such stocks occur, and there is no doubt that very great quantities of fish are taken by subsistence operations. There are however certain localities in which very considerable quanties of fish are taken in commercial operations. Most notable of these are the lakes of Silhyet, India, the Great Lakes of Cambodia, and the great lake systems of China. But in addition, important commercial operations take place in the natural waterways of the great river systems and in some cases in artificially impounded bodies of water such as Mettur in southern India. There are no important instances of artificial stocking of open waterways but the stocking of irrigation areas, more especially with paddy cultivation, is rapidly developing as standard practice in the region. Although it is impos-

TABLE 1

AREA OF INLAND WATERS (CULTIVABLE) IN THE INDO-PACIFIC REGION

Series No.	Country	Fish Ponds		Natural Lakes	Artificial Lakes, Reservoirs, Tanks, Channels, etc.	Salt or Mangroove Marshes Suitable for Pond Construction	Lagoons & Estuarine Waters Suitable for Fish Culture	Rice Fields		Total Inland Water	Arable Land	Total Area of Country	Percentage of Cultivable Inland Water to Total Area of Country
		Fresh water	Brackish water					Without fish-culture	With fish-culture				
		ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	ha.	
1.	British Borneo	—	—	—	50	195,000	—	17,500	—	212,550	—	19,100,000	1.11
2.	Burma	—	—	—	—	—	—	—	—	—	8,754,000	—	—
3.	Cambodia	120,000	—	350,000	500	—	72,000	1,400,000	—	—	—	—	—
4.	Ceylon	—	—	—	8,000	—	117,000	350,000	—	547,000	1,469,000	6,600,000	8.29
5.	Formosa	10,318	112,921	1,500	10,000	—	—	528,879	—	—	—	—	—
6.	Hawaii	—	850	—	—	—	—	—	—	—	—	—	—
7.	Hong Kong	130	60	—	214	1,200	5,700	8,280	—	15,584		100,00	15.84
8.	India	337,980	2,671	725,783	179,943	121,166	264,444	5,762,792	1,619	7,396,398	123,820,000	316,100,000	2.34
9.	Indonesia	9,000	110,000	335,000	27,000	6,000,000	8,500,000	4,500,000	67,000	19,548,000	11,000,000	149,200,000	13.1
10.	Japan	617	—	21,000	—	—	—	495,000	18,200	534,817	5,992,000	38,200,000	1.4
11.	Korea (South)	—	—	—	—	—	—	—	—	—	2,649,000	—	—
12.	Laos	—	—	—	—	—	—	—	—	—	—	—	—
13	Malaya	150	—	—	500	300,000	—	—	300,000	600,650	2,129,000	13,530,000	4.4
14.	New Guinea (Aus.)	—	—	80,000	—	500,000	100,000	—	—	—	—	—	—
15.	New Guinea (Dutch)	—	—	—	—	—	—	—	—	—	—	—	—
16.	Pakistan	105,000	24,600	30,100	68,500	305,200	424,000	43,400	—	1,000,800	21,000,000	94,300,000	1.06
17.	Philippines	50	70,000	199,400	437	430,400	—	516,000	—	1,146,287	8,180,000	29,600,000	3.87
18.	Singapore	—	253	—	—	—	—	—	—	253	—	70,000	0.36
19.	Thailand	100	—	25,700	—	—	—	6,161,000	—	6,186,800	4,751,000	50,000,000	0.124
20.	Vietnam	—	—	—	—	—	—	—	—	—	—	—	—

sible at this stage to attempt an estimate of potential productivity of inland waters it should be possible in time for administration to make a classification of these waterways into categories taking cognizance of the principal features of such waterways and, on the basis of experience of productivity of such categories, to attempt an estimate of production. The productivity of cultivated waters is of course much greater than that of open waterways and if the modest figure of one ton per hectare could be expected, fishponds of the area, which amount to half million hectares, should be able to produce half a million tons of fish.

The extent of brackish water in the region is very considerable. The estimate of these areas is also attempted in Table 1. These waters carry natural stocks and can support culture operations. The cultivation of *Chanos chanos,* mullets and shrimps takes place principally in India, Indonesia and the Philippines.

In considering the marine resources it is desirable to attempt a division of the region into a series of sub-areas or provinces. The distribution of resources in these provinces is discussed as follows:

1. The Arabian sea undoubtedly contains pelagic resources, but of these however little is yet known and there is virtually no fishery. As an exception to this mention must be made of the fisheries of the Laccadive and Maldive Islands.

2. Indo-Pakistan continental shelf is known to carry both demersal and pelagic resources and these are at present subject to fishing operations. There is every reason to believe that the yield from the demersal resources could be greatly increased especially by operations off the Kathiawar Coast and also on the Wadge Bank. The pelagic resources, which include Rastrelliger and the Indian oil sardine, are subject to considerable exploitation. It is possible that extensive exploration and research might stabilize and sometimes increase the catch from these species for which possibly the main problem is the improvement of the knowledge of the behavior of fishes. There is an extensive littoral stock in this province and the littoral of Ceylon may conveniently be taken as part of this. This stock, of course, is subject to continuous fishing. The possibility of mid-water stock, either as permanent inhabitants or as transients from the demersal or the pelagic, has not yet been explored.

3. Bay of Bengal.—This province has known littoral resources which are intensively fished and demersal stocks whose limits outward from the coast are as yet undefined. Undoubtedly, this province also carries pelagic resources and perhaps mid-water resources.

4. Andaman Sea.—This province is known to carry extensive demersal stocks as inhabitants of the reefs of the Andaman and Nicobar Islands and of the Mergui Archipelago. Undoubtedly there are pelagic stocks.

5. Strait of Malacca.—This small province carries littoral stocks, and in off-shore water both pelagic (Rastrelliger) and demersal stocks, all of which are subject to relatively intense fishing.

6. Indian Ocean.—It is known that there are pelagic resources (including tuna) in this province which is, of course, of tremendous area, but they are subject to no fishing.

7. Gulf of Thailand and Southern South China Sea.—This area contains littoral stocks which are subject to very intense fishing especially in the Gulf of Thailand. Demersal stocks are known to be present in the off-shore waters but these are not exploited to any great extent. Pelagic resources are known to be present.

8. Gulf of Tonkin and the Northern South China Sea.—The littoral stocks of this province are intensively fished. Off-shore demersal stocks are intensively fished in the Gulf of Tonkin and off the China coast. Pelagic stocks are also extensive and these are fished intensively at least off the China coast.

9. East China Sea and Yellow Sea.—This province carries very considerable stocks of fishes in all strata and is one of the most intensively fished provinces of the region. The littoral fisheries are very intense.

10. Sea of Japan.—This province also is extremely rich in littoral and off-shore stocks and also is very intensively fished.

11. Western Sunda Seas.—This province carries rich littoral stocks and these are extensive areas with demersal stocks in off-shore waters (chiefly reef fish) and it also carries considerable pelagic stocks.

12. Eastern Sunda Seas.—Besides its littoral stocks and demersal stock which are essentially reef fish, this area carries some heavy stocks of pelagic off-shore fishes including the flying fish and tuna. The former are subject to intensive fishing.

13. Pacific Ocean.—This province, which should in due course be subdivided, carries abundant littoral stocks in the reefs and lagoons of islands

and undoubtedly carries an abundance of oceanic pelagic fishes. The fisheries are relatively neglected.

FISHERY INDUSTRIES

Fishing Operations.—The most striking feature of the marine fishing industries of the region during the period is the vigor with which mechanization is being effected. It is probably true that some development of this kind is taking place in every country of the region by the action of the fishermen themselves; sometimes the change involves the installation of an engine in an existing craft, sometimes new craft have been built. Notable instances of such vigorous development are those of Bombay Province, Malaya, Singapore, and Hongkong. This move is being assisted in various ways by Governments, as the Governments of Bombay, Singapore and Hongkong. Coupled with this move on the part of the fisermen are the projects receiving external aid under Technical Assistance programmes; thus, the Government of Indonesia has received a substantial contribution of vessels and engines from the U.S. under the MSA and it is understood that a similar contribution will be received by the Government of India. Again, the Food and Agriculture Organization has been assisting the Government of Ceylon in a survey of its indigenous craft and in experimentation on the introduction of mechanization. An important element of this move toward conversion of the fishing operations is the action of various Governments in conducting deep-sea operations with vessels from overseas; these include the Government of India's Deep Sea scheme operating from Bombay (with which may be associated the operations of a Japanese unit from the same port), the Government of West Bengal's project with Danish vessels operating out of Calcutta, and the continuation by the Government of Ceylon of its trading operations on the Wadge Bank. Finally, in this connection should be noted the apparently highly successful mother-ship operations in fishing for tuna in the Pacific by Japanese companies under Government sponsorship.

The importance of this development is fully appreciated by the Food and Agriculture Organization which, in addition to its direct technical aid to certain governments, is preparing plans for technical instruction to fishermen in connection with mechanization, and to fishery administrators in connection with Governmental aspects of such programmes.

In respect of inland fisheries the most important aspect to note here is the growth of interest in this section. Active Governmental programmes in Pakistan, India, Thailand, Indonesia and the Philippines are supplementing the efforts of operatives in extending fish-cultural practices.

Harbour Facilities.—Plans for a fishery harbour at Karachi have been drawn up by specialists supplied under the FAO Expanded Programme of Technical Assistance and Government of Pakistan has approved the project for construction of the harbour. Survey work is being done in West Bengal and in East Pakistan to determine the need for these facilities in the Gangetic Delta. The Government of Singapore's Harbour Control point, which assists fishermen in their contacts with Administration, has been further developed and made a 24-hour service.

Marketing.—New fish market premises have been constructed in Bombay. The Karachi fish harbour plans include provision of marketing facilities. Marketing of fish from the Gangetic Delta is being surveyed on behalf of the Governments of West Bengal and East Pakistan under the FAO Expanded Programme of Technical Assistance. The Singapore Government has continued its survey of its fishing industry as preliminary to embarking on a marketing scheme; and a formal scheme is understood to be under consideration. Hongkong Government has completed the construction of new fish market premises at Aberdeen Town Market; at the same time the market system has evolved further, and several modifications in the procedure at the Kowloon market yield important increases in efficiency. The Government of Ceylon is conducting experiments in various aspects of the marketing system.

Secondary Industries.—Whilst it would appear that further progress has been made by certain countries in the re-establishment of their processing industries, chiefly for export, as for example, Cambodia, Hongkong, Japan, the picture in this sector of the industry is essentially unchanged. Some apparently successful experiments have been conducted in Hongkong in the use of artificial drying equipment.

Trade.—The most recently available information on the trade in fish and fishery products is presented in Table 2. The data, although incomplete, show clearly that the international trade in these commodities has not yet returned to its pre-war level. Of the total of 196 thousand metric tons of imports shown in this table, almost half was cured fish; of the remainder a large proportion (about 21%) was canned, of which more than half was imported by the Philippines.

TABLE 2A.—IMPORTS

Year	Country		Total Grand	Fish Fresh or Frozen	Fish Cured	Fish Canned	Crustaceans and Molusks Fresh, Frozen or Cured	Crustaceans and Molusks Canned	Other Edible Aquatic Animal Products	Fish Oils and Fats	Aquatic Animal Oils and Fats	Aquatic Mammal Oils and Fats	Fish Meals and Fertilizers	Miscellaneous Aquatic Animal and Plant Products	Miscellaneous Aquatic Mammal Products
								Metric Tons							
1950	Brunei	Q	100	*	100	—	—	—	—	—	—	—	—	—	—
1950	Ceylon	Q	35,600	*	32,000	600	—	—	—	—	—	—	3,000	*	—
1950	China	Q	16,400	*	15,200	—	1,100	—	*	*	—	—	—	100	—
1950	Hong Kong	Q	24,800	1,200	—	4,400	13,800	2,700	200	—	*	—	700	1,800	—
1949-50	India	Q	6,100	—	3,200	200	—	—	—	500	—	—	1,400	800	—
1950	Indo China	Q	300	*	200	—	100	—	—	*	—	—	—	*	—
1950	Indonesia	Q	15,600	*	12,700	2,000	500	100	—	—	—	—	—	100	*
1950	Japan	Q	5,800	*	2,000	*	100	—	—	—	*	—	—	3,700	—
1950	Malaya	Q	58,300	5,300	22,800	9,900	—	—	200	*	*	—	17,700	2,400	—
1950	N. Boreo	Q	300	—	—	300	—	—	—	—	—	—	—	—	—
	Pakistan (No Imports)	Q													
1950	Philippines	Q	28,900	*	500	26,500	300	1,000	—	—	—	—	600	*	—
1950	Sarawak	Q	3,700	*	2,100	800	*	—	*	—	—	—	*	800	—
1950	Thialand	Q	500	*	400	100	—	—	—	—	—	—	—	—	—

* Less than 100 tons.

TABLE 2B.—EXPORTS

Year	Country		Grand Total	Fish Fresh or Frozen	Fish Cured	Fish Canned	Crustaceans and Molusks Fresh, Frozen or Cured	Crustaceans and Molusks Canned	Other Edible Aquatic Animal Products	Fish Oils and Fats	Aquatic Animal Oils and Fats	Aquatic Mammal Oils and Fats	Fish Meals and Fertilizers	Miscellaneous Aquatic Animal and Plant Products
	Brunei (No imports)													
1950	Ceylon	Q	300	100	*	—	—	—	100	—	—	—	—	100
1950	China	Q	*	—	—	—	*	—	—	—	—	—	—	*
1950	Hong Kong	Q	18,200	300	200	5,000	6,600	2,100	100	—	100	—	*	3,800
1949-50	India	Q	16,300	—	16,300	—	—	—	*	—	—	—	—	—
1949	Indo China	Q	3,700	*	1,900	*	700	—	—	1,100	—	—	—	—
1950	Indonesia	Q	12,400	300	200	—	*	—	100	—	—	—	—	11,800
1950	Japan	Q	61,900	13,406	3,100	20,900	12,400	1,500	*	—	8,300	—	—	2,300
1950	Malaya	Q	25,300	100	17,500	3,300	—	—	*	*	—	—	1,100	3,300
1950	North Borneo	Q	1,300	—	800	—	100	—	*	—	—	—	—	400
1950	Pakistan	Q	15,700	5,700	5,900	—	—	—	—	—	—	—	4,100	—
1949	Philippines	Q	700	100	200	—	*	—	*	—	—	—	—	400
1950	Sarawak	Q	400	*	100	—	100	—	—	—	—	—	—	200
1950	Thailand	Q	21,900	*	21,000	—	900	—	—	—	—	—	—	—

TABLE 3.—TOTAL ANNUAL CATCH OF FISH, CRUSTACEANS AND MOLLUSKS IN 11 ASIAN COUNTRIES, 1938 AND 1947-51

Continent and Country	Prewar		Postwar				
	Year	Quantity	1947	1948	1949	1950	1951
					Metric tons		
Brunei	—	—	—	—	—	—	—
Burma	—	—	—	—	—	43,200	—
Ceylon	—	—	—	24,000	36,000	43,000	37,000
China	—	—	—	2,500,000	3,000,000	—	—
Hong Kong	1938	29,000	12,000	21,000	27,000	31,000	31,000
India	—	—	662,000	530,000	503,400	811,800	746,100
Indochina	—	266,000	—	—	410,000	—	—
Cambodia	—	—	—	—	—	—	156,800
Vietnam	—	—	—	—	—	—	—
Indonesia	1940	472,000	—	350,900	420,000	—	—
Japan	1938	3,521,000	2,967,100	2,453,800	2,980,000	3,793,600	3,796,700
Korea	1938	1,954,700	—	—	—	—	—
North	1938	1,326,000	—	—	—	—	—
South	1938	628,700	302,000	285,300	299,900	219,400	276,900
Macau	—	—	9,000	—	—	—	—
Malaya and Singapore	1936–40	87,000	119,000	139,000	162,000	185,000	177,000
Pakistan	—	—	—	—	—	—	—
Philippines	—	—	—	—	—	—	—
North Borneo	—	—	—	—	—	—	—
Sarawak	—	—	—	—	—	—	—

Production.—Information furnished to the Food and Agriculture Organization permits the preparation of Table 3 which gives latest estimates of production. It will be observed that there are numerous gaps to this table. These, unfortunately, cannot as yet be removed although statistical work is being actively developed in the region. On the other hand, attention must be drawn to the possibility that production is significantly under-estimated in certain countries where it yet proves impossible to attempt an assessment of subsistence catch. Since the report for 1951 was prepared, some preliminary investigations show that the magnitude of this neglected element is quite considerable. It is impossible, in view of the deficiency of this table to reach any conclusion on whether production in 1951 and 1952 was more or less than the production in previous years. The main impression of the available evidence is that there may have been a slight recession in total production.

Prospects.—The prospects and the development of the fisheries of the region which can be stated at this juncture, in some measures of confidence may be summarized as follows:

Inland Fisheries.—Improvements by conservation measures for the wild stock and heavily increased production by the use of stocking methods especially in conjunction with paddy cultivation. Considerably increased production in certain areas by the adoption and extension of fish culture practices in fresh and brackish waters.

Marine Fisheries.—In some areas, improvement in the quality of the yield by introduction of conservational measures and in other cases the quantity will be increased by extended operations. In the pelagic neritic, improvement by stabilization of yield from increased knowledge of the stocks. In the demersal, direct increase in production by extension and intensification of operations which will be accomplished by mechanization of craft and gear. It must be assumed that the increase is also likely in this zone by the adoption of methods of fishing in mid waters. In offshore waters, important increment to the catch by the development of new fisheries to exploit resources which at present are neglected.

GOVERNMENT PROGRAMMES

It is extremely encouraging to observe that governments of the area without exception are actively developing fishery programmes. Such developments are being based on the expansion of administrative services and an important sign of the development of governmental administration is the holding in various places in the region, of meetings and conferences of fishery officers; for instance, in Pakistan, India and Vietnam. Also the appearance of regular reports of fishery administration, such as those from East Pakistan, from various states and provinces of India, from Ceylon, Malay and Singapore, and Hongkong, and in the case of Malaya this includes a regular monthly record of the industries, constitute a very healthy sign of the growth of administrative practice in the region.

Research work is rapidly developing in the region as is shown by the growing number and the improving quality of the technical papers being published in the region. Within the past few years, certain institutions have been re-established and certain new institutions have been created as for instance, the Inland Fishery Institute of Phnom-Penh, and the Dagatdagatan Saltwater Experimental Fish Farm in the Philippines. In addition, action has been initiated for the creation of a fresh water institute at Penang, a Marine Institute in Singapore, and a fishery institute in Hong Kong.

Many governments are devoting much attention to the socio-economic problems of industries. Schemes of financial assistance in various forms have been developed in Bombay Province, Ceylon, Singapore and elsewhere. Schemes for the promotion of cooperatives have been undertaken in various parts of the regions and schemes for improvement of the facilities for education and for health for the fishing populations have also been developed. Practical schemes for improving harbour facilities, the roads used by fishermen for transporting their catch, and to give safety at sea, have been developed in certain places.

Without exception, the administrators of the region have become keenly interested in the development of a statistical programme and the response to the invitation to participate in the Indo-Pacific Fisheries Statistic Training Centers was unanimous among the governments of the region.

Most countries of the region have projects of economic development of the industries. Many of these projects relate to mechanization of fishing operations, but projects for improvement of harbour facilities, for the development of fish culture, and for the dissemination of technical instruction, have also been initiated.

COUNCIL CORRESPONDENTS

The Council at its Third (Madras) Meeting considered a proposal from the Executive Committee and recorded the view that it was desirable that the Council should be provided with Administrative and Bibliographic Correspondents and recommended to Member Governments that these should be provided. The following is a list of Administrative and Bibliographic Correspondents as communicated to the Secretariat by Member Governments.

COUNTRY	*Administrative Correspondent*	*Bibliographic Correspondent*
Australia	Secretary, Dept. of Ext. Affairs, Canberra	Mrs. L. M. Willings, Cronulla (through Dept. of External Affairs.)
Burma	Secretary to Govt., Union of Burma, Ministry of Agriculture and Forest, Rangoon	Officer-in-charge, Fisheries Bureau, Rangoon
Cambodia	Monsieur Dom Saveun, Phnom-Penh	Direction des Eaux et Forets du Cambodge (Section Recherche Piscicole du Petit–Takee, Phnom Penh, Cambodia.)
Ceylon	Mr. E.R.A. de Zylva, Colombo	Mr. E. R. A. de Zylva, Colombo
France	Monsieur R. Serene, Nha-Trang	Mon. R. Serene, Nha-Trang
Japan	Mr. Y. Hasegawa	Mr. K. Kuronuma
Korea	Mr. Chee Choul Keun, Pusan	Mr. Nam Sang Kyu, Pusan
India	Dr. B. N. Chopra, New Delhi	Dr. S. L. Hora, Calcutta
Indonesia	Mr. G. M. Charidjie Kasuma, Djakarta	Mr. A. Jansen, Djakarta
Netherlands (for New Guinea)	Ir. A. Perk, Hollandia	Ir. A. Perk, Hollandia
Pakistan	Dr. M. R. Qureshi, Karachi	Dr. H. K. Bhatti, Lahore
Philippines	Mr. C. Martin, Manila	Mr. H. R. Montalban, Manila
Thailand	Mr. Boon Indrambarya, Bangkok	Mr. Boon Indrambarya, Bangkok
U. K. (for Federation of Malaya, Singapore, N. Borneo & Sarawak);	Mr. T. F. Brenchley, Singapore	Mr. D. W. Le Mare, Penang
(For Hong Kong)	Director of Agriculture, Fisheries and Forests, Hongkong.	Director of Agriculture, Fisheries and Forests, Hong Kong.
U. S. A.	Mr. O. E. Eette, Honolulu	Mr. O. E. Sette, Honolulu.
Vietnam	Monsieur Le-Huu-Ky, Saigon	Monsieur Tran Van Tri, Saigon

The Executive Committee assumes, in the absence of directions of Member Governments to the contrary, that the nominations already received of Administrative and Bibliographic Correspondents are of a permanent nature unless and until a change should be communicated to the Secretariat. Where present correspondents have been transferred or for other reasons are no longer able to act, Member Governments are requested to nominate suitable replacements.

PROPOSAL FOR THE AMENDMENT OF THE COUNCIL'S AGREEMENT

At its Third (Madras) Meeting, the Council adopted Resolution number 22.1(1) amending the constitution of its Executive Committee by the addition of the immediately retired Chairman. This Resolution did not in itself extend the financial undertaking of the Food and Agriculture Organization to include cost of travel of the immediately retired Chairman when performing Council work between Meetings, and it has been suggested that this purpose might be accomplished by amending Article VI, paragraph 2 of the Agreement.

The Government of the Republic of the Philippines has communicated to the Secretariat a proposal for the amendment of the above mentioned Article in the following terms:

"That paragraph 2, Article VI of the Council's Agreement be amended as follows:

"Replace the word 'and' between the words 'Chairman' and 'Vice-Chairman' by a comma and insert after the word 'Vice-Chairman' the words 'and the immediately retired Chairman'."

This proposal was incorporated in the Provisional Agenda of the Fourth (Quezon City) Meeting, as circulated to Member Governments on 12th September, 1952, and the Director-General of the Organization was informed of this proposal, in acordance with provision of Section XV of the Council's Rules of Procedure, on the same date.

The Executive Committee draws the attention of the Council to the provision of Article VII of its Agreement, whereby proposals for the Amendment of the Agreement require the approval of a two-thirds majority of all the Members of the Council and that in addition the approval of the Director General of the Food and Agriculture Organization of the United Nations is required where such amendments to the Agreement extend the powers of the Council to incur expenses to be borne by that Organization.

APPENDIX 2

STUDY BY THE COUNCIL OF THE CONDUCT OF ITS WORK

The Council at its Fourth Meeting at Quezon City, Republic of the Philippines, reviewed at length the reports submitted by the Executive Committee and by the two Technical Committees, including those of the Sub-Committees, and gave special attention to that part of the Executive Committee's Report which summarizes the Council's constitutional responsibilities and poses a series of questions regarding their effective discharge, which were summarized as follows:

(1) What procedures should be employed to improve the identification and analysis of problems.

(2) What methods should continue to hold a place on the Council's worksheet and what relative importance should be allotted to each.

(3) What type and extent of work should be expected of the Council's Committees (a) by correspondence, (b) by meetings during the Council meeting, (c) by special meetings.

(4) To what extent the Council should seek to have special technical personnel assigned to work full time for extended periods on international aspects of the work and by what means and through what agencies should such personnel be employed.

The work of the Council to date has been concerned chiefly with defining fisheries problems for the improvement, development, and administration of the fisheries of the Indo-Pacific Region. Much information has been collected, compiled and summarized in various types of reports. The question arises as to whether the work to date has contributed or will contribute in the immediate future to an increase in fisheries production which is the primary concern of most member governments. There is the additional question whether better utilization of the catch has been or can be accomplished in the near future by improvements in processing, handling and distribution of fisheries products. Both of these actions, i.e. increasing production and improvements in processing and marketing are directly interrelated with the welfare of the operatives in all phases of the fishery industries but especially with that of the fishermen.

Along with these practical aspects of the Council's interest are the equally important activities dealing with fisheries management including biological and oceanographical research and the maintenance of adequate fisheries statistics. The importance of these items are fully realized by experimental fisheries workers but to a much lesser extent by some fisheries administrators.

In considering the functioning of the Committees and Sub-Committees during the course of the Meetings, attention was drawn to the fact that the only documentation available at the Meetings for obtaining basic information as to programmes, problems and methodology are the technical papers presented to the Council and therefore the bulk of the published information upon the fisheries of the region is not available for use during Council sessions. It was therefore proposed that, if alternate Meetings could be held at the Secretariat headquarters, a larger proportion of the basic published matter would be immediately available and it was proposed to investigate this possibility more thoroughly at the Council's Fifth Meeting to take place in Bangkok in January, 1954. Certainly it should be possible to have available at the Regional Office, properly classified, most of the technical papers, contributed publications and reprints available on a particular subject in the Indo-Pacific region, including Government reports and other relevant documents.

Therefore, as an example, and acting on the assumption that the Technical Committees have been almost entirely dependent for their work at the meetings upon the IPFC technical papers available to them, it was considered desirable to make an analysis of all the papers which have been received by Technical Committee I at the four Meetings of the IPFC.

In making this analysis, the functions of the Council as set out in Article III of the Agreement were used as criteria for the classification of the subject matter of these technical papers:

a. To formulate the oceanographical, biological and other technical aspects of the problems of development and proper utilization of living aquatic resources;

b. To encourage and coordinate research and the application of improved methods in everyday practice;

c. To assemble, publish or otherwise disseminate oceanographical, biological and other technical information relating to living aquatic resources;

d. To recommend to member Governments such national or cooperative research and development projects as may appear necessary or desirable to fill gaps in such knowledge;

e. To undertake where appropriate, cooperative research and development projects directed to this end;

f. To propose, and where necessary to adopt measures to bring about the standardization of scientific equipment, techniques and nomenclature;

g. To extend its good offices in assisting Member Governments to secure essential material and equipment;

h. To report upon such questions relating to oceanographical, biological and other technical problems as may be recommended to it by member Governments or by the Food and Agriculture Organization of the United Nations and other international, national or private organizations, with related interests;

i. To report annually to the Conference of the Food and Agriculture Organization of the United Nations upon its activities, for the information of the Conference; and to make such other reports to the Food and Agriculture Organization of the United Nations on matters falling within the competence of the Council as may seem to it necessary and desirable.

It was felt that an analysis into the following four types of papers and their combinations would enable the working group to ascertain which papers had contributed to the functions of the Council.

a. Those papers which simply describe the phenomena in a region without much reference to methodology, review of the subject, or formulation of problem for investigation. These have been marked with the suffix D;

b. Those papers which detail the methods employed in a particular line of investigation. These have been given the suffix R;

c. Those papers which attempt to review the work in a particular field but do not formulate local problems. These have been marked with the suffix M;

d. Those paper which review the data available and formulate problems for future investigation. These have been given the suffix F;

It is possible to have combinations of these types, for example, D. M. suffix indicates a paper in which both the descriptive and methodological aspects are considered.

In this manner, a table was prepared showing a subject and type analysis of all papers that have received consideration by Technical Committee I since the Singapore meeting. There have naturally been occasional difficulties in assigning papers to a particular type, but for the most part a decision has been possible in respect of all the papers that have been considered by Technical Committee I.

Table II lists the subject and type analysis arranged according to the country of origin of the author.

Table I showed quite clearly that some 80% of the papers received to date, and considered by Technical Committee I are descriptive only. Moreover, whilst only 50% of the papers at the Singapore meeting were descriptive, the whole of the papers at the Madras and about 80% of the papers at this present meeting fall within the category. Table II demonstrated that about 80% of the papers to date have been contributed by only a few countries, namely India, Indonesia, Philippines, United Kingdom, and Australia.

Whilst these descriptive contributions are necessary and desirable, it is an unhealthy sign that the more advanced papers concerned with the reviewing and formulating of problems have not reached a higher percentage in the Council's technical papers. Moreover, it seems necessary to request descriptive papers from those countries which as indicated in Table II, have so far given no basic data to Technical Committee I for its primary and therefore most essential task, i.e., the surveying of the programmes in hand, contemplated or desired for its particular subject division.

In order that Technical Committees may contribute more efficiently to the functions of the Council as listed previously, it is felt that:

(1) A more efficient and complete documentation of all Indo-Pacific fisheries research material should be available for the use of Technical Committees during some (at least) Council sessions;

(2) On the basis of Table II, member countries which to date have not furnished Technical papers of a descriptive nature should be encouraged to do so at future meetings.

Those countries from which descriptive papers have been received in sufficient volume should be asked to give consideration to methodological review or formulation papers.

(3) The Council's functions can better be fulfilled if:

(a) Meetings are alternated between Secretariat Headquarters and a member country;
(b) Those meetings which are held at the Secretariat Headquarters should give very close attention to sections a, b, and c of the Council's functions;
(c) Those meetings which are held away from the Regional Office are designed primarily to assist the Council in its functioning under items d to i.

Committee work can be more effective if:

(a) Each committee and sub-committee considers that its work is continuous—not merely a task occurring just prior to a meeting,
(b) committee and sub-committee chairmen commence action on recommendations immediately following the meeting,
(c) and the Secretariat provide each committee with an outline of recommended work at the close of each meeting.

It was therefore recommended that:

(1) The future meetings of the Indo-Pacific Fisheries Council should alternate between the Secretariat Headquarters of the Council and a host country including Thailand.

(2) Prior to the next meeting at Bangkok, the Indo-Pacific Fisheries Council's Secretary should give special attention to simplifying the documentation in order to reduce the cost of meetings and to permit more time for presentation of the results of work. It is anticipated that the Secretariat's files and library will be of great help to delegates and these should be made available as needed. It should be accepted as regular practice for the Executive Committee and Committee Chairmen to meet a few days in advance of the regular meeting in order to better plan the meeting. Full consideration of the best ways of providing complete documentation at the Bangkok meeting should be given full consideration at the 5th I.P.F.C. meeting.

(3) The Council should request that at all meetings the number of official receptions should be held to a minimum.

(4) All working papers on policy matters, such as executive report, secretariat, financial, suggested budget, amendments to Agreement or Rules of Procedure should be provided Member Governments at least two (2) months before the meeting so that delegations may obtain proper instructions, and provisional items on the Agenda may be considered and drafted more expeditiously.

(5) Member Governments should accordingly be requested to furnish well in advance as much information as may be possible in order to facilitate the drafting of the Executive Committee's report and other working papers and particularly the information needed for the report on the status of the industry.

(6) In a similar manner, it should be requested that technical papers intended for consideration at the Council's Meetings be prepared and submitted, if possible, two (2) months before the Meeting since the deadlines for the submission of papers have in the past seldom been adhered to. The Secretariat will study the feasibility of making such papers available in printed form at the Meetings.

(7) The meetings held in host countries should be so programmed that the fullest possible attention may be given to extension and encouragement functions of the Indo-Pacific Fisheries Council. To expedite this:

(a) The host country should be asked to prepare and circulate in advance of the meeting, adequate documentation of its fisheries programme, technical needs, and to prepare a note on major problems upon which the advice and assistance of the Indo-Pacific Fisheries Council is sought.
(b) The Indo-Pacific Fisheries Council during such a meeting should give priority and every possible attention to the research, technical and developmental needs of the host country.
(c) Sufficient time should be made available at such meetings for full discussion between the technical experts of the Indo-Pacific Fisheries Council and the local fishery workers.
(d) Any excursion programme planned by the host government should give priority to excursions which would enable the Indo-Pacific Fisheries Council to develop personal and intimate knowledge of the host country's fisheries problems.

(8) The meetings held at the Secretariat Headquarters should be so programmed as to facilitate the executive functioning of the Council, particularly those detailed in (a), (b) and (c) of Article III of the Agreement.

(9) The Secretariat should advise committee and sub-committee chairmen of the Council's plans for work at the close of each meeting.

D—descriptive only; R—review papers; M—methodology papers; F—formulation of problems for study.

TABLE 1

	Hydrology	Plankton	Tuna	Pelagic Neritic	Fish Culture	Taxonomy	Seaweed	General Biology (Shellfish & crustacea)	Hilsa	Chanos	Total
Singapore ...	1.D	1.M	—	1.D-F	3.D 1.D-M	—	1.D	1.D	—	—	6.D 1.D-M 1.M 1.D-F
Cronulla	2.D	2.D 1.M	1.D 1.D-M	—	2.D	1.D	—	12.D	—	—	20.D 1.D-M 1.M
Madras	6.D	2.D	2.D	3.D	6.D	3.D	2.D	14.D	—	1.D	37.D
Manila	2.D 1.D-M	2.D 2.D-M	3.D 1.D-M	1.M	1.D 1.R	—	1.D	—	11.D	1.D	21.D 4.D-M 1.M 1.R
Total	11.D 1.D-M	6.D 2.M 2.D-M	6.D 2.D-M	3.D 1.D-F 1.M	12.D 1.D-M 1.R	4.D	4.D	27.D	11.D	2.D	

TABLE 2

	Hydrology	Plankton	Tuna	Pelagic Neritic	Fish Culture	Fish Taxonomy	Seaweed	General Biology	Hilsa	Chanos	Total
Australia ...	2.D	1.D; 1.M	1.D	—	—	—	—	5.D	—	—	9.D 1.M
Burma	—	—	—	—	—	—	—	—	—	—	—
Cambodia ...	—	1.D; 1.M	1.D	—	1.D	1.D	—	—	—	—	4.D 1.M
Ceylon	—	—	—	—	—	—	—	—	—	—	—
China	—	—	—	—	1.D-M	—	—	—	—	—	1.D-M
France	—	—	—	—	—	—	—	—	—	—	—
India	2.D	1.M	2.D	3.D; 1.M	2.D	—	1.D	12.D	9.D	—	31.D 2.M
Indonesia ...	2.D	—	1.D	—	3.D	1.D	3.D	—	—	—	10.D
Japan	—	—	—	—	—	—	—	—	—	—	—
Korea	—	—	—	—	—	—	—	1.D	—	—	1.D
Netherlands .	—	—	—	—	—	—	—	—	—	—	—
Pakistan	—	—	—	—	1.R	—	—	2.D	2.D	—	4.D 1.R
Philippines ..	2.D; 1.D-M	2.D	1.D	—	4.D	—	—	5.D	—	2.D	16.D 1.D-M
Thailand	—	—	—	—	1.D	—	—	—	—	—	1.D
U.K.	3.D	2.D	—	—	1.D	—	—	2.D	—	—	8.D
U.S.A.	—	—	2.D-M	—	—	—	—	—	—	—	2.D-M
Vietnam	—	—	—	1.D-F	—	1.D	—	—	—	—	1.D 1-D-F

APPENDIX 3

REPORT OF TECHNICAL COMMITTEE I FOR 1951-52

This report is compiled under various sub-headings in each of which the particular asignment from the Madras meeting is given together with a summary of the work to date, and of any specific recommendations that arise out of the Sub-Committee's report and which should be assigned to the future Technical Committee I for consideration and possible action.

Generally Technical Committee I has accomplished much in the interval since the Madras meeting, but it is the view of the Chairman that a definite limit must be placed upon the type of technical work which can be successfully organized by correspondence. The success of the 1952 Hilsa Meeting at Calcutta is indeed proof of the results to be obtained by personal exchange of ideas and results in a particular technical field. In view of this the Chairman feels that the time is ripe for an investigation of the possibility of attaching technical staff to the I.P.F.C. Secretariat. This matter will probably be much discussed in the full Council sessions, but it is given here as a personal recommendation of the Chairman of Technical Committee I.

Hydrology Sub-Committee

This Sub-Committee was requested at the Madras Meeting to:

(1) *Propose measures for the compilation and tabulation of surface temperature and salinity data and their display in atlas form.*

The Sub-Committee has received information from practically all Member Countries regarding the collection of surface temperatures and salinities. The publication by P. Ch. Veen, "Surface Salinities in the Indonesian Archipelago and Adjacent Waters", O.S.P. Publication 33, 1951, could serve as a stimulation to other countries to make greater use of commercial ships for similar collections. At the Quezon City Meeting, a paper by Robinson, Tong and Tham Ah Kow, "A Study of Drift in the Straits of Malacca and Singapore Straits from Salinity Determination in these Waters" will be presented and will apprise the Council of the study of surface salinity in the Malayan waters. The Chairman has also received copies of surface temperature data collected in North Borneo.

The report of the Chairman of this Sub-Committee, IPFC/C52/14-A reviews the efforts to date and the difficulties involved in the preparation of an atlas of surface temperatures and salinities. The Chairman of Technical Committee I, in a letter dated 19/5/52, IPFC/C52/14-A Appendix I suggested that the preparation of an atlas be temporarily shelved and that only reneoed lists of temperatures per standard square be compiled and distributed by the Secretariat of the I.P.F.C.

At the third Executive Committee Meeting, the following aspects of the problem were listed:

(a) The procurement of co-operation from commercial lines to provide an adequate frame-work of sampling.

(b) The encouragement of Member Governments to set up the laboratory facilities for the analytical work.

(c) The standardization of field collection apparatus and method.

(d) The compilation, tabulation, and mapping of results.

(e) The publication of regular charts.

The Vice Chairman of the Executive Committee was asked to accept responsibility for (a) and (b), whilst the Chairman of Technical Committee I was asked to give thought to (c). Those items covered by (d) and (e) were left in abeyance for the present.

In his letter of 9/5/52 to the Secretary, I.P.F.C., the Chairman of Technical Committee I also makes certain recommendations regarding the collection and analysis of surface water samples.

(2) *Recomend to Member Governments that they should initiate or develop hydro-biological investigations of estuarine and neritic waters.*

The Sub-Committee has been informed of these investigations in Japan. India has referred the matter to a National Committee. The U.S.A. has assigned priority to its deep sea investigations in the area, and cannot, therefore, undertake any such work. A paper by Tham Ah Kow, "Summary of a Preliminary Study of the Physical, Chemical and Biological Characteristics of Singapore Straits," will be presented at the Quezon City Meeting, and will detail the methodology and the results to date of studies in Malayan neritic waters.

Although it has not been possible to proceed with the compilation and presentation of the surface salinity-temperature data in the form of an atlas, considerable surface information is now in the hands of the Secretariat. Technical Committee I, therefore, recommends that the preparation of renewed lists of surface temperature and salinity per standard square be proceeded with forthwith. There is, however, urgent need for standardization of the method of collection and analysis of such sea samples. Technical Committee I, therefore, requests the member countries carrying out marine studies to accept the recommendations contained in the Chairman's letter and that the Secretariat be requested to facilitate, if possible, the procurement of the necessary specialized glassware and other equipment.

HILSA SUB-COMMITTEE

The following tasks were assigned to this Sub-Committee at the Madras Meeting:

(1) *Preparation of bibliography on the Hilsa fishery of Burma, India, and Pakistan.*

Mr. S. Jones of the Central Inland Fisheries Research Station, Barrackpore, has undertaken this task. The bibliography has now been published in the Journal of the Zoological Society of India.

(2) *Development of a programme for the investigation of the racial composition of the Hilsa stocks.*

Based upon discussions at the Third Meeting, and subsequent approval by the I.P.F.C. Executive Committee, a document, entitled "Proposal for the investigation of the Hilsa stocks of India, Pakistan, and Burma," was drawn up by the Secretariat and is appended to the Sub-Committee Report. This comprehensive and practical approach to the problems involved was considered at a later meeting of the Hilsa Sub-Committee, and certain priorities agreed to.

In IPFC/C52/14-B, the full report of the Hilsa Meeting, held in Calcutta from September 4-7, is given. This meeting was a most important one, not only for the Member Governments concerned, but also as a demonstration to the I.P.F.C. of the value and practicability of sub-area regional meetings. The enthusiasm displayed and the standard of contributions augur well for the future success of this Sub-Committee's activities. It is regrettable, however, that Burma could not be represented at this Meeting.

The future application of the recommendations contained in these documents is now the responsibility of the Member Governments concerned, assisted as much as possible by technical advice from the Hilsa Sub-Committee. However, a general recommendation from Technical Committee I urging Member Governments to play as active a part in the implementation of these recommendations as possible is suggested.

TUNA SUB-COMMITTEE

At the Madras Meeting, this Sub-Committee was assigned the following task:

Compilation of morphometric data of Indo-Pacific tuna populations, especially of those around India and Ceylon.

In the full report of this Sub-Commitee, IPFC/C52/14-C, there is tabulated the available morphometric data for the whole IPFC area.

Although not listed in the report, morphometric data on tunas of Ceylon have also been made available for use by this Sub-Committee. The Chairman of this Sub-Committee, however, feels that there are still some morphometric data which have not been published in his report and makes certain suggestions regarding them.

Technical Committee I therefore strongly urges Member countries of IPFC to fully inform the Tuna Sub-Committee of any such data and to assist the work of the Sub-Committee in any way possible.

PLANKTON SUB-COMMITTEE

This Sub-Committee was requested at the Madras Meeting to:

Compile the information received from Member Countries regarding their marine, brackish, or freshwater planktological programmes, and on the basis of the study thus made, to formulate further proposals for the consideration of the Council at its next meeting.

In the report of the Chairman of this Sub-Committee, it is to be noted that Planktology is divided into inland water and seawater sections.

This division is one which exists in practice in the IPFC area, and different sampling methods have developed for these two aquatic regions. For inland waters, the methods of J. Blache seem to be supported by a majority of the members of the Sub-Committee. For sea waters, the methods followed in neritic water studies of India, Malaya, and Australia, whilst differing slightly in practical details, could be used as examples of sampling procedures in the sea water region. In his report, however, the Chairman is unable to make any reccommendation based upon the views of his Sub-Committee regarding the sampling procedure in sea water, and has asked the Chairman of Technical Committee I to prepare a recommendation for consideration at the next I.P.F.C. meeting.

However, it is necessary for the method of plankton sampling to be so designed as to give a certain level of statistical significance to the plankton information obtained. It would seem desirable, therefore, for the Biology Sub-Committee, the Statistical Working Group, and the Plankton Sub-Committee to discuss ways and means of gaining knowledge of the statistical reliability of accepted methods of plankton sampling and, on the basis of such information, to suggest the sampling procedures to be followed in a particular environment (*cf.* General Biology Sub-Committee report). Moreover, it is apparent that the level of significance desired from plankton sampling varies greatly with the use to which such data will be put.

In his report, the Chairman of this Sub-Committee has stressed the ecological use of plankton. He feels it necessary to have a quantitative description of the plankton at all size levels, and to attempt to relate such data to a number of environmental characteristics, e.g., temperature, Secchi disc turbidity etc., which will be measured at the same time as the field collections of plankton are made.

Whilst admirable in itself, this approach seems a little unrealistic for the Indo-Pacific area, and it cannot attained, by force of circumstances, for many parts of the region.

For the marine region, the Chairman of Technical Committee I suggested to Dr. Vaas, that the objects of plankton investigations in the I.P.F.C. area might be:

(a) The identification of indicator species, which would enable a fishery biologist, in the absence of hydrological data, to obtain information on the movement of water masses in his area. It was suggested that, if surface plankton collection could be made in conjunction with the salinity- temperature observations envisaged by the Hydrology Sub-Committee, the necessary material for the specialists in the area to make a selection of indicator species would be quickly accumulated.

(b) The listing of the plankton organisms which are preferred as food by the principal fishes of the area, and the concentration of effort by the planktologist on the preparation of identification keys of these organisms. The study of such plankton organisms might then yield valuable supplementary information on the causes of fluctuations in abundance of the principal food fishes.

Technical Committee I, therefore, recommends that this Sub-Committee's resolution regarding the methods to be employed in freshwater research be accepted by the I.P.F.C. However, it is further recommended that statistical studies of the level of significance to be placed upon the results of such methods undertaken.

For marine waters, Technical Committee I recommends that the methods contained in Dr. H. Thompson's Singapore papers should be adopted. Further, it is recommended that the two approaches suggested by the Chairma nof Technical Committee I be considered as practicable forms of plankton research for the IPFC marine region.

FISH-CULTURE SUB-COMMITTEE

With the appointment of Mr. Schuster to F.A.O. Headquarters, Rome, this Sub-Committee has lost the service of a most capable and enthusiastic worker. The full report of this Sub-Committee, which has been prepared by Dr. Job, is given in IPFC/C52/14 E. In this report it will be noted that considerable progress has been made in the Sub-Committee's assignments from the Madras Meeting.

(a) *Survey of cultivable waters.*—Since the Madras Meeting, information has been supplied from Cambodia, Formosa, Hong Kong, India, West Pakistan, and Thailand.

Information is still requested from Burma, China, Laos, Dutch New Guinea, Korea, and Vietnam.

A dissection of the data into freshwater ponds, brackish-water ponds, natural lakes, artificial reservoirs, marshes, lagoons, and rice fields, has shown that only about 5 per cent of the total area of the countries is composed of definitely cultivable waters, of which only a fraction appear to be under fish culture. Much further data on the hydro-biological characteristics of such waters will be necessary before any significance can be attached to any figures of potentially productive inland waters.

No specific recommendation from Technical Committee I regarding this arrangement can be given.

(b) *Determination of the quality and quantity of fish food organisms in the different types of waters with reference to their physico-chemical conditions and the variation thereof.*

This problem has been referred to the Plankton and Hydrology Sub-Committee,

and any progress in these investigations are given in the reports of these Sub-Committees.

(c) Biological studies, including:

(1) *Study of the feeding, breeding, and growth of cultivable species.*

(2) *Study of fish association and the determination of the optimum densities of compatible combinations of different age groups for stocking operations.*

In pursuance of these aims, it is to be noted the IPFC Special Publications Nos. 1 and 2, "Fish Culture in Brackish Water Ponds in Java" and "Fish Culture in Indonesia," have appeared in print and describe the practical and economic aspects upon which biological work in this field can be developed.

A further extension of this series by the publication at FAO Headquarters of a "Handbook on Fish Culture" edited by Dr. Hora, will also be most welcome. There is urgent need for the empirical practices developed in pisculture in the IPFC region to receive scientific appraisal and it is, therefore, reccommended by Technical Committee I that an Inter-Committee Working Group to consist of representatives of the Plankton, Hydrology, Fish Culture and General Biology Sub-Committees be formed to formulate proposals for such fundamental studies in pisciculture.

The two comprehensive bibliographies on *Chanos* cultivation by Schuster, and on fish farming in India by Pillay, are commendable signs of scientific enthusiasm in this field of IPFC work. The rapid development of the fish seed trade is a reminder of the urgent necessity of encouraging studies of the physiological reactions of fry and fingerlings to the abnormal conditions in the transporting containers. The encouragement of physiological studies, such as those of Basu, by the Secretariat is therefore to be commended. A report, Appendix (1), by Dr. Job on Fish Seed Conservation and distribution in the IPFC area contains certain practical recommendations regarding this subject and Technical Committee I urges that these recommendation be given further consideration by the new Fish Culture Sub-Committee.

(d) *Preparation of a handbook on the use of hormicidal herbicides in the prevention of the spread of various noxious weeds in inland waters.*

Although work on weed control has been undertaken in the Philippines and India, results to date are only preliminary and real control measures have not yet been worked out. As an interim measure, therefore, the Sub-Committee has recommended that the publication recently compiled by Dr. K. F. Vaas of the Laboratory for Inland Fisheries at Bogor should be considered as a basic contribution for the future handbook. In the future Technical Committee I recommends that the Fish Culture Sub-Committee should devote special attention to the vexed problem of hormicidal or chemical control of obnoxious aquatic plants. The Sub-Committee could perhaps seek information through FAO from countries with well developed chemical industries regarding such herbicidal practices.

(e) *Codification of information on the cases of population, on the nature and effect on stock of the reported pollution, and on any action taken to implement a remedy for such effect.*

Action on this recommendation is still in the survey stage, and no report is yet possible. The Chairman of Technical Committee I feels that work by the Sub-Committee has not yet proceeded beyond the collecting and compilation phase and no recommendation is necessary.

SEAWEED SUB-COMMITTEE

At the Madras Meeting, the following assignments were referred to the Sub-Committee:

(1) *Collection of information on the critical factor in the manufacture of Alginic Acid and/or Agar for dissemination to members of the Council.*

As a lot of this information is in the nature of industrial trade secrets, the only information that can be supplied is that contained in scientific publications. A list of the Australian published material to date has been forwarded to the IPFC Secretariat by the Bibliographic Correspondent. Presumably this has been done by the other Member Countries.

(2) *Encouragement of studies by Member Governments on the economic genera* Gracilaria *and* Hypnea.

The Chairman of this Sub-Committee reports that Australian studies of *Gracilaria* have practically ceased, and there is little prospect of a future continuation of the study. The return of Dr. Zaneveld to Holland and the absence of in-

formation from other members of the Sub-Committee renders it impossible for the Chairman of this Sub-Committee to make a formal report to the Council.

Technical Committee I has no specific recommendation concerning the activities of this Sub-Committee to place before the Quezon City meeting The Chairman of this Sub-Committee reports that unless more members are found, its functioning will be impossible.

PELAGIC NERETIC FISHERIES SUB-COMMITTEE

This Sub-Committee at the Madras Meeting was asked to compile, study and report on the programmes of investigation dealing with:

(1) *Rastrelliger kanagurta* and related speices.
(2) *Sardinella spp.*
(3) Other Clupeids and Anchovies.

In the unavoidable absence of the rapporteur of the Sub-Committee no report has been received on the activities of the Cub-Committee.* It is felt that to avoid such an event occurring again, the Sub-Committee reports should be in the hands of the Chairman of the Technical Committee at least one month before the Council meeting.

TAXONOMY SUB-COMMITTEE

The following assignments were given this Sub-Committee at the Madras Meeting:

(a) *Preparation of field keys of local common fish species, for use by members of the* IPFC.

Dr. Hardenberg has collected and deposited with the Secretariat lists of common fish species from the IPFC region. It is recommended by Technical Committee I that appropriate action be taken to transfer these lists into keys as soon as possible.

GENERAL BIOLOGY SUB-COMMITTEE

The following assignment was given this Sub-Committee at the Madras Meeting:

To study the methodological problems involved in the conduct of population studies, having particular attention to the sampling programme to be followed and the statistical techniques to be employed in the analysis of the data.

No report has been received to date,* although Dr. Pannikkar has advised the Secretariat of the collection of data relating to (1) the statistical studies of fish populations, and (2) statistical variation in plankton catches.

It is recommended by Technical Committee I that this Sub-Committee be requested to continue the collection of this very necessary statistical data relating to fisheries methodology in the IPFC region. It is further requested that it collaborate with the Statistical Working Group and the Plankton Sub-Committee, in order to come to a decision regarding the statistical significance to be attached to various methods of plankton collection. (See also the Plankton Sub-Committee's report.)

REPORTS OF SUB-COMMITTEES TO TECHNICAL COMMITTEE I

REPORT OF SUB-COMMITTEE ON HYDROLOGY

Le programme d'activité du Sous-Comité pour l'Année 1951-52 était defini par deux resolutions du III Conseil a Madras. La premiere resolution interesse le ressemblement d'observations sur la salinité et la temperature de l'eau de mer.

"Having considered the report of Technical Committee I in respect of its implementation of the proposal, made at the 2nd Meeting, in connection with the taking of surface salinity observations, and the compilation of the data thus obtained in an atlas,

"And believing that the successful development of this programme would be of assistance to the Fishery programme of Member Governments,

"Recommends to Member Governments that programmes of collecting surface salinity and temperature observations either be initiated or, if in progress, be developed, and that the results be transmitted regularly to the Secretariat,

"And requests the Hydrological Subcommittee of Committee I to propose measures for the compilation and tabulation of the data and their display in atlas form,

"And directs the Secretariat to assist the Sub-Committee in this work and to take such steps, for the dissemination of the analysed results, as might be possible."

L'Australie, l'Indonesie, les Philippines, et U.K. (Malaya) ont fait connaitre au secretariat leur programme de recherches hydrologiques. Les U.S.A. ont signalé que le programme de "U.S. Pacifis Oceanic Fishery Investigations" comporte des observations hydrographiques dans le Pacifique Nord. L'U.K. a communiqué son programme de recolte d'observations sur les temperatures de surface dans le "North Borneo." L'Inde par lettre gouvernementale N F19-21/51Fy a diffusé la recommendation du Conseil a ses services nationaux.

* Since received during the Meeting.

La deuxieme resolution charge le Secretariat de distribuer largement des copies de IPFC/C51/11 et,

> "Recognizing the importance of estuarine and neritic waters in the fisheries of the Indo-Pacific region,
> "Recommends to Member Governments that they should initiate or develop hydro-biological investigation of these waters.
> "And further, recommends to the attention of Member Governments the simple methodology described in Mr. Tham Ah Kow's paper 'Statement on Marine Investigations in Malaya,' which might easily be adopted even in countries with limited specialized staff and facilities."

Le Secretariat a fait la distribution demandée de IPFC/C51/11. Le Japon, les Philippines, l'Australie, l'Indonesie lui ont signalé leur programme de recherches hydrologiques dans les estuaires et les eaux nérétiques.

L'Inde par lettre gouvernementale a diffusé la recommendation du Conseil a ses services nationaux. Les U.S.A. ont reconnu l'importance des eaux des estuaires et des eaux nérétiques pour les pecheries de la Region Indo-Pacifique; mais dans la partie de l'Indo-Pacifique qui les interesse d'abord, ils jugent que les ressources de haute mer doivent receivoir une plus grande importance.

Un paragraphe de la premiere recommendation demandait que les resultats des observations (data) soient transmis regulierement au Secretariat. L'Inde a transmis des observations de temperature et salinité de surface faites dans quelques centres cotiers des Indes. Le Royaume Uni a transmis des observations de temperature de surface du "North Borneo."

Les U.S.A. dans leur important programme oceangraphique du Pacifique equatorial rassemblent des observations sur les salinités et temperatures de surface, qu'ils publient. La premiere publication intitulée "Mid-Pacific Oceanography January-March 1950" a paru comme un "Special Scientific Report" dans le Fisheries Report No. 54 of Fish and Wildlife Service, en Juillet 1951.

Les Philippines dans la reponse au questionnaire du Chairman ont precis;

Surface temperature: data unpublished; under reduction

Surface salinity: idem.

Haute mer: Temperature et salinité de la surface a 400 metres de fond: Aucun resultat encore publié: "data under reduction".

Un des objectifs du Comité est d'aider a la diffusion des observations que les Etats ne sont pas en mesure de mettre eux-memes en forme de publication; il interesse moins les pays comme les U.S.A., le Japon, l'Indonesie et les Philippines qui publient leurs observations. Le "North Borneo" semble seul s'etre rallié a cette methode; l'Institut Franco-Vietnamien de Nhatrang est pret a se joindre a cet effort.

En resumé l'Australie, l'Inde, l'Indonesie, le Japon, les Philippines, l'U.K., les U.S.A., la France et le Vietnam ont contribué aux travaux du Sous-Comité.

Un autre paragraphe de la premiere resolution demandait au Sous-Comité de proposer des mesures pour la compilation et la tabulation des résultats sous forme d'atlas et chargeait le Secretariat de l'assister dans ce travail. Le secrétaire en Avril 1951 a Djakarta et en Mai 1951 a De Bilt (Hollande), etudiait les possibilités de réalisation d'un plan de coordination dont il rendait compte par des lettres circulaires EXCO/51/6 et 7 qui étaient discutés a la 2e reunion du Comité executif. La question devait etre reexaminé en Octobre a De Bilt par MM. Rochford et Serene. De son coté le Chairman avait diffusé une circulaire aux membres du Comité. Les Philippines ont répondu exactement au questionnaire, les autres membres du Sous-Comité ont adressé des informations.

Au 3e Comité Executif le programme du Sous-Comité était longuement discuté, et il était reconnu qu'il devait etre poursuivi selon les grandes lignes suivante.

a) the procurement of cooperation from commercial lines to provide an adequate framework of sampling;
b) the encouragement of Member Governments to set up the laboratory facilities for the analytical work;
c) the standardization of field collection apparatus and method;
d) the compilation, tabulation and mapping of results;
e) the publication of regular charts.

It was agreed that whilst it might be expected that at present about six countries, and perhaps nine within the near future, might be able to participate in this work, it would be inadvisable to attempt to delimit zones of interest (The six countries referred to are: Australia, Indonesia, Philippines, Malaya, India and Vietnam; the three additional ones; Ceylon, Hongkong, Thailand). It was resolved that the Vice-Chairman should take up the matter of developing plans respect of *a* and *b*; that the Secretariat should communicate with Mr. Rochford in respect of *c*. In respect of *d* and *e* it was recognized that the quotation made by de Bilt put that possibility out

of court; consideration was given to the possibility of having the work become a project for an international institute. It was also proposed that perhaps the Council should simply give its temperature records to de Bilt (and to any other compiling institutions which might be interested) and make local arrangements for the salinity records for the next five years or so during which mimeograph analytical sheets might be issued.

Le projet de création d'un Institut International d'Oceanographie auquel le Comité Executif s'est alors attaché depasse le cadre du Sous-Comité et sera exposé par ailleurs au Conseil.

Une vue d'ensemble des travaux du C.I.P.P. 1951-52 interessant l'hydrologie doit signaler la diffusion des:

Ocasional Paper 51/I—Dr. Rochford
" " 51/4—Drs. Bas Becking, Tubb, Kesteven
" " 52/4—FAO Reg. Office
" " 52/7—Dr. Rochford

La part prise par Mr. Rochford aux travaux du Comité, bien qu'il n'en soit pas membre, doit etre particulierement signalé.

APPENDIX

Dr. G. L. Kesteven,
Secretary, Indo-Pacific Fisheries Council,
Maliwan Mansion,
Phra Atit Road,
BANGKOK, THAILAND.
Dear Dr. Kesteven,

Since receiving your letter, ref. Fish 376, I have given some thought to the general proposal regarding the collection and publication of surface salinity and temperature data by member countries of the I.P.F.C.

It appears to me that for some time the quantity of temperature data will be statistically insufficient for the preparation of a general temperature atlas of the area. Moreover, it is probable that the marginal areas will never have sufficient shipping coverage to render the proposal a practical possibility. In view of these limitations, apart from the question of high costs involved in the K.N.M.I. quotation, I would suggest that the idea of atlas presentation be temporarily shelved and that renewed lists of temperature per standard squares, averaged over a sufficient period of time to eliminate any local or random effects, be prepared by the I.P.F.C. Secretariat and distributed to member countries. As the data become available, salinity figures could also be added, as well as any other oceanographical data of interest. This procedure will enable the Secretariat or member countries whoever is charged with the responsibility to become familiar with the clerical and statistical procedure for the checking, reduction, and tabulation of oceanographical data so that in the future, as the quantity and spatial distribution of such oceanographical data warrant, their presentation in the form of atlases will not be difficult.

For the collection of sea surface temperatures and salinity I would suggest that greater use be made of the convenience afforded by the continuous pumping of sea water through the ships' condensor intake. It should be a relatively simple matter to interest the ships' engineers in the installation of a sensitive thermometer and a sampling tap on the condensor line. Certain precautions regarding the possible heating effect of the engine room and influence of stray ship temperatures on thermal data collected in this fashion should be adopted. However, the greater ease and personal convenience of this method of collection should lead to the collection of more reliable and consistent data.

For the storage of samples for salinity analysis, use should be made of some evaporation proof bottle. It is suggested that the standard bottle as sold by the Hydrographic Laboratory, Charlottelund, Denmark, should be universally adopted. Failing this, screw glass bottles with waxed or plastic washers would be desirable.

In the shore laboratory it is imperative that a standard analytical procedure be adopted. The following equipment should be available:

1. Knudsen bulb pattern burette—graduated from 18 to 21 doppel ml. in 1/20—bulb capacity of 36 ml.
2. Knudsen tap pipettes 15 ml. capacity.
3. Standard Copenhagen sea water or a locally prepared secondary standard.
4. Magnetic stirrer with plastic covered rotors.
5. A titration cabinet in which the light condition can be maintained constant and a yellow light focused on the titration vessel.
6. Knudsen's hydrographical tables.

Items 1 and 2 can be imported from West Germany as the best source, but recently they have been manufactured in Australia. The *approximate* costs are as follows:

Burettes: Germany £5 (stg.).
Austarlian £7/10/-
American $25.
Pipettes: American $7.50.
Germany £1/5/- (stg.).

Items 3 and 6 may obtained at low cost from Copenhagen.

Item 4 may be made from simple electrical equipment and so lessens the fatigue and consequent loss of accuracy in the routine determination of salinity that its use is essential.

Item 5 is also a desirable necessity in order to reduce errors in burette reading and the consistent detection of the same end point.

It would be necessary also to adopt some standard form of laboratory analytical sheet upon which analytical information would be entered so that cross checking of any doubtful results could be made prior to publication.

Yours sincerely,
(D. ROCHFORD).
Chairman, Indo-Pacific Fisheries Council Technical Committee I.

REPORT OF SUB-COMMITTEE ON HILSA

The following three urgent assignments were entrusted to the Hilsa Sub-Committee at the Madras Meeting:

1) *The preparation of Bibliography of the Hilsa.*
2) *Compilation of all available information on the Hilsa and the fishery that bears upon it.*
3) *Drawing up of a programme of studies on the racial composition of the Hilsa stocks.*

The preparation of a Bibliography of the Hilsa by Dr. S. Jones was completed some months ago and it has now been published by the Zoological Society of India. Copies could be made available for the inspection of the Technical Committee I, if desired.

SYMPOSIUM ON HILSA AND ITS FISHERIES

The Symposium on "Hilsa Fisheries" held on the 5th and 6th September, 1952 at Calcutta in conjunction with the meeting of the Hilsa Sub-Committee has brought together a considerable amount of information on the Hilsa and its fisheries. The items discussed at the Symposium are summarized below.

The Hilsa [*Hilsa ilisha* (Ham.)], and the fisheries bearing upon it received the attention of fishery investigators in the latter part of the nineteenth century. Enquires were then mainly directed towards an appraisal of the effects of dams, weirs an anicuts on its migratory movements. The Fisheries Departments in Madras and Bengal conducted certain investigations to study the habits of the Hilsa and the possibilities of artificially propagating them in these States. However, very little authentic information on the bionomics of the fish existed till 1938 when the Zoological Survey of India, during a faunistic survey of the Palta Water Works near Calcutta accidentally became interested in the problem. Based on the observations made in the settling tanks of the water works, it was possible to locate the breeding grounds of the fish, and with the aid of studies made in different Hilsa fishing centres in East and West Bengals and Orissa Coast, postulate the general features of its biology. Several aspects of absorbing interest came to light during the these investigations and it was found that the Hilsa fishery is subject to extreme fluctuations and the fishing intensity brought to bear upon the stocks is alarmingly high. It is now generally suspected that the Hilsa resources in our rivers are fast dwindling and the fishery as a whole is on the decline. The Indo-Pacific Fisheries Council of the Food and Agriculture Organization of the United Nations at its third meeting at Madras in 1951 recognized the importance of Hilsa Fisheries to India, Pakistan and Burma and appointed a Sub-Committee consisting of the representatives of these three countries to develop the Council's interest in the subject. This Sub-Committee met at Calcutta from the 4th to the 6th of September, 1952, to consider a Co-operative Programme of Research on Hilsa. At the instance of the Government of India, a symposium on Hilsa and its Fisheries was arranged in conjunction with the meetings of this Sub-Committee. Even though a final decision with regard to the holding of the symposium was taken rather late and the time available for making suitable arrangements was only about a fortnight, the response from specialists was very encouraging. The symposium was held in three sessions, two on the 5th and one on the 6th September. Thirteen contributions, dealing with various aspects of the problem, were presented at these sessions and representatives from East and West Pakistan, Burma, most of the States concerned in India, research workers and trainees of the Central Inland Fisheries Research Station in Barrackpore; workers in the Zoological Survey of India; Directorate of Fisheries, W. Bengal; the Zoology Department of the Calcutta University and the Fish Retailers Association in Calcutta attended the Symposium and participated in the discussions

PRESENT STATUS:—

The most important fisheries for the Hilsa exist in East Bengal in Pakistan and West Bengal in India. Dr. Nazir Ahmad, Deputy Director

of Fisheries, East Pakistan, in his contribution on "Hilsa Fishery in East Bengal" described in some detail the location of the fisheries, fishing methods and production of Hilsa in that area. He presented statistical data of the local consumption and exports of fish from East Bengal during 1949-50 and 1950-51. This data showed that 1949 was, as was expected by some previous workers, a bumper year for the Hilsa, even though due to various reasons it was not very noticeable in West Bengal. Another point of interest brought to light by him was that the current year is an exceptionally bad one for Hilsa in East Bengal, and the high prices in the Calcutta markets are largely due to the poor catches obtained during the season. Preliminary surveys in East Bengal tend to indicate that the fishery is fast declining. Mr. K. N. Das of the Central Inland Fisheries Research Station, in this connection pointed out the high efficiency and destructive nature of the fishing gear employed in some of the rivers in East Bengal.

Dr. S. L. Hora, Director, Zoological Survey of India, dealt with certain new trends observed in the Hilsa Fisheries of West Bengal. Large-scale Hilsa fishing during the winter season, he felt, would have disastrous effects on the fisheries in the region as a whole. He was of the opinion that if the Hilsa occurring in East Bengal, West Bengal and Orissa could be considered to belong to a single stock, it is probable that the West Bengal waters, where there was little Hilsa fishing for a period of about three months as a result of a religious injunction prohibiting the eating of Hilsa during that period, served as a sancturay for the species during that part of the year. The occurrence of certain new types of Hilsa in West Bengal waters now is probably indicative of a situation where the real Hilsa is losing ground in these habitats. He also invited attention to the intensification of fishing for Hilsa in the rivers of this State due to the increase in the number of fishermen brought about by the influx of displaced persons from East Bengal. Dr. Hora, in another paper on the "Proverbs and Popular Sayings concerning Hilsa Fish current in Bengal" explained the scientific basis of these popular sayings and proverbs. For example ,the saying that enjoins every Hindu to desist from eating Hilsa from Bijoya Dasami to Sree Panchami, was actually an indirect measure to protect the spent Hilsa that return to the sea and the swarms of young ones that come up the rivers for feeding.

Mr. J. C. Biswas, President of the Fish Retailers' Association, Calcutta, in a paper on the "Trends of Hilsa Prices in Calcutta Markets" detailed the sources and quality of Hilsa supplies to Calcutta markets and the causes that have contributed to the prevailing high prices. Lack of adequate supplies and increase in demand are the two main reasons that have influenced the prices. The transport and incidental expenditure has gone up and due to an increase in the number of retailers, who have to eke out a living from the limited supplies they can secure, the prices have naturally gone up. He indicated the presence of a five-year cycle in the prices of Hilsa, closely related to the five-year biological cycle discovered by the Bengal workers. Mr. G. N. Mitra, Deputy Director of Fisheries, Orissa, referred to the system of marketing Hilsa from Chilka Lake and the considerable increase in prices brought about by the numerous intermediaries involved in the trade.

Mr. C. P. Varma, Fisheries Development Officer, Bihar, described the existing fisheries in Bihar and presented estimates of production in that State. He referred to the belief current in Bihar that there is a four to five-year cycle in the production of Hilsa, just as it has been found in Bengal waters. Reviewing the "Past, Present and Future of Hilsa Fisheries in Madras", Mr. P. I. Chacko, Assistant Director of Fisheries (Freshwater Biology), Madras, described how the flourishing fisheries in the upper reaches of the Godavary, Krishna and Cauvery Rivers have been ruined by the construction of anicuts. Attempts at resuscitating the rivers by the provision of fish passes or by artificial propagation have not met with any success so far. At present, the fisheries are fairly stationary in the lower reaches of the rivers, but to maintain this, he considers it necessary to regulate the fishing intensity on a scientific basis. Dr. Rahimullah Qureshi, Director of Fisheries, Sind, and Deputy Fisheries Development Adviser to the Government of Pakistan, in a contribution on the "Palla * of Sind" discussed the obstruction caused by the construction of the Lower Sind Barrage which would cut down by about half the extent of migration of the fish. He mentioned that a fish pass has been constructed on this barrage by the engineeers without obtaining the advice of fishery experts, with the effect that the fish pass provided is of a type that is not likely to be negotiated by Hilsa. The discussion at the symposium tended to show that there are signs of depletion of the Hilsa stocks in all the areas investigated and that the present position is beset with grave dangers to this valuable natural resource common to the three countries concerned.

* Palla is the Sindhi name of the Hilsa fish.

RECENT RESEARCHES:—In a review of the progress of Hilsa investigations since 1938, Dr. N. K. Panikkar, Chief Research Officer, Central Marine Fisheries Research Station, Mandapam, summarised the results of recent investigations. The more important achievements have been the location of spawning grounds, study of the embryonic and larval development, determination of the feeding habits and the formulating of a general concept of the migrations of the fish and fluctuations of its fisheries. No reliable methods have so far been evolved to determine accurately the age and rate of growth of Hilsa in their natural habitats. Dr. S. Jones, Research Officer (Estuarine), Central Inland Fisheries Research Station, Barrackpore, narrated the aims and achievements of the Hilsa Fishery Investigations at that station, which was started in 1947. The objects of the investigations are to (1) work out the life-history of the fish in detail, (2) determine the effect of the existing fishing conditions on the fish stocks, (3) find out causes of seasonal and periodical fluctuations of the fishery, (4) study the migratory movements and the general environmental conditions influencing the migrations and (5) assay the effect of dams and anicuts obstructing the ascent of the spawning Hilsa on the stocks. As a result of these investigations, the early developmental stages of Hilsa have been described and spawning grounds in certain localities detemined on the basis of the collection of eggs and larvae. From observations of the Hilsa fisheries of Lake Chilka and the River Hooghly at Barrackpore it has been inferred that temperature and floods have the most profound effect on the migratory movements of the fish. In the discussions that followed, Dr. Jones explained that these correlations need be considered at present only as causal observations, and more detailed studies are necessary to establish these.

RACES OF HILSA:—The possibility of the occurrence of several races of Hilsa in our waters has been suggested by certain previous workers. Most of the participants in the symposium referred to the need for the elucidation of this aspect in order to understand the biology of the fish and manage its fisheries. Mr. T. V. R. Pillay of the Hilsa Fish Enquiry, Indian Council of Medical Research, in a paper entitled "A Preliminary Biometric Study of Certain Hilsa Populations" showed that an analysis of the available data has indicated the presence of three stocks of Hilsa in the region covered by East and West Bengals, Uttar Pradesh and the Orissa Coast. In the ensuing discussions Mr. Pillay pointed out that it will be necessary to study large samples from a series of localities at different times of the year to delimit the stocks. He emphasized the usefulness of regression and analysis of covariance techniques which have been employed in this contribution for the first time in a study of this type in India. In another paper on the "Morphological and Serological Characters of Hilsa with reference to Racial Investigations" he detailed the magnitude of variations of the morphological characters of the Hooghly Hilsa and discussed the usefulness of the various characters in racial studies. He also showed the presence of three blood groups among the Hooghly Hilsa and expressed the opinion that the serological characters may be of help in recognizing races of Hilsa and also in studying its migrations. Dr. K. S. Misra of the Zoological Survey of India thought that the determination of the range of migration of Hilsa by tagging will be the only suitable means of determining the races.

In the ensuing discussions, it was pointed out that, though tagging was a useful aid, morphometric studies were indispensable in such investigations. Mr. Y. R. Tripathi of the Central Inland Fisheries Research Station, Barrackpore, in a note entitled "Some Observations on Parasites of Hilsa" mentioned that distinctive parasitic faunæ are found in Hilsa from certain localities and the study of parasitic faunæ might be of help in distinguishing Hilsa stocks. Dr. B. S. Chauhan of the Zoological Survey of India did not agree with this viewpoint and thought that such studies will have little value in investigations of this type.

EFFECT OF DAMS, ARTIFICIAL PROPAGATION:—The construction of dams, weirs or anicuts across the rivers in which the Hilsa migrate, has disastrous effects on their fisheries. The range of migration is very much restricted and the fish congregate below these obstructions from where they are caught very easily and in large numbers by the fishermen. Dr. K. K. Nair of the Directorate of Fisheries, West Bengal, in a contribution on "Dams and the Problem of Hilsa" reviewed the previous attempts to provide fish passes in Madras and Orissa and expressed the opinion that it is probably not feasible to have a fish pass for the Hilsa which is at the same time technically efficient and economically sound. He suggested two solutions to the problem. One is the restriction of fishing in a specified stretch of the river below the obstructions, if the fish is found to breed there freely; and the other is artificial propagation of the species for stocking the rivers to prevent depletion of the fisheries. Dr. H. S.

Rao, Chief Research Officer, Central Inland Fisheries Research Station, Barrackpore, considered it worthwhile to start experiments in devising a suitable fish pass for Hilsa in the light of our present day knowledge, instead of losing hope because of the failures of early attempts. Dr. Cecil Miles, Secretary, Indo-Pacific Fisheries Council, pointed out that the results of artificial propagation of fishes in similar circumstances have not been very encouraging so far, and expressed the opinion that the protection of a few brood fish will be much more useful than a number of hatcheries. Dr. Mair invited attention to the fact that artificial propagation had been suggested by him only as a last resort. Dr. Rao proposed that further studies on this aspect should be taken up, at least as an academic problem of some importance.

Mr. F. Botke, Fish Culturist of the Food and Agriculture Organization, incidentally raised the question of Hilsa Culture in brackish water ponds. Dr. Rao suggested that probably flowing water was necessary for the fish to thrive in enclosed waters. Mr. Pillay explained that there is a certain amount of flow in typical brackish water bheries in Bengal which are filled up by tide water. In such bheries there is a great demand on the benthic flora as the majority of the fishes in them consist of bottom feeding herbivores, and only a part of the surface plankton is utilized. If Hilsa could be cultured in bheries, it might prove very useful from the point of view of pond economy, as it is known to feed in the surface zones on copepods and diatoms. He also emphasized the importance of experiments in the rearing of Hilsa in connection with artificial infection of the fish for studying its role in maintaining Cholera endemicity, now being pursued by the Indian Council of Medical Research.

RECOMMENDATIONS:—After the various papers had been read and discussed, the Chairman, Dr. S. L. Hora, formulated a questionnaire setting out suggestions made for research or management by the participants with a view to drawing up recomendations of the symposium for the conservation and judicious exploitation of the Hilsa fisheries. A very lively and useful discussion ensued and definite recommendations were made available to the Hilsa Sub-Committee of the IPFC to help them in the finalization of a Co-operative Research Programme on Hilsa. The study of the Hilsa stocks and their biology was considered indispensable and deserving of top priority. Tagging of Hilsa as an aid to racial studies was also considered to be of some importance, even though the prospects of recovery are not very clear at this stage. There are very strong indications to show that Hilsa stocks are being fished too heavily and an urgent need exists to assess whether the present scarcity is due to overfishing or is only due to the biological cycle, since this information is a prerequisite to the promulgation of any management measures. Researches for an appraisal of the Hilsa fisheries were considered essential and a research programme for this purpose should be undertaken for a minimum of five years, which is believed to be the period of one biological cycle for the Hilsa. As regards fish passes for Hilsa, it was recommended that research should be undertaken to find out whether there is really a necessity for fish passes in dams and weirs and if so what type of pass should be provided. It was the opinion of the house that though artificial propagation of Hilsa may be useful to the fish farmer, it has very little relation to an overfishing problem, and so deserves only a low priority in a research programme. Culture of Hilsa in brackishwater ponds, it was considered, might be feasible and experiments in this line will be worthwhile but at this stage do not deserve high priority.

S. L. HORA
Chairman
Hilsa Sub-Committe

ANNEXURE

PROPOSAL FOR THE INVESTIGATION OF THE HILSA STOCKS OF INDIA, PAKISTAN OF BURMA

The Council, at its Third Meeting, adopted a resolution establishing a working group to consider the problems of the Hilsa fisheries of this region, and recommending action by Member Governments concerned. The Working Group, which, in default of nomination from the Government of Burma, has consisted only of the representatives from India and Pakistan, has exchanged correspondence and has proposed a basic plan of research concerning the species. The present memorandum reviews these proposals and suggests a plan of action for the consideration of Member Governments.

The Hilsa is a species of very considerable importance to the three countries, India, Pakistan and Burma; and is of greatest importance in the river systems at the head of the Bay of Bengal. The species is highly prized and the catch is great, although subject to fairly considerable fluctuations. In addition to the economic importance of the catch, there is now the interest in the

species arising out of the recent hypothesis that this fish plays a role in maintaining cholera endemicity in India. The importance of early investigations of the species is therefore quite clear.

The species has distribution from the Persian Gulf to Burma, but it is not yet known whether there is a single homogeneous species, or whether perhaps there are several races, or sub-species. Whilst it is most likely that the western populations (of the Persian Gulf and of the Indus) remain quite distinct from those of the Bay of Bengal—in fact the reverse seems most improbable—the status of the Bay of Bengal stocks cannot be considered with the same assurance. There is a possibility that each separate river system has its own stock and even that each of these is further fragmented into spawning or ecological groups. This possibility has considerable bearing on the planning of the bionomic investigation of the species, and the conclusions reached in respect of it will have very great bearing on the plan of exploitation of the species; the conduct of racial investigation is therefore of first importance. The current hypothesis on the movements of Hilsa have been summarized by Pandit and Hora (1951) as follows:

(1) During the flood season, the adult Hilsa mostly swarm up the rivers for breeding purposes and move midwater. They probably breed in the lower reaches of the rivers. Some immature fish associated with these swarms move up but they probably breed much higher up next year;

(2) The young fall back to the sea or estuarine areas and move near the bottom in the Hooghly at Nawabgunge; their number is highest in October-November and the size smallest; and then the number decreases and the size increases up to February;

(3) About the same time, from November to February, the young (the progeny of the earlier breeders), which had migrated to the sea during the flood season and have already grown to 7 to 9 inches, approximately at the rate of 1 inch per month, form a big fishery during this season;

(4) In March and April, the young, known as Jatka, enter East Bengal waters in large swarms and form an important fishery. In fact, the forecasting of the Hilsa fishery (top during the flood season) depends upon the numbers of the Jatka fish that come up during this season. It is not a breeding phase but a feeding phase;

(5) These swarms probably move upriver and fatten as they go up and up, and mature in the middle and higher reaches of the river. The upward movement of Jatka is probably facilitated by the increase of volume of water in the rivers due to the melting of the snow in the Himalayas during the spring and hot months.

This clearly leaves open the possibility of communication between at least the stocks of the rivers flowing into the Bay of Bengal even if it should be unlikely that Cape Comorin should be rounded by these fish .

It therefore seems logical that the primary study should be biassed toward elucidation of the question of the degree of independence or interpendence of these stocks.

These investigations should follow the usual plan of (1) morphological description, (2) systematic sampling for biometrical analysis in relation to the morphology and bionomic status, (3) distributed studies including, where possible, tagging operations. Completion of these studies should establish the limits of the distinct population units and the further, more profound studies of population structure and properties would then be planned with regard for such results.

The Working Group has outlined these studies as follows:

Morphological and Anatomical Studies: The first item of work under the programme will be to undertake a detailed study of the anatomy of Hilsa. Specimens from the Hooghly, which is the type locality of the species and the source of an important Hilsa fishery, could be utilised for this work. The study should include both external and internal characters during different stages of growth. The external characters would consist of the meristic features, body measurements and colouration. The body measurements of a large collection of Hilsa consisting of all availalable size groups should be obtained so as to express the relationships of the different parts of the body in terms of regression equations and illustrated by means of graphs. From this it will be possible to ascertain whether there is a constant linear relationship between the different parts of the body and the total length of the fish and whether there is any allometric growth in the species. The method of analysis of data must be modified with reference to the results of this study. The length weight relationship of the species should be determined by the study of a sufficiently large collection.

After this study, certain characters which are likely to be useful in racial diagnosis should be selected. A tentative list of characters to be examined for samples is given below:

Meristic: 1. Fin ray counts; 2. Vertebrae; 3. Scale counts; 4. Scute counts; 5. Teeth counts; 6. Counts of Gillrakers.

Body Proportions: 1. Total length; 2. Standard length; 3. Body length; 4. Head length; 5. Length of Caudal Preduncle; 6. Height of head; 7. Height of body; 8. Least height of Caudal Peduncle; 9. Interorbital distance; 10. Diameter of eye.

Visceral: 1. Form and Length of alimentary canal; 2. Number of pyloric caeca.

Other Characters: 1. Colouration; 2. Weight in relation to length.

Intraspecific Variations: As a preliminary to finalising the sampling programme now to be attempted, a tentative measurement of the intraspecific variation of these characters should be done. For this purpose small samples of, say 30 specimens, should be collected from a series of localities and studied for the characters indicated above. This data should be analysed by the method of analysis of variance. The results would show which characters should be studied in detail and the frequency and size of samples to be examined.

Geographical Variations: Having thus finalised the sampling programme, sampling work should be carried out at different localities during different seasons. The data should be treated separately for the sexes, seasons and locality. The investigation on the biology of the species may provide certain biological features, such as the spawning season, migratory movements, growth rate or other behaviour factors against which the data will have to be statistically analysed. The analysis of variance and covariance may be a suitable technique for the purpose; and the results of this analysis will serve to ascertain the identity of stocks of Hilsa in the area of investigation.

The Working Group has proposed that the primary study, involving the three listed types of work, should be undertaken by the Member Governments concerned, in a co-operative project of research.

It would seem that this project should be planned along the following lines:

(1) the Working Group should meet, with representatives of each country, with the object of planning the programme; at this meeting assignment could be made of the several parts of the programme, as follows;

(2) the responsibility for the morphological description, and for the formulation of the measurement system to be followed could be assigned to an officer who should thereafter assure a principal role in this programme;

(3) on the basis of general information submitted at the meeting and with the aid of research workers qualified in the statistical aspects of fisheries biology, a pattern and regime of sampling for measurements could be designed; each Government would accept responsibility for assigning staff to undertake such sampling, and the work would be commenced at the earliest opportunity;

(4) each Government would make every possible effort to gather statistical data on this fishery—the inventory of its equipment and manpower, the operations and the production;

(5) arrangements would be made for uniform practice in the statistical reduction of the data, and for its compilation and comparison at a central point;

(6) arrangements should be made for subsequent meetings of the Working Group and of the research workers for the purpose of reviewing the results;

(7) consideration should be given to the retention, at the joint cost of the Governments concerned, of a senior research worker to participate in the field work in the three countries, to be responsible for the submitting of proposals for the extension of the programme.

Report for 1952 of the Sub-Committee on Tuna

At previous meetings of the Indo-Pacific Fisheries Council during which the opportunities to collaborate in the study of tuna were explored, it was reported "that the most urgent and fundamental problem with the tunas and one of distinctly international bearing is to determine whether the population of each important tuna species is continuous and homogeneous throughout its range or whether each is composed of a number of independent or semi-independent units and if so, the limits of each." At later conferences it was agreed to standardize the measurements used in this study as defined by H. C. Godsil (A Preliminary Population Study of the Yellowfin Tuna and the Albacore. California Division of Fish

AVAILABLE TUNA MOPHOMETRIC DATA

LOCALITY	SPECIES										
	Neothunnus macropterus [1]	Parathunnus sibi	Thunnus germo	Thunnus sp. (Bluefin)	Katsuwonus pelamis	Euthynnus sp.	Gymnosarda nuda	Auxis sp.	Grammatorcynus bicarinatus	Kishinoella tonggol	Sarda sp.
Equatorial Pacific											
120°W. Long.		20									
130°W. Long.		5									
140°W. Long.	113	31			27						
150°W. Long.	84	40	5		12						
Line Is.		87	6		66						
Phoenix Is.		1	14		19		1				
E. Marshall Is.	40	4	40		1						
W. Marshall Is.[2]	18	142	15	3	73	30	64		15		
E. Caroline Is.	12	201	91		29		1				
C. Caroline Is.		113	27	5	10						
W. Caroline Is.		32	5		7	4					
Pacific Coast, U.S.[2]			16								
Hawaiian Is.	27	227	103	1	265	64		14			
Society Is.					86						
Marquesas Is.					13						
Marianas					33	1					
Philippine Is.[3]	237				136	426	56			119	
Japan		6	10	4	31	13	2	24			
Australia				14							
Australia [4]	9		44	504		27		14		101	63
	540	909	376	531	808	565	124	52	15	220	63

[1] These are in addition to those included in a manuscript "Preliminary report on a comparison of the stocks of Yellowfin Tuna."

[2] Supplied in part by Mr. J. C. Harr.

[3] Supplied by Dr. D. V. Villadolid.

[4] Reported by Dr. Thompson, February 25, 1952.

Note: All data except those reported from Australia are on file at the Pacific Oceanic Fishery Investigations in Honolulu.

and Game, Fish Bulletin No. 70, 1948) and by John C. Marr and Milner B. Schaefer (Definitions of Body Dimensions Used in Dsecribing Tunas. U.S. Fish and Wildlife Service Bulletin. 47, 1949). At the last meeting it was reported that morphometric measurements on 2,783 specimens of 12 tuna species from 10 different parts of the Indo-Pacific region had been taken.

Since the last meeting most of the available data on the yellowfin tuna, *Neothunnus macropterus*, have been analyzed. The results are to be presented during these meetings. In addition attention is directed to the recent publication by H. C. Godsil and E. C. Greenwood "A Comparison of the Populations of Yellowfin Tuna, *Neothunnus macropterus*, from the Eastern and Central Pacific." (California Fish Bulletin No. 82.) Both of these studies indicate that the yellowfin populations are composed of independent or semi-independent units.

In addition to these reports many additional measurements have accumulated. The distribution of these data among species and localities is given in the attached table.

The analysis of these data involves a great deal of labor. It is nearly completed for the big-eye tuna, *Parathunnus sibi*, the albacore, *Thunnus germo*, and the skipjack, *Katsuwonus pelamis*, for the data available to the Pacific Oceanic Fishery Investigations, but there remain numerous other data distributed among several organizations in the Indo-Pacific area. In order to expedite the comparison of these data the Committee makes the following recommendations:

1. That institutions with a substantial amount of morphometric material on which they plan should proceed with the publication and inform the Tuna Sub-Committee of the material available on each species and the probable date of the publication.

2. That institutions having a small amount of morphometric data should list it with the Tuna Sub-Committee and consider suggestions which the Tuna Sub-Committee may make to facilitate comparison of the data with that collected by other organizations.

3. That institutions which may have accumulated large numbers of morphometric measurements but lack the facilities for accomplishing the analysis might consider having the analysis performed on IBM equipment. In Hawaii, this service costs about 35¢ per specimen having 12 measurements.

O. E. SETTE
Chairman
Sub-Committee on Tuna

Report for 1952 of the Sub-Committee on Plankton

Introduction:—

The status of plankton investigations is at varying levels in different countries primarily owing to lack of personnel and, in the case of marine work, also on account of lack of vessels. Important progress has nevertheless been made in many fields and those regions where circumstances do not as yet allow of greater progress in this type of work find themselves at a distinct disadvantage.

In certain countries, considerable help is available from investigators other than fisheries workers, especially those engaged in research in pure science at musea and universities; nevertheless, it must be admitted that, with the limited number of workers available, most of whom have to divide their time between plankton studies and a number of other subjects, progress is of necessity slow.

However, if it is taken into account that it is relatively easy to obtain new and interesting results in the fields of taxonomy and ecology, when investigating either marine or fresh waters in the tropics, it is suggested that planktonologists in the area might advantageously enlist the support of their fellow scientists abroad, in order to organize an expedition to study those waters which are economically important from the fisheries standpoint. The important results achieved in Indonesia by the German Sunda Expedition may be cited as an example of the success which is likely to attend such an enterprise.

Activities of the Sub-Committee

The Chairman of the Sub-Committee canvassed the views of the members on various subjects and propositions and in the course of time there developed a fruitful correspondence with Messrs. Tham Ah Kow, Blache, Rabanal, Panikkar, Chidambaram and Rochford. It is regretted that some members did not reply. The following may be regarded as the "communis opinio" of these men. In the separate subjects dealth with, reference will be made under the heading "Results available" to the appendices attached to this report, and under the heading "Desiderata" recommendations for further work will be discussed.

Suggestions for Further Work of the Sub-Committee

In view of the great differences existing in the sampling techniques in marine and freshwater environment and, moreover, of the different

uses made of plankton data in both environments when interpreting them for fisheries purposes as also the different requirements as regards basic knowledge on plankton of marine and inland fishery operations, it is suggested that the present Sub-Committee be divided into two, one dealing with marine and one with freshwater plankton. The brackish, estuarine environment might come within the purview of both. It must be stated that this recommendation is the private opinion of the Chairman, formulated at a stage when there was not sufficient time to consult the other members regarding this item.

RESULTS AVAILABLE AND DESIDERATA FOR FUTURE WORK ON PLANKTONOLOGY:—

A. GENERAL

I-A. Available Literature on Plankton in the Area.

a) *Indonesia:* A list of literature on the subject was given in the paper by J. S. Zaneveld, "A Review of three centuries of phycological work in Indonesia (1650-1950)"—O.S.R. Publication 21, Bandung, 1950.

b) *Philippines:* A list presented by H. R. Rabanal will be presented to the meeting.

c) *Indo-China:* Two papers by J. Blache are listed, the only ones available on Indo-China.

I-B. Desiderata as regards Literature.

a) Lists of literature on plankton from other parts of the area should be sent to the Chairman of the Sub-Committee. Mention has been made in correspondence of a list concerning India. This list did not reach the Chairman in time to be incorporated in this report.

At the Madras Meeting, the following proposal was adopted:

That the revised bibliography of Plankton in the Western Sector be completed by India as soon as possible and circulated in whatever manner may appear best and most feasible to the Editorial Committee.

It is hoped that this bibliography may soon be available.

b) When all the available literature is collected, it is proposed that the IPFC Secretariat be approached with the request that the whole list be published and circulated widely among workers in the area, who will be invited to contribute additional material.

c) The Sub-Committee should continue to collect material, which should be circulated in the form of an annual supplement to the above mentioned list.

II. Lists of Plankton Organisms in the Area.

II-A. Available.

a) An inventory of common organisms found in the sea off Singapore Straits is being prepared by Tham Ah Kow.

b) An inventory of organisms encountered so far in Indonesian inland waters is being prepared by Vaas.

c) An annotated inventory with many ecological details relevant from the viewpoint of fisheries was published by J. Blache for Indo-China.

d) An annotated inventory of organisms encountered in *Chanos* ponds in Indonesia and elsewhere was published by Vaas and Sachlan (*vide* Appendix I—Vaas and Sachlan in Special Publication No. 2. IPFC).

II-B. Desiderata as regards Plankton Lists

a) The compilation of comprehensive annotated lists of Indian marine and fresh-water plankters will be facilitated by the fact that many quantitative and qualitative studies on plankton are at present being carried on by Indian Fishery Institutes and Universities.

b) It is desirable that similar work be undertaken for the remainder of the area.

c) Even more urgently required than annotated lists, are the shorter ones, giving only those plankters which might serve as "indicator species" of certain environments; those which are important constituents of the food chain of certain fishes; and those which, for other reasons (e.g. production of noxious substances) make their presence specially noteworthy. Since this implies a profound knowledge of the fishes involved, of their feeding habits and the technique of their cultivation and capture, it is proposed to split this problem into a large number of specific ones, differing according to region and fishing industry. For each single problem one worker would be chosen and before commencing their activity these workers should agree upon the standards and criteria to be used. As a tentative suggestion—the final form to be

decided at the Meeting—and as an example of the procedure envisaged, the following names and subjects might be proposed:

Freshwater Organisms from Cambodian Inland Waters— Blache.

Organisms from Brackish Ponds— Rabanal, Vaas.

Organisms from Australian Estuaries— Rochford, Thompson.

Freshwater Organisms from Indian Ponds— Gayapati.

The lists mentioned should contain: Name and short characteristics of the organism; its distribution in terms of space and time; its environmental requirements; its chemical or physical action on the environment; its place in the food-chain; bibliography; and type locality.

III. Specialists to be consulted for Identification.

The following list of specialists suggests itself from the correspondence available to the Sub-Committee;

a) Within the Area

Dr. Subramanian	—Marine Diatoms
Dr. Prasad	—Copepods
Mr. Nair	—Fish eggs & larvae
Dr. G.T. Velasquez	—Blue-green algae

b) Outside the Area

Prof. V. Brehm	—Crustacea
Prof. F. Ruttner	—Zooplankton
Dr. Lindburg	—Copepoda
Dr.Bergius	—Rotifera
Dr. Angelier	—Hydracarinae
Prof. Prescot	—Desmids
Miss Koster	—Blue-green algae
Mr. van der Werf	—Diatoms
Dr. Bourrelly	—Freshwater algae
Dr. Zaneveld	—Marine algae

Each of these specialists has already worked on samples sent from tropical waters.

B. Recommendations for Inland Waters

1. Sampling

The methods advocated by J. Blache as described and discussed by him in a separate paper are advocated, in view of the results achieved by such methods in Cambodia and elsewhere.

As difficulties are anticipated in the operation of the Hardy recorder in silt-containing fresh waters, the methods of Van Oye are to be recommended. Here a measured quantity of water, taken by means of a container from the surface, or by a sampler from deeper layers, is strained through plankton silk and preserved in 5% neutral formalin with glycerine. 0.1 cc. is examined under the microscope in various ways and the results are expressed in a semi-quantitative way with the use of certain index-numbers. Samples can also be taken with a pump.

2. Description of the environment

The following determinations are suggested as a minimum programme;

a) Temperature of air, surface and at various depths; diurnal and monthly variations measured with a maximum-minimum thermometer.

b) Visibility as Secchi-disc reading. The limitations of this method are apparent, but for field work in remote waters under difficult circumstances no better method suggests itself. There is urgent need for an efficient method that can be used under field conditions.

c) pH, measured colourimetrically with minimum accuracy of 0.5.

d) Alcalinity as 0.1 n HCL in 100 cc., against methyl-orange or other suitable indicator. In recording this value the method used should always be clearly indicated.

e) Salinity as Silver Nitrate. Knudsen (in brackish water).

f) Oxygen as Winkler titration (surface and deeper water).

g) In addition to the above items, which are to be determined in any case, the following should when possible be included; CO_2 (phenolphthaleine), organic matter ($KMnO_4$), simplified B.O.D. (when no incubator available, 24 hours at environmental temperature), phosphates (Deniges-Atkins or perhaps Thyvolle, as suggested by Blache).

C. Recommendations for Seawater

1. Sampling

As no suggestions were forthcoming in the correspondence at hand regarding this

item, the Sub-Committee is not able to comment on this point. It is suggested that this be made an item for next year and that Mr. Rochford be requested to draft a recommendation on the subject.

Attention is drawn to the work of Tham Ah Kow on plankton off Singapore, submitted to the Meeting, and to the work still in progress in India.

2. Description of the Environment

The following standards are proposed:

a) Temperature of air, surface, bottom up to 50 fathoms, and beyond at 50-75-100-200 fathoms.
b) Photometer visibility
c) pH, colourimetrically
d) Knudsen salinity
e) Nitrates, phosphates and silicates
f) Force and direction of current.

It has been suggested that the chemical composition of plankton occurring in bulk be determined as often as possible, in order to judge its digestibility and food value. The facilities of a chemical laboratory are essential for this purpose.

Attention is drawn to the list recently published by the Secretariat giving addresses from which equipment for plankton research equipment is procurrable.

One member of the Sub-Committee asked whether there is a prospect of obtaining financial aid for acquiring apparatus and the Meeting is requested to state its opinion in this respect. It is suggested, for instance, that those countries receiving aid from the American Technical Assistance Programmes might apply for specialists bringing their own equipment.

K. F. Vaas
Head, Laboratory of the Inland Fisheries, Bogor.
October 10, 1952.

Report of the Sub-Committee on Fish-Culture

(to September 23rd, 1952)

The productivity of the tropical and sub-tropical inland waters in this area is generally high as is revealed by the yield per unit area of such waters in China, India, Indonesia etc. There is indeed an awakening to the farming of waters in most of these countries. While fish farming has been traditional in certain parts of China, India and Pakistan, the present methods of fish farming in these as well as other countries like Indonesia are largely empirical. A more scientific approach to the subject has, however, been apparent in recent years, especially in India and Indonesia, but final solutions of the various problems of culture work have seldom been arrived at. This is partly due to the limitations of the methodologies adopted and partly due to the immensity and highly varied nature of the problems. At this juncture when considerable regional studies are being undertaken in a number of Member Countries on isolated aspects of the problem, the greatest immediate need is for the collection and collation of all existing information and the dissemination of (i) the established facts for practical application by fish farmers and of (ii) matters requiring co-ordinated investigation by the different fishery workers in the Member Countries.

It is gratifying to report that the Council's Resolutions No. 20.3 (4), (5) and (6) on Fish-Culture and the associated aspects of Weed Control and Pollution have met with fairly active response from some of the Member Countries as detailed in the Intern Report (Mem. 14 of IPFC/C51/EX3).

Regarding the Survey of Cultivable Waters, since a systematic inland water survey record is an essential pre-requisite for organized aquiculture, the Sub-Committee on Fish Culture has pursued the collection of data relating to the extent of cultivable waters in the Member Countries. Because of the widely scattered and varying nature of inland water masses and of the limitations of staff and facilities, the work has necessarily proceeded at a slow pace, and the figures obtained are only approximate. Additional information has been gathered from Cambodia, Formosa, Hong Kong, India, West Pakistan and Thailand. This, with the information already available for British Borneo, Ceylon, Indonesia, Japan, Malaya, Australian New Guinea, East Pakistan, Philippines and Singapore, gives us a more or less appreciable picture (*vide* Appendix I, Table) of the cultivable waters in the Indo-Pacific area, though the figures for Burma, China, Laos, Dutch New Guinea, Korea and Vietham are still lacking. Replies from the Chiefs of the Central Fisheries Inspection Station, Korea, and of the Fisheries Bureau, Vietnam are awaited. The available data under the different heads such as fresh-water ponds, brackish-water ponds, natural lakes, artificial reservoirs, marshes, lagoons, rice fields, etc. however indicate that about five per cent of the total area of the countries is composed of definitely cultivable waters, of which only a fraction appears to be under fish culture. This does not include the vast stretches of open inland waters like estuaries and

rivers which constitute a major proportion of inland water sheets. The data themselves are far from final, and considerable areas still remain to be surveyed. It is also necessary to gather the statistics of different of waters according to their durations, depths, source of water supply etc. Interest in water survey work has, of late, received considerable impetus, and in India the Fisheries Statistical Committee of the Ministry of Food and Agriculture has initiated a systematic survey of inland waters on a nation-wide basis."

Since the hydrological and the planktological aspects of the productivity of inland waters come under the purview of the respective sub-committees concerned, they are not detailed in this report.

As regards work on culturable fish, biological studies of a number of species are understood to be in progress at the inland fisheries research stations at Barrackpore, Cuttack, Madras, Narakal and Kaymakulam, (Tavancore-Cochin) in India, at Bangkhen in Thailand, at Comilla in Pakistan, in Java and Celebes in Indonesia etc. Information on the culturable qualities of *Tilapia melanopleura* and details of mullet culture are being gathered. The Vice-Chairman of the Sub-Committee has proposed to Dr. Hardenberg that the scope of the list of fishes to be treated in the handbook which is to be edited by him might be enlarged to include the major inland culturable species.

The IPFC Special Publications Nos. 1 and 2, *viz,* Fish-Culture in Brackish-water Ponds in Java (English edition) and Fish-Culture in Indonesia, describe the present status of brackish- and fresh-water fish-culture in these areas. The FAO Headquarters has also arranged a Handbook on Fish-Culture to be edited by Dr. Hora. An annotated bibliography of *Chanos* culture by Schuster and a bibliography of fish farming in India by Pillay cite diverse publications relating to the respective subjects. Notable cases of introduction of exotic species to new areas during the period are those of the Grass Carp—3 successive dispatches Thailand to Israel and one of *Tilapia mossambica*; also one from Thailand to India and another to Pakistan. Other instances of recent transplantation of exotic species brought to the Sub-Committee's notice during the period are: the transport to North Borneo of *Trichogaster pectoralis* from Sarawak, of *Tilapia mossambica* from Singapore and of *Cyprinus carpio, Xiphophorus hybrids, Brachidanio lineata, Pterophyllum eimeki, Carassius auratus* and *Mollienesia* sp. from Hong Kong.

The Chairman has furnished to India the details with sketches of a re-modelled can for the transport of fry and fingerlings.

Fish seed trade is fast developing, especially in India, Singapore and Hong Kong. The large amounts, of spawn, fry and fingerlings transported by the Fish Seed Syndicate organized last year at Barrackpore, by the Fisheries Department at Singapore and by the Seed Supply Agency in Hong Kong and the transport of fingerlings from Thailand to Israel and India bear out the progressive interest in fish transplantation and culture which is growing in and around the Indo-Pacific area. A special working paper on Fish Conservation and Distribution in the Indo-Pacific Area is presented for the Council's consideration.

An Inland Fisheries Training Course conducted at the Central Inland Fisheries Station in India provided instruction in fish-culture to workers in India and Nepal. The expansion and development of this Indian training institution under the joint auspices of the Government of India and the F.A.O. so as to cater to the needs of the other Member Governments also is under consideration. Another valuable contribution to the promotion of fish-culture in the Indo-Pacific area as a whole has been the Fish-culture Seminar held at Bogor, sponsored by the IPFC and the FAO.

Weed Control.—Weed Control received special attention in the Philippines and India. Two weeds, viz, water hyacinth, *Eichhornia crasssipes* and water bloom, *Lemna minor* infest Philippine waters. A Committee which studied the *Lemna* nuisance in the Laguna de Bay Lake and the Pasig River discharge, recommended diversion of the excess discharge through a canal to be constructed. Real control measures have not been worked out. In India some experimental work was done at the Central Inland Fisheries Research Station and recently Mr. Botke, the ETAP Fish-Culture expert assigned to West Bengal where *Eichhornia* and other weeds form a serious problem, has started intensified field work with some encouraging results.

The chokage of water stretches by aquatic weeds, which screen off sunlight and thus impoverish productivity and render large stretches of water practically impenetratable for inland craft, is a major problem in the Indo-Pacific region and until this is solved effectively, extensive waters of the mainland and of the archipelagoes are likely to remain useless from the point of view of fish production, not to speak of the navigational difficulties involved. Some of

the findings already made are indeed encouraging, but it has not been possible to apply in the field some of the theoretically effective methods of weed control, mainly because of the cost of application. As it is, pending the availability of detailed information from Member Countries, the Sub-Committee has recommended that the publication recently compiled by Dr. K. F. Vaas of the Laboratory for Inland Fisheries at Bogor (Buitenzorg) be considered as a basic contribution for the future handbook to be prepared on this subject.

Pollution.—With increasing industrialization in many Indo-Pacific countries, the discharge of factory effluents and municipal wastes into inland waters begins to assume serious proportions and to affect fish life to a varying extent. In the Philippines, the cases of pollution, the Sub-Committee understands, relate the sugar mills, mamaguey retting, breweries, distilleries, cosmetics factories, desiccated coconut plants, lard and margarine works and domestic sewage. The polluting factors in these discharges have been classified into (i) oxygen-depleting; (ii) toxic and (iii) inert, choking substances. Remedial measures adopted consist chiefly of (i) removal of solids; (ii) coagulation of polluting matter and (iii) lagooning and impoundment. Where the effluents are directly toxic, alkali recovery or neutralization is resorted to. When topography favours economic deviation of the effluent, the latter is practiced.

Indonesia's pollution problems are seen to centre mainly around rosella sewage, molasses from sugar factories and tapioca sewage. Details of the polluting ingredients and remedial measures attempted are available.

In India, considerable information on the chief centers of pollution and the primary nature of the various States has been obtained. Detailed studies at a typical pollution centre near Dalmianagar in the Sone River have been started.

Pakistan also is trying to collect information on this problem as far as it affects that country, while Australia has agreed to supply the information as it becomes available. With additional information forthcoming from the Member Governments, it should be possible to assess the actual damage caused, if any, by the different types of pollution in the countries of the Indo-Pacific region and to formulate remedial measures on economic lines with due regard to industrial interests.

Regarding investigational work in the area and its co-ordination, it is proposed to prepare and circularise questionnaires to Member Countries inviting information on their activities and later findings on problems of productivity, weed control, aquatic manuring, seed procurement, stocking proportions and species combinations, predator elimination, mortality control, crop assessment, harvesting, and other items of fish culture technique.

T. J. JOB
Chairman *a.i.* of Fish Culture
Sub-Committee

Report of the Sub-Committee on Neritic Pelagic Fisheries

The Committe pursued the inquires relating to neritic pelagic fish stocks in the various countries and have collected considerable data on *Rastrelliger*. Morphometric data on *Rastrelliger* from Indonesian and from India have been collected as a beginning towards more extensive studies. The problem has now arisen whether the different species of *Rastrelliger* reported from Indo-Pacific waters are all valid; increasing evidence is forthcoming that the commercially important species of the genus is more or less limited to *R. kanagurta*, which probably has geographic races or sub-species which may have been considered as independent species. The question can be decided only by careful systematic examination of the large samples collected from various parts of the Indo-Pacific. The correct taxonomic assessment of the species entering the *Rastrelliger* fishery is of the highest importance and it is to be found out if racial variations exist within the same species. The characters on which further studies have to be based remain to be determined. There is need for a central agency or a group of workers who will collect and examine *Rastrelliger* from the different countries and at the same time keep morphometric data. The Committee strongly feels that the time has come when an integrated programme on *Rastrelliger* should be taken up as a collaborated effort by the countries where this fish forms valuable fisheries.

Owing to the recent revival of the sardine fishery in India the opportunity is probably offered for further work on an extended scale on the oil sardine and this is also a line in which collaborated effort between the member countries interested would be desirable. It is for examination of Technical Committee I as to the manner in which collaborated programmes research on mackerel and sardines could be implemented.

The question of collecting information on the more common neritic pelagic fishes as part of the programme of preparing a popular and scienti-

fically accurate account of the important fishes of the area received the attention of the Committee and a tentative list of the major fishes which should be included in the proposed handbook has been drawn up .

As regards the notations now in existence for reporting the state of maturity of species of commercial fishes, it would be desirable to re-examine the appropriateness or otherwise of continuing the notations proposed by the International Council. While for some species the International Council notation can be used without any modification, there are practical difficulties in its adoption in regard to a few important fishes like mackerel, ribbon fishes, etc. The committee wishes to draw attention to this and has obtained the maturity scales for *Rastrelliger kanagurta* drawn up by the workers of the Central Marine Fisheries Research Station. The Committee wishes to draw the attention of workers on individual species in the area which have wide geographic distribution to examine if revision is called for in respect of any of them, and if so, such revised definitions may be sent to the Committee, so that the information may be circulated ensuring that maturity stages are correctly determined by field workers. This work will have to be pursued in consultation with the General Biology Sub-Committee as well.

There is a certain amount of confusion in the existing literature on the exact measurements of fish, whether they refer to standard or total length. The Sub-Committee desires that the correct measurements employed may be fully defined when reporting the work on individual species.

N. K. PANIKKAR
Chairman
Sub-Committee on Neritic Pelagic Fisheries

Report of Sub-Committee on Taxonomy on Standardization of Names

It may be recalled that at the third Meeting of the Indo-Pacific Fisheries Council held at Madras, I was authorized by the Council to pursue the correspondence with the International Commission on Zoological Nomenclature on the question of standardization of names. I have accordingly been in correspondence with the Secretary to the Commission, Mr. Francis Hemming. The main idea with which the correspondence was pursued was to see whether with the existing available check lists of fishes it would be possible to proceed with definite work on the standardization of names. From the correspondence and persual of papers very kindly sent by the Secretary to the Commission, it is clear that this involves the preparation of applications to the Commission for the addition of accepted names to the official lists which has to be made on certain standard forms which requires a considerable amount of bibliographic work. The question naturally arises whether it will be possible for individuals to take up this work unless they are fully familiar with the taxonomy on the one hand and on the other have convenience for bibliographic investigations at their place of work. So far as fishery workers in the Indo-Pacific area are concerned the experience seems to be that most of them are somewhat overworked and it is doubtful whether we could assign to any single individual the responsibility of preparing applications to the International Commission in the approved manner and devote time to the considerable amount of preliminary collection of bibliographic work before such applications are made.

There is the second aspect to be considered whether an *ad hoc* procedure for the standardization of names should be taken up without reference to the larger question of drawing up of appropriate lists as a guide to the applications to be drawn up to the Commission. Such a list has already been prepared for the Scombroids by Dr. Rosa of the F.A.O. Division of Fisheries and so far as that particular group is concerned it is now possible to proceed on more sound lines than would have been possible without such a taxonomic compilation. I wish to submit that the group in which we urgently require taxonomic standardization is the Clupeoids which are represented by a very large number of species in our waters, some of them having very extensive distribution. Isolated efforts at the taxonomy of this group have been attempted in many centres, but the time has come when a comprehensive list on the lines of the Scombroid list as has been drawn up by Dr. Rosa would be extremely helpful and provide the basis for making applications to the International Commission. It is further to be realised that as the species involved are distributed over a considerable range it would not be desirable to draw up lists exclusive to one particular area and further, the Clupeoid group is of the highest commercial importance throughout the world, contributing to something between a third and a fourth of the world's fish production. In the circumstances it is recommended for the consideration of the Council that early steps should be taken for the compilation of a world list of Clupeoids similar to the list on Scombroids already sponsored by the F.A.O.

and that the F.A.O. may be requested to arrange for the compilation of such a list under its auspices as has already been done in the former instance.

Apart from the question of standardizing the scientific name, there is also a pressing need to arrive at some kind of uniformity of the popular names employed in Fisheries Reports. Unfortunately, the popular names of commercial fishes vary widely from country to country for the same species and, occasionally, different names are employed for the same species even in reports issued from the same country. To avoid this, certain countries are proceeding with the standardization of names of fishes even within the same country as has been done in Australia by Inter-state agreement. The Council may recommend that such action may be taken by the members of the Council to ensure such uniformity within their own country. The approved list of each country, giving both the commercial and scientific names (as far as can be ascertained, because taxonomic difficulties may sometimes make the correct assignments of scientific names difficult) may be sent to the Secretariat of the IPFC to pursue what further action can be taken towards standardization. The Council may, if necessary, appoint a small panel to scrutinize the final list received from member Governments and make suitable recommendations which may be circulated to all member Governments for the expression of their views. Names accepted by the member Governments may be published in the IPFC Bulletin for information and general adoption; those requiring further discussion may be again examined by the Council as advised to the panel's experts and suitable recommendations made to have a small choice of names drawn up for such fishes, which would meet with general acceptance.

N. K. PANIKKAR

Report of the Sub-Committee on General Biology

Between the period of the last meeting of the Council and the present, the Chairman of the Sub-Committee was in touch with the members and many other specialists on the problems of methodology in relation to the studies that are being carried out in the various centres. It has, however, not been possible to finalize definite proposals owing to lack of active contact and a clearer formulation of specific problems which the Committee should tackle. It is hoped that these matters will be discussed during the forthcoming meetings of the Sub-Committee.

One of the problems discussed was the need for statistically sound procedures in the programmes of investigation of fish populations of inshore waters. Based on the discussion during the last meeting a series of trials on a statistically designed basis were made in the analysis of fish samples from the inshore sea bottom of the Calicut coast. The results are now available and could be further discussed. Another line in which the importance of statistical procedures has come to the fore is in regard to the composition of inshore plankton. Data on this available at Mandapam have shown that very large variations exist within short distances, emphasizing the need for a larger number of stations to be chosen for assessing plankton production in inshore waters. This subject will be pursued in consultation with the Sub-Committee on Plankton.

The Committee feels that there ought to be closer scientific contact between specialized workers in the area. Exchange of scientific information and discussions will be of great value to active workers and such flow of scientific information will be a great stimulus to further work. As a beginning towards this, the Committee recommends (1) the publication of periodical lists of fishery scientific workers of the area with informative notes on the problems which are actively pursued, so that the workers on allied problems could correspond with one another on purely scientific matters and (2) an effective means of publication of advanced abstracts of papers completed at Fishery Institutions.

In the second objective it is for consideration whether the scope of the present IPFC Bulletin could be slightly enlarged to allow a small number of such abstracts to be published. It is suggested that these may be discussed by the Committee and suitable recommendations placed before the Council.

N. K. PANIKKAR
Chairman
Sub-Committee on General Biology

APPENDIX 4

REPORT OF TECHNICAL COMMITTEE II FOR 1951-1952

The Committee regrets that Chairman is unable to attend the fourth meeting of the Indo-Pacific Fisheries Council.

The activities of the Committee during the year consisted mainly of initiating action in accordance with the recommendation of the Council at its third meeting. Unfortunately, progress has been limited by the extent of the problems concerned and by the preocupation of fisheries workers in this area with domestic problems. Members of the Committee have not, therefore, been able to devote as much time to the work of this Committee as the problems necessitate.

Progress during the year is summarized below:

(a) *Gear Technology:* The response to the request for copies of published material, with one notable exception, has been disappointing. Nevertheless, a bibliography of papers relating to fishing methods in this area was prepared and circulated during the year. A revised bibliography is made available to the meeting as IPFC/C52/TECH 32. The Sub-Committee recommends that Member Governments further revise this bibliography, removing references of little value.

Mr. Van Tri has made marked progress in the complication of descriptions of fishing methods of the northern part of the area, but the Chairman of the Committee has been fully engaged in a heavy domestic developmental programme which, unfortunately, has made it impossible for him to prepare a catalogue of fishing methods. He, therefore, recommends that the entire work of preparation of a catalogue of fishing gears be entrusted to Mr. Van Tri.

(b) *Fishing Boats:* The response to the request for published material was extremely disappointing and only two member Governments supplied material. Dr. Gibson-Hill has, however, prepared a preliminary bibliography of the area which is made available to the meeting as IPFC/C52/TECH 34. The Committee recommends that Member Governments revise this bibliography and include any references that have been omitted. Dr. Gibson-Hill has further considered the classification of fishing boats and has made some modifications of it, which presented as IPFC/C52/TECH 31.

(c) *Preservation of Fishing Gear:* The Committee regrets to have to record that response to its request for information on this question was disappointing. The following Member Governmensts have forwarded information on this subject: North Borneo, Australia, India, Thailand, Indonesia and Singapore. Contradictory statements were found in certain reports and the information furnished was not, on the whole, sufficiently substantial to permit proper consideration of the subject. Nevertheless, a bibliography of methods of preservation of fishing gear has been prepared by the Sub-Committee and is made available to the meeting as IPFC/C52/TECH 33. The Sub-Committee is now considering a form which they hope will simplify collection of data on the preservation of fishing material. It is recognized that this is deficient in certain respects particularly insofar as the actual process and the nature of the twine is concerned. The Committee requests that this be considered by the Technical Committee during the ensuing meeting.

(d) *Introduction of Non-Indigenous Gear:* Progress in respect of this subject has been extremely limited. The memorandum produced by the IPFC Executive Committee at the Third Meeting (1951-1952) at Nha Trang, Vietnam, provides the best statement of the present position insofar as it is known to the Sub-Committee. The Committee recommends that this matter be further considered, that Member Governments be requested to revise the list and that the Sub-Committee concerned consider the recommendations made in paragraph 5.

The Committee believes also that the question of the introduction of non-indigenous fishing gear cannot be divorced from a consideration of fishing methods in the area since methods which are indigenous within one country may be non-indigenous to adjacent territories. The Committee, therefore, recommends that consideration be given to continuing this assignment with the preparation of a catalogue of fishing methods.

(e) *Introduction of Powered Fishing Vessels in India and Ceylon:* Mr. Chidambaram has extended the scope of his paper on the experimental introduction of powered fishing vessels within India and Ceylon and this revised paper is presented to the Council.

(f) *Food Technology:* A classification of methods has been prepared by Monsieur Lafont, as was recommended by the Council in Resolu-

tion 51/21.2, and is presented. It has not been possible to prepare a handbook describing the processing equipment, methods and procedure. It was hoped that Mr. L. P. D. Gertenbach of the Fisheries Division FAO Rome would be able to assist the Committee in the preparation of a report on the fish trade in South East Asia but this has not proved possible. The Committee, therefore, recommends that this project be further considered as it clearly requires the attention of a worker, preferably employed on more than a part-time basis, who has access to all current trade statistics.

(g) *Socio-Economics:* Whilst the committee itself has not been able to carry out any work on behalf of the Council in this field, attention may be drawn to the numerous technical papers which have been furnished is response to the Council's Resolution 51/21..3(1) and to the papers prepared for the symposium on this subject. The Committee believes that these papers will furnish an effective basis for the vigorous development of the work in this field.

(h) *Statistics:* Considerable progress has been made by the Statistics Sub-Committee largely as the results of the indefatigable work of Dr. G. L. Kesteven. On the Council's recommendation the FAO, through its ETAP, organized and conducted a Technical Instruction Centre at Bangkok in June/July this year. An account of this school is furnished in another working paper. Prior to this school the Secretariat conducted preliminary courses for Thai officers during 1951 and early in 1952. Certain members of the Working Group were present at the Training Centre and took the opportunity to hold discussions on the future of the work. These discussions were based upon earlier correspondence and meetings as a result of which the Secretariat had prepared a memorandum on statistical work addressed to Administrative Correspondents; since this memorandum summarises the present position of work in this field, it is reproduced here as Appendix B. The Committee earnestly recommends the proposals in this memorandum to the consideration of the Council during the current meeting.

General: The Committee recognizes that workers in this area are heavily engaged in the problems besetting them in their own domestic fisheries. It is of the opinion, therefore, that progress cannot be rapid unless trained personnel can be specifically assigned, full-time, to the projects in question. The Committee, therefore, recommends that this matter be considered with a view to ascertaining what assistance could be obtained from external sources in order to permit the early completion of the assignments given to it by the Council.

(T. W. Burdon)
Chairman,
Technical Committee II

Present Status of Information on Projects for the Introduction of Non- Indigenous Gear

1. During the current period the Secretariat has received reports from the following countries:

Philippines:	Deep-sea long-lining for tuna, Trawl fishing (two papers).
U.S.A.:	Purse-seine and gill netting in North Pacific (Cruise reports furnished).
Thailand:	Masu-ami.
Sarawak:	Otter trawl and danish seine
Australia:	—

The Secretariat has also been infromed that information is being collected in India.

2. The Secretariat is aware, through various channels including the reports referred to above, of the following projects in this field within the last few years.

Australia:	Danish seining; tuna trolling.
British Borneo:	Otter trawl; danish seine.
Burma:	Various gear types.
Ceylon:	Trawling.
Hawaii:	Purse seine and gill-netting.
India:	Trawling; danish seining; mechanized carrier vessels; mother-ship operations.
Indonesia:	Tuna trolling; mechanized majang operations.
Malaya and Singapore:	Mid-water trawl; long-lining; pair trawling.
Pakistan:	Trawling.
Philippines:	Tuna long-lining; trawling.
Thailand:	Mechanized tow-vessels.

No attempt has been made to include, on the one hand, the projects of more than about ten years back, nor, on the other hand, those which are under consideration under current technical assistance programmes. For the western sector Chidambaram's paper gives a useful list, but for the north-eastern sector there exists a need for a special study. Furthermore, it should be noted that special consideration should be given to the Japanese activities in extending their operations into the south-eastern and central sectors, both pre-war and within the past eighteen months.

It will be clear that this is a very broad field, but it will also be clear that the importance of this field is such that its breadth cannot be permitted to cause hesitation in approaching it. Practically, all countries of the region are now embarking on mechanization projects and much money and materials will be expanded on these. Some of the projects will be highly successful; some will be slow to develop and others will fail. In the course of the next few years important economies will be possible if all experience and all data gathered in this field can be rapidly gathered together and analyzed and the results made available to all persons concerned with planning and directing projects of this kind. Such information will serve to indicate to workers courses open to them, and also courses which they should avoid. It is obvious that the Council has in this matter a clear responsibility to assist in this process of collection and analysis of information and its dissemination among workers. The problem for consideration by the Executive Committee is what suggestions might be made to the committee appointed for this work in respect of a system which might be adopted to discharge this function.

3. A request was recently received from Mr. Tubb in Borneo for suggestions as to the form in which reports should be made on this subject and in answer the Secretariat sent the following draft outline:

1. Name of Gear.
2. Description of gear with statements concerning country from which imported and arrangements for the importation.
3. Description of craft on which operated, giving especially information on standing gear. If the craft is a local craft and has been modified for the purpose of experiments, these modifications should be described.
4. An account of fish-finding equipment, methods and problems.
5. An account of ground in which used (species, sort) and methods employed.
6. A brief history of operations.
7. A quantitative analysis of the operations including (a) the quantity of fish caught and yield per unit effort, etc.; (b) a financial statement of costs and returns.
8. A summary statement of conclusions in respect of gear indicating whether the operations suggest that new gear can probably be introduced and/or whether any local modifications of the gear, craft and its method of operation should be adopted.

4. The Council's interest in this question is along the following lines:

1. What structural modifications in craft and gear were found necessary to meet the new circumstances of operation. This would include any innovations; it would be difficult to distinguish between those innovations which might be regarded as inventions of general advantage which could have been introduced in the gear in its original place of use, and those which had to be introduced because of the new circumstances;
2. Similarly, what modifications in the technique of operation have been introduced; including speed of craft, number of crew;
3. What are the conditions under which the gear is used; for what types of fish, on what kind of fishing grounds which includes water depth, weather, sea-floor conditions, etc.;
4. What results have been obtained: what fish catch, yield per unit effort, yield per cost; operational cost analysis.

5. It is suggested that a new *pro forma* incorporating the material of paragraphs 3 and 4, should be submitted to the sub-committee on this question with a request that they consider it urgently so that it might be sent at once to Member Governments with a request for information accordingly.

APPENDIX B

Circular Letter to Administrative Correspondents

Acting on the general direction given by the Council at its 3rd Meeting (Res. 51/21.3[2]), the Statistical Sub-Committee has reviewed the entire range of problems concerned in the development of efficient statistical systems for fishery industries of this region. The first result of this work is a draft statement of the statistical programme, prepared by one number of the Committee and now under review and consideration by the Committee as a whole. It has now been decided that this draft statement should be circulated to Administrative Correspondents in order to apprise them of developments in this field and to enlist their aid in certain parts of the programme.

In distributing this statement the Sub-Committee wishes to draw attention to various points.

Firstly, it wishes to stress the tentative nature of the document, as indicated by the introductory paragraphs under the main title. From this point of view the Sub-Committee would welcome any suggestions for improvement of the document to make it better for the general purposes as described in the second paragraph of the introduction. In particular, it must be stated that substantial modification has already been proposed in the definitions contained in sections 1, 2 and 3 of the Glossary.

Secondly, it is the Sub-Committee's view that the sequence of steps to be taken is roughly as indicated on the first half of page 3 with the following modifications:

(a) Of the handbook mentioned in para 2, Part I should be issued as soon as it can be prepared, but Part II should be issued only after much material has been obtained with which to give useful illustration of particular applications of statistics to fishery work.

(b) Para 4 should be taken to include the creation of cadres of efficient personnel.

(c) The development of plans for a census should be marked as step 5 whilst the development of tentative estimates, and of a programme of seminars should be undertaken as soon as opportunity offers.

Thirdly, the Sub-Committee believes that, whilst census work should be promoted wherever and whenever possible, nevertheless, it should not be thought that such work must be completed, or even might be indispensable, before sampling work may be undertaken. This view constitutes a reservation to the introductory paragraph of section 4.1 on page 13.

Finally, in the matter of current statistics (statistics of operation and production) the Sub-Committee believes that attention should be concentrated for the time being on records of production from fishery.

The Sub-Committee wishes to obtain, as material for the Council's 4th Meeting, a full description of statistical services for fisheries in each country, together with information on plans for development of those services. Accordingly it has prepared the following check-list and requests that you be so kind as to have this completed for your country in fullest possible detail. The Sub-Committee recognizes that this list is somewhat long and may appear to present a formidable task—it therefore requests that you do the best you can and be not worried if certain sections must be left blank because excessive researches would be involved in completing them. However, the Sub-Committee feels that you will recognize the considerable advantage to your fisheries service in having available a check-list such as this.

In addition, the Sub-Committee wishes to have some figures of fishery production for this meeting and suggests that a useful approach would be for each country to make a tentative estimate in the form of the triple table described and exemplified in section 2 of the Programme. It will be recognized that this triple table furnishes three, more or less, independent estimates of production whose relationship may give useful pointers to inaccuracies and inconsistencies. The Sub-Committee would greatly appreciate receiving from each country a tentative estimate in this form.

Check-List of Primary and Secondary Sources of Fishery Statistics

1. *General.*

   Is there a fishery statistical service?
   In what department does it function?
   What is its organization?
   What are the experience and qualifications of its personnel?
   What kind of statistics does this service collect?
   Are there any plans for expansion and development of the service and for training staff?

2. *Statistics of Manpower.*

   What information has been collected, in a population census, concerning the manpower engaged in fisheries, and concerning dependent persons?
   What details are included in the census inquiry?
   Are there any other records concerning fisheries manpower, as for instance, the records of employment exchanges, social insurance services, taxation, etc.?
   What details on fisheries manpower are included in these records? (the answer to this question should be given separately for each type of record).
   What efforts have been made to extract information for fishery statistical purposes from any of these records?
   Are fishermen licensed? If so, by whom and under what conditions?

3. *Statistics of Organization.*

Are any fishery units incorporated under company law, and is any effort made to extract information from the records of the registrar of companies?

Are there any fishery co-operatives, are they registered, and is any effort made to assemble information furnished to the registrar of co-operatives?

4. *Statistics of Equipment.*

What records are kept by licensing, registration or other means of

(a) Fishing Craft (by Fisheries Department, Marine or other Department)

(b) Fishing Gear (by Fisheries Department, Marine or other Department)

(c) Fish ponds or other waters (by Fisheries Department, Lands or other Department)

(d) Fishery installations (e.g. factories, ice-plants, storage plants, transport units) [by Fisheries Department, Department of Industries, Commerce or other.]

5. *Statistics of Operations.*

What records are kept of fishing operations by the operatives, or such as records of craft movement by Harbour Control?

What records of transport operations are kept, by railways, water-transport, other land-transport or air-transport units?

(Give full information on the detail in which these records are kept, and on the effort made to extract the information for fishery statistics purposes)

6. *Statistics of Production.*

What records are kept by individuals, companies and co-operatives or by official recorders, of fish caught, landed, handled, sold?

What records are kept of fish bought, received, treated, and sold by processing establishments?

What are the arrangements for the collection and compilation of these records?

What industrial statistical are available?

(Give full information on the detail in which these records are kept, and on the effort made to extract the information for fishery statistics purposes)

7. *Statistics of Commerce.*

What records are kept of fish handled, stored, sold by (a) Government agencies (Municipal markets, etc.), (b) private agencies in markets (c) by wholesale and retail agencies outside markets?

(Give full information on the detail in which these records are kept, and on the effort made to extract the information for fishery statistics purposes)

In what detail are records kept of fish and fishery products entering international trade, apart from the published statistics of foreign trade?

8. *Prices.*

What records are kept of the prices at which fish are sold at various points in the distribution system, including the sale of processed fish?

What records are kept of the prices at which producer supplies are sold to the industry, and of the transport tariffs?

What efforts are made to collect and compile such records?

9. *Finances.*

Have any efforts been made to collect information on the sums of money made available to the industry and on the rates of interest charged?

(a) Are any data available concerning the income of fishermen?

(b) What is known about the contribution of fisheries to the national income?

10. *Consumption.*

Have any efforts been made to collect direct information concerning fish consumption as by family budgets, dietary surveys, etc.?

NOTE: As far as possible attach copies of all forms used, and of any relevant legisgislation.

In all cases give an exact citation to any publication in which tabulations of statistics relating to fisheries in the widest sense are published.

Where more than one department, or more than one level of Government (central, provincial, etc.) is involved, give full details in respect of each.

In each indicate whether the record is directly made from a real measurement, or is an estimate, and in the latter case give an indication of the basis of the estimate.

APPENDIX 5

REVISED PROSPECTUS FOR FOOD TECHNOLOGY HANDBOOK

Volume V. Food Technology.

0. Introduction.

It is proposed that the volume contain historical data to established why the Member Governments are concerned with the processing of aquatic products. These would include some remarks on:

a. Principles of Food Technology in the Indo-Pacific Region.
   Volume should contain a broad statement of the basic conditions which make processing necessary and/or desirable and statements regarding the existence or creation of consumer demand for processed aquatic products.
b. Demography, geography and climate as they affect the processing and distribution of aquatic products.
c. Economics of fish processing.
   Should contain reference to:
   (1) Comparison of cost in processing fish in various forms .
   (2) Occurrences of gluts in fish landing centers.
   (3) Distribution of processed fish products —local consumption and export.
d. Consumption habits of the indigenous populations in regards to aquatic products.

1. Determination of Requirements for Processing.

   1.1 Availability of Raw Material.
   1.2 Suitability of Processing Techniques.

2. Processing Techniques.
   Volume should contain general statements descriptive of drying, salting, curing, pickling, smoking, fish cakes, paste, sauce, icing, refrigerating, freezing, processing of fish meal, manufacture of by-products, and others.

3. Handling and Sanitation.
   Volume should contain a statement emphasizing the importance of sanitation in the handling of fish from the time it is caught until it is delivered to the consumer in order to prevent spoilage.

4. Research and Development in Food Technology in the Indo-Pacific Region.
   Volume should contain a list of such institutions and facilities in countries of Member Governments.

5. Standards and Quality Control.
   Volume should contain a list of existing standards and quality control methods in the Indo-Pacific Region.

6. References.

APPENDIX 6

REPORT ON INTERNATIONAL OCEANOGRAPHIC REQUIREMENTS

The Council has examined various information supplied to it on the national oceanographic programmes of this region. The Council draws attention to the following features of these programmes as revealed by the survey .

(1) Whilst certain countries of the region, representing a fair proportion, have oceanographic institutions, there remain other countries which as yet have no such instiutions, which means, of course, that the pattern of investigation for the region must necessarily remain incomplete;

(2) Of the institutions already established in the region some are well-equipped and quite active whilst others are seriously under-staffed and possess relatively little equipment. One of the most important features to be noted in this sense is the lack of ocean-going vessels;

(3) There is inadequate information available as to the lines along which precisely these programmes are functioning and it is clear that such work as is being done is not being coordinated in either subject or area sense, and it is known that there is lack of uniformity and standardization in the methods and apparatus being used;

(4) The information furnished to the Council included reports of new institutions to be established, and it is obvious that any defects by lack of coordination noted in the present situation may be aggrevated with the development of these new institutions in the near feature.

The Council is convinced that insofar as the governments of this region are spending money on these programmes, there is an urgent need to secure the most efficient use of the personnel and facilities being used and that an important contribution to this could be made by the establishment of effective machinery for the coordination of the programmes and by continued compilation and publication of the results of the programme and standardization of the equipment and methods.

In addition, the Council notes the general dearth throughout the region of highly qualified technical personnel to participate in oceanographic programmes. Whilst this aspect of the situation is, of course, only a further symptom of the general situation in respect of fisheries of this region, which is otherwise expressed by the general situation of oceanographic programmes as described above, it makes its contribution to the restraint upon the development of these programmes. The Council, therefore, believes that, insofar as governments of the region are likely to continue their national programmes in oceanography, there is a need for efforts to make available appropriate instruction in oceanography in order to expand the cadre of its field personnel for this work.

In addition to recognizing the simple fact of the existence of national programmes and of the importance of proposing measures to assist these programmes even at their present level, the Council has examined the importance of this oceanographic work and has attempted to assess the need for such work at its present level and possibly at higher levels. The Council draws attention to the fundamental fact that all fishing operations at sea are based upon intelligent recognition of various biological and physical phenomena. The fishermen within their present range of operations have learned to correlate the distribution and behaviour of fish with certain gross features of season, current, water color, etc. The proposition of oceanographic research is that it should add to the number of such signs, and also improve the equipment for their observation. The Council also draws attention to the fact that even in the presence of such fishermanlore, it has been found necessary, in many parts of the world, to furnish by governmental service some guidance to the industry in heightening the efficiency of its fish-finding activities; in its most modern form this is represented by the use of echo sounders and aeroplanes. Beyond this situation, which refers essentially to existing fisheries, there remains the problem of developing neglected fisheries. In this field it has been found that, although fishermen may themselves succeed in carrying out exploratory operations to determine distribution of neglected stocks, in many cases it has been necessary that scientific investigation should be mobilized to carry out this investigation on behalf of the industry and, generally, such effort, has had to be organized by government.

The Council, therefore, is convinced that there is a real need for oceanographic programmes, both for existing fisheries and for the development of new fisheries and far from suggesting to Member Governments that their oceanographic programmes should be abandoned, the Council takes the opportunity of emphasizing the importance of such programmes for both immediate and long range purposes.

The Council is equally well-convinced that there is a real need for international action to secure the best use of the facilities available at any time, and, furthermore, to promote the development of the national programmes and to supplement them, both in the special sense of coordination, etc. and by way of dealing with particular subjects and areas which lie beyond the range of the national programmes.

The Council submits that it is not a question of whether there should be international action, but of the form which such action should take. The Council has accordingly returned its attention to the existing situation within the region and believes that this situation indicates a need for international work of the following kind:

(1) The establishment of a complete and reliable register of the institutions, vessels, and projects concerned with oceanography within the region which could be supplemented by an appraisal of these activities by a fully qualified oceanographer who should visit all the institutions listed in the register;

(2) The establishment of a file of all oceanographic data collected in the area and its subsequent reduction to a form in which it could be published and made available to workers of the area by whom it could be used in their own pragrammes;

(3) The establishment of a special documentation and bibliographic service in oceanography for the region;

(4) The establishment of a consultative service to be made use of by Member Governments in the planning and execution of their oceanographic programmes and in the interpretation of oceanographic results for the purpose of making these available to industry;

(5) The establishment of a service to promote the local manufacture of oceanographic equipment;

(6) The establishment of training facilities in field and laboratory practice in oceanography;

(7) The establishment of arrangements whereby the national programmes will be fully coordinated, and methods and equipment will be standardized.

The Council believes that action should be taken immediately to establish these service within the region as quickly and efficiently as possible. The Council assumes within a few years the results of this data would furnish guidance to the Council as to the lines along which international activities should develop.

The Council is confident that there would continue to be a need for the coordinating and compiling activities at the international level and whilst it believes that there would be a need for specific action in field and laboratory work of special international character, it thinks that the decision on whether such action should be taken by means of collaboration of national programmes or should be effected by the provision of vessels, laboratory and equipment for the use of the international unit would be a matter for a decision when the need for these projects had it been submitted to Member Governments and the Council and had secured their approval.

Finally, the Council draws attention to the very great importance of the fundamental aspects of this work and of the needs for basic education upon which training in oceanography can be established. It believes that, generally, the prosecution of fundamental research in physical and biological oceanography within the region should be promoted and that steps should be taken to encourage universities and other educational institutions to expand and develop the curricula to provide basic education for those who might intend to make oceanography a career. It is obvious that this is a field in which UNESCO should be able to play an important role, and the committee believes that the Council should draw the attention of UNESCO to this work and that in planning international action the Council should arrange that UNESCO should be kept informed of the needs and of developments so that its own programmes might be made as effective as possible in assisting the achievements being sought by the Council's international programmes.

APPENDIX 7

NOTES ON THE MILKFISH, *CHANOS CHANOS*

The following information was transmitted to the Food and Agriculture Organization in response to a memorandum on the problems of *Chanos chanos*, recommended to the Council by the Director, Fisheries Division.

1. The various aspects of the biology of *Chanos chanos* in natural waters remain to be fully studied. Work is in progress in the Philippines and India in this direction. The question of spawning is one phase of this problem. This sub-committee feels that studies may be divided along the following lines:
   a. Charting the spawning grounds within the area including the conditions obtaining therein.
   b. Spawning season in these various grounds giving time or times of the year and duration.
   c. Spawning habits or behavior.
2. There is very little known of the variation of the success of each year's spawning and the subsequent availability of the fry, although twice a year spawning in Indonesia and India and once a year in the Philippines have been reported. It is a well-known observation, however, that yearly fluctuations in abundance do occur so that studies along this line are very essential in order that the industry may be prepared to meet such exigency for its stabilization.

3. Very little is known on the survival rates of various life stages of *Chanos chanos* in its natural habitat. Studies should be directed to find whether there is any strain on the species caused by the intense fishing of the natural stock of fry to supply the expanding fishpond industry.

4. Fry transportation methods at present are beset with defects causing undue wastes and mortality. In the Philippines, for example, the waste lies in the persistent use of earthen containers which are subject to easy breakage. Present storage techniques do not provide adequate aeration and cooling of containers, and lack of knowledge on proper feeding of fry while in prolonged storage results in large scale mortality.

5. There are no concrete data yet on the survival rates of different stages under varying types of cultivation, although experienced fishpond operators know more or less what to expect under a given set of conditions. Thus, a survey of these experiences and studies along this line is imperative.

6. Studies on the growth rate of this species under a certain set of conditions have been made. Particular attention is called at this point to technical paper No. 15 which deals with studies on the rate of growth of *Chanos chanos* in the nursery pond stage of its cultivation as practiced in the Philippines. This paper points out that improvements of pond management techniques may be achieved from the data obtained. More work on the growth rate under varying conditions of food supply and other ecological factors should be made for more extensive knowledge on this point.

7. Food supply in the ponds is a major problem because of the fast decline of the fertility of ponds with continuous and prolonged use. Studies towards stimulating the natural food by fertilization of the ponds or producing some cheap and easily procurable artificial feed should be seriously considered.

8. It is highly desirable to evolve techniques for the assessment of the carrying capacity of ponds since a mistake along this point leads to high mortality and to the possible production of inferior quality fish. It is possible that this problem may be attacked on the basis of availability of food and space and such other criteria as may be found feasible.

9. It has been observed that the fish is very pliant to changes of wide ranges of salinity which could be taken advantage of in its cultivation and stocking. Studies on salinity tolerance are being undertaken in the Philippines and India and the problems of osmoregulation are in progress in India. The limits of salinity tolerance lie between fresh water and salt water salinities up to 60 parts per mille. The changes in total osmotic concentration is rather small for wide variations in external salinities. Papers on the subject are being published (one has already appeared) in the Proceedings of the Indian Academy of Sciences, Bangalore.

10. Other aspects for study:

    a. On the biological aspect, efforts should be made for devising ways and means for inducing spawning of fish in ponds or of increasing propagation in natural waters.

    b. On fish culture techniques, attention is called to the aspect of fishpond engineering which includes selection of sites; principles of irrigation and drainage, measurement and calculation of land areas, leveling, contouring and mapping; and construction of dikes, water gates and pipes, in relation to fishpond work.

    c. Another point is the solar salt bed-fishpond combination. A survey by member governments of this system where it is practiced is highly recommendable for its possible adoption in other countries within the area.

APPENDIX 8

STUDY OF SEAWEEDS

The Council is of the opinion that the paper by Zaneveld on the Economic Marine Algae of Malaysia and their Applications, of which the first two parts have already been published by the Council (Proceedings I and III) and of which the third and last part has been presented at this meeting as IPFC/C52/TECH 35, constitutes a useful and effective survey of current knowledge on the taxonomy, distribution and uses of marine algae of this region. The Council recognizes that, despite the geographic limitation implied by the title, the survey made by this paper is very broad, and believes that the paper could be made complete for the region, within the limits which Mr. Zeneveld has set, with relatively little further work. The Council believes that it would be very useful to workers in this field to have this paper available as a single publication and therefore proposes to reprint this paper as a manual for workers of the region, and to request Member Governments to direct their workers in this subject to furnish Mr. Zaneveld with notes on any changes or additions which ought to be made to this paper and that Mr. Zaneveld be asked to undertake the revision. In addition, the Council has examined Mr. Zaneveld's index of the Malayan vernacular names for seaweed in manuscript and feels that this list should be extended to include vernacular names from other countries and be included in the reprinted paper. The Council, therefore, proposes to request Member Governments to direct workers in this subject to furnish Mr. Zaneveld with a list of vernacular names of sea-weeds for their country. The Council finally requests members of the Seaweed Sub-Committee to assist Mr. Zaneveld in this work.

The Council believes that the development of seaweed industries is restrained by the lack of reliable methods for realistic measurements of the abundance of weeds. Many countries are aware of the existence of seaweed resources in their waters but are unable to decide whether these are of sufficient extent and abundance to warrant the establishment of industries. The Council does not know whether methods have been perfected for making such determination but imagines that a modern method would have recourse to aerial photography, underwater photography, echo-sounding and similar techniques which would be employed in conjunction with the work of the seaweed taxonomist and ecologist. The Council proposes to request Member Countries which have had experience in this type of work to furnish the Sub-Committee with reports on their work including a statement of their estimate of the seaweed resources of their waters, and at the same time to request the Fisheries Division of FAO to direct enquiries in this matter to countries beyond the region and furnish the Council with a report of the result of such enquiries: if this survey should reveal that a suitable technique is already in existence, an account of it should be widely distributed by the Council; if, on the other hand, there remained a need to bring about improvements in such survey technique, the Council would propose to authorize the Sea-weeds Sub-Committee to study the possibilities of having appropriate experimental work undertaken by interested Member Governments.

In addition to the foregoing the Council recognizes the importance of the following matters concerning the sea-weed resources:

1. Special forms of Algae form the major part of the food of *Chanos;* the Sub-Committee feels that this is an important field in which the Council should interest itself; the Sub-Committee ventures to suggest that this subject should be a matter of discussion between the *Chanos* and Sea-weeds Sub-Committees and that such discussion could in particular refer to the utilization of *Gracilaria* as a supplementary food for *Chanos*, and to the possibility of devising improvements in the cultivation of the genera *Enteromorpha, Cladophora,* and *Chaetomorpha.*

2. It is probable that there exist many seaweeds which are at present neglected but which could be used economically if appropriate processing methods could be devised; the Sub-Committee suggests that Technical Committee II be invited to give this matter its consideration.

3. There are certain seaweeds which undoubtedly could be more fully used; e.g., *Sorgassum* as a potential source of alginic acid, *Porphyra* as a source of food and *Digenea simplex* as a source of anshelminthic. The Sub-Committee suggests that the attention of Member Governments be drawn to these possibilities.

APPENDIX 9

STUDY ON PELAGIC-NERITIC FISHES

The Council after examination of the problem of pelagic-neritic fisheries found that while the resources coming within the neritic-pelagic group of fisheries were considerable and of great importance to the area as a whole, the information available on these resources in the various countries was inadequate to form an over-all picture. The Council felt that the first requisite should be to collect information on these fisheries, and on the programmes relating to them, from the various Countries, for which purpose a questionnaire was drawn up.

The Council considered the reports on the subject for last year and felt there was sufficient indication to show that the mackerels belonging to the genus *Rastrelliger* and Sardines belonging to the genus *Sardinella* had wide distribution in the seas adjoining most Member Countries and contributed to very valuable fisheries. Information was incomplete, however, and it was very necessary at this stage to obtain comprehensive data on the extent of these fisheries and their relative importance to various countries. It was needless to add that such information would form the basis to collaborative effort, which might be worked out by Member Countries for the study of these fisheries. It was understood that detailed investigation on *Rastrelliger kanagurta* and *Sardinella longiceps* were in progress in India; and on *Rastrelliger sp.* in Indonesia and in the Philippines. Investigations on *Scomber* and sardines were also carried out in Japan. A simple questionnaire to elicit information on these fisheries was drawn up for transmission to Member Governments for report.

So far as *Rastrelliger* is concerned, while work seemed to be in progress in India, Indonesia and Philippines, the other regions of the area where these species form large fisheries did not seem to be receiving adequate attention in the scientific study of these fisheries. Data for Burma, Malaya, Thailand, Vietnam and Ceylon were urgently necessary. Any information available on the biology of *Rastrelliger* in these areas should be made available to the Committee for study and report for the development of an integrated programme on *Rastrelliger.*

Similar information was also necessary for the somewhat erratic fishery for the oil sardine, *Sardinella longiceps,* which also is widely distributed. The Council referred to the paper presented at the Meeting by the Government of India and proposed to request collection of data on oil sardines on the lines roughly indicated in the scheme of investigations followed in India.

The Council further proposed that problems of methodology relating to neritic-pelagic fish stocks should receive close attention from all fishery workers in the area. There should be frequent exchange of information and discussion on practical difficulties encountered in the study. Experience gained in any one sector should be made available to others starting on the problems. For this purpose the Council desired that conclusions on topics which would have a bearing on methodology arrived at by different workers in the area should be transmitted to the IPFC Secretariat for distribution throughout the area as occasional papers.

For its next meeting the Council believed that methodological problems relating to neritic-pelagic fish stocks should receive special attention and should be so notified to Member Governments while inviting contributions.

The answers received in reply to the questionnaire will be consolidated in the form of a report for presentation at the next meeting of the Council to consider further development of the programmes in these fisheries.

APPENDIX 10

APPOINTMENT OF SUB-COMMITTEES

TECHNICAL COMMITTEE I—
SUB-COMMITTEES
Chairman: D. H. Rochford
Reporteur: J. H. Hardenberg

TUNA:
H. Thompson (Australia)
D. C. Zwollo (Netherlands)
A. M. Mane (Philippines)
W. F. Royce (U.S.A.)—Rapporteur
Tran Van Tri (Vietnam)
H. Nakamura (Japan)
M. R. Legand (France)

NERITIC PELAGIC FISHERIES:
Le-Huu-Ky (Vietnam)
M. L. Parry (U. K.—Malaya)
P. R. Manacop (Philippines)
J. D. F. Hardenberg (Indonesia)
N. K. Panikhar (India)—Rapporteur
Chee Choul Keun (Korea)
M. R. Qureshi (Pakistan)
J. Nakai (Japan)

FISH CULTURE:
Chee Choul Keun (Korea)
S. Jones (India)
Dom Saveun (France)
H. R. Montalban (Philippines)—Rapporteur
Jinda Thiemmedh (Thailand)
Soong Min Kong (U. K.—Malaya)
Cao Thien Buu (Cambodia)
K. Kuronuma (Japan)
Nasir Ahmad (Pakistan)
Amin Katamsi (Indonesia)
O. L. Meehean (U.S.A.)

PLANKTON:
Nguyen Nhu Nghi (Vietnam)
J. E. King (U.S.A.)
Tham Ah Kow (U.K.—Malaya)
R. Esguerra (Philippines) — Rapporteur (Marine)
Miss P. Kott (Australia)
K. F. Vaas (Indonesia)—Rapporteur (Freshwater)
R. Serene (France)
J. Blache (Cambodia)
B. Prasad (India)
S. Motoda (Japan)

HYDROLOGY:
R. Jayaraman (India)
R. Serene (France)
P. Ch. Veen (Indonesia)
D. Rochford (Australia)
T. Megia (Philippines)
Tham Ah Kow (U.K.—Malaya)
T. S. Austin (U.S.A.)
Lee-Huu Ky (Vietnam)
M. Uda (Japan)

TAXONOMY:
Chote Suvatti (Thailand)
G. J. Blanco (Philippines)
I. S. R. Munro (Australia)
J. D. F. Hardenberg (Indonesia)—Rapporteur
M. R. Qureshi (Pakistan)
R. Serene (France)
K. S. Misra (India)
M. Abe (Japan)

SEAWEED:
Mrs. Thivy (India)
R. Serene (France)
E. J. F. Wood (Australia)
M. A. Abagon (Philippines)—Rapporteur
S. Yamada (Japan)
B. T. Chiu (U.K.—Hong Kong)

HILSA:
S. L. Hora (India)
Nasir Ahmad (Pakistan)
S. Jones (India)
M. Qureshi (Pakistan)—Rapporteur

GENERAL BIOLOGY:
Tham Ah Kow (U.K.—Malaya)
J. Thiemmedh (Thailand)
J. S. Domantay (Philippines)
J. D. F. Harderberg (Indonesia)
R. Serené (France)
B. S. Bhimachar (India)—Rapporteur
M. Fujinaga (Japan)

CHANOS:
N. K. Panikkar (India)
H. R. Rabanal (Philippines)—Rapporteur
J. Thiemmedh (Thailand)
Tran Van Tri (Vietnam)
Cao Thien Buu (Cambodia)
Hasanuddin (Indonesia)

TECHNICAL COMMITTEE II—SUB-COMMITTEES

Chairman—Dr. M. R. Qureshi

Rapporteur—M. Tran-Van-Tri

SUB-COMMITTEE ON GEAR TECHNOLOGY

1. Mr. Agustin F. Umali—Philippines
2. Dr. C. J. Bottemanne—Netherlands
3. M. Tran-Van-Tri—Vietnam
4. Mr. T. Gorazdowski—U.K. (Hongkong)—Rapporteur
5. M. Dom-Saveun—Cambodia
6. Mr. W. C. Neville—U.S.A.
7. Mons. R. Serene—France
8. Mr. S. Takayawa—Japan
9. Mr. Nam Sangkyu—Korea
10. Mr. Sawarng Charoenphol—Thailand
11. Dr. S. B. Setna—India
12. Mr. H. E. Timmis—U.S.A.
13. Mr. U Ba Kyaw—Burma

SUB-COMMITTEE ON FOOD TECHNOLOGY

1. M. R. Lafont—Cambodia
2. Mr. C. Martin—Philippines
3. Mr. Jose I. Sulit—Philippines
4. Mr. C. M. Adams—U.S.A.—Rapporteur
5. Mr. C. Kosol Suriyongs—Thailand
6. Dr. K. C. Saha—India
7. Mr. Ree Bong Re—Korea
8. Mr. H. Bullock—Australia
9. Mr. D. R. Niven—U.K. (Malaya)
10. Mr. J. Watari—Japan
11. Mr. V. Uyengco—Philippines

SUB-COMMITTEE ON SOCIO-ECONOMICS

1. M. Dom-Saveun—Cambodia
2. B. Ongchango—Philippines—Rapporteur
3. Mr. Charidjie Kasuma—Indonesia
4. Mr. C. M. Adams—U.S.A.
5. Dr. C. J. Bottemanne—Netherlands
6. Mr. H. Oka—Japan
7. Dr. M. R. Qureshi—Pakistan
8. Mr. Sant Bandukul—Thailand
9. Mr. K. N. Anantaraman—India
10. Mr. H. E. Timmis—U.S.A.
11. Mr. W. C. Neville—U.S.A.
12. Mr. Tran-Van-Tri—Vietnam
13. Mr. J. G. Sanchez—Philippines
14. Mr. U Ba Kyaw—Burma

SUB-COMMITTEE ON STATISTICS

1. Mr. Jose R. Montilla—Philippines
2. Mr. H. E. Timmis—U.S.A.
3. M. Tran-Van-Tri—Vietnam
4. Mr. W. C. Neville—U.S.A.
5. Mr. Amin Katamsi—Indonesia—Rapporteur
6. Mr. K. Chidambaram—India
7. Mr. Klan Suwanaratana—Thailand
8. Mr. T. Yamamoto—Japan
9. Mr. Tran-Van-Bach—Vietnam
10. Mr. U Ba Kyaw—Burma

LIST OF DOCUMENTS ISSUED

Working Papers:

IPFC/C52/1	Draft Agenda and notes on the Agenda
1 Rev 1	Provisional Agenda and notes on the Agenda
1 Rev 2	Provisional Agenda and notes on the Agenda
1 Add	Symposium at the 4th Meeting
2	Executive Committee Report to the Council at its 4th Meeting
3	Secretary's Report on the Financial Affairs of the Council
4	Statement of the IPFC budget provided by FAO for 1952/53
5	Status of IPFC Resolution 51/52.1(1) passed at the 3rd (Madras) Meeting
6	Proposal for the amendment of the Council's Agreement
7	Council's Rules of Procedure-Proposal for amendment to Section X
8	Liaison with FAO
9	Proposal for the establishment of an Oceanographic Institute for the Indo-Pacific region
10	General Fisheries Council for the Mediterranean
11	Liaison with International Organizations
12	Nomination of Committees and working groups
13	Council correspondents
14	Report of Technical Committee I for 1951-52
14A	Rapport—sur les activites du S/Comite d'Hydrologie 1951-52
14B	Report of the Hilsa Sub-Committee
14B Rev 1	Report of the Hilsa Sub-Committee
14C	Report for 1952 of the Sub-Committee on Tuna
14D	Report for 1952 of the Sub-Committee on Planktology
14E	Report of the Sub-Committee on Fish Culture up to September 23. 1952
14F	Report of the Sub-Committee on Neritic Pelagic Fisheries
14G	Report of the Sub-Committee on Taxonomy on progress of work on the Standardization of Names of Fishes of commercial importance in the Indo-Pacific area
14I	Report of the Sub-Committee on General Biology
15	Report of Technical Committee II for 1951-52
16	Register of Projects
17	Report on Bibliographic work
18	Report on Publications
19	Distribution list
20	List of Films Fisheries and related subjects
21	———————
22	Report on Technical Instruction Centres—Fish Culture Seminar Bogor, Fisheries Statistics Training Centre, Bangkok
23	Regionalization
24	Fishing in International waters
25	Membership in Council
26	Presentation of Technical Papers
27	Annual Report to the Food & Agriculture Organization
28	Liaison with UNESCO
29	Handbooks
30	Liaison with the Pacific Science Congress
31	Proposals concerning *Chanos chanos* culture
32	Status of the Fishery Industries of the Indo-Pacific region during the period 1951-52
33	Report on Credentials
34	Report of Technical Committee I on Assignment Note No. 12

Working Papers (continued):

IPFC/C52/34Rev 1	Report of Technical Committee I on Assignment Note No. 12
34Rev 2	Report of Technical Committee I on Assignment Note No. 12
34Rev 3	Recent status of Oceanographic Investigations in the Indo-Pacific Region
35	Report of the Sub-Committee on Tuna
35Rev 1	Report of Assignment Note No. 15 & Ancillary Matters
36	Report of Committee on Register
37	Report of Sub-Committee on Seaweeds
37Rev 1	Report of Sub-Committee on Seaweeds
38	Report of Technical Committee I on the Socio-Economic Sub-Committee
38Rev 1	Report of Technical Committee I on the Socio-Economic Sub-Committee
39	Report of Technical Committee I on Liaison
40	Report of Technical Committee I on Pelagic Neritic Fisheries
41	Report of Technical Committee II on the Sub-Committee on Statistics
42	Report of Technical Committee II on the Sub-Committee of Gear Technology
43	Report of the Budget Committee
44	Report of Technical Committee II on the Sub-Committee on Food Technology
45	Report by working group on Regionalization
46	Report of Technical Committee I on the Sub-Committee on Planktology
47	Report of Technical Committee I on Fish Culture
48	Report of Technical Committee I on Fish Culture
49	Report of Technical Committee I on General Biology
50	Report of Technical Committee II on Technical Assistance Centres
51	Report of Technical Committee I on Fish Culture
52	Report of Technical Committee I on Sub-Committee on *Chanos chanos*
53	Report of Technical Committee I on the Sub-Committee on Hydrology
54Rev 1	Report of Technical Committee I on Sub-Committee on Hilsa
55	Report of Technical Committee I on Handbooks
56	Report of Technical Committee I on Sub-Committee on Taxonomy
57	Report of working group—Technical Committee I on High Seas Fishing
58	Report of Technical Committee II on Assignment Note No. 3
59	Report of Technical Committee II on Assignment Note No. 5
60	Report of Technical Committee II on Assignment Note No. 9
61	Report of Technical Committee II on Assignment Note No. 15
62Rev 1	Report of Technical Committee II on Assignment Note No. 33
63	Report of Technical Committee II on Assignment Note No. 27
64	Report of Technical Committee II on Assignment Note No. 32
65	Report of working group appointed by Technical Committee I on Assignment Note No. 4
66	Report of Technical Committee I on Fish Culture

Technical Papers:

IPFC/C52/TECH 1	The experimental introduction of power fishing vessels within India and Ceylon by K. Chidambaram, Deputy Director of Fisheries, Madras, India.
2	Manufacture of Elasmin Pearls at the Fisheries Technology laboratory, Bombay, by E. M. Arsiwala, Dept. of Fisheries, Bombay, India.
3	Some observations on the Tuna fisheries off the Bombay Coast by S. B. Deodhar, Dept. of Fisheries, Bombay, India.
4	The "Tugoh" net by J. A. Tubb, Director of Fisheries, British North Borneo.
5	La Peche au day dans le Tonle-Sap par M. Sao Leang, Chef, Division des Peches de Kandal, et M. Dom Saveun, Chef du Cantonnement des Peches de Phnom Penh, Cambodia.
6	A study of drift in the Straits of Malacca and the Singapore Straits from salinity determinations in these waters by R. A. Robinson, Professor Chemistry, University of Malaya, Mrs. H. Tong, Demonstrator in Chemistry, University of Malaya and Tham Ah Kow, Fishery Officer (Research) Dept. of Fisheries, Federation of Malaya and Singapore.

Technical Papers (continued):

IPFC/C52/TECH 7 The plankton calendar of Singapore Straits with suggestions for a simplified methodology for its determination by Tham Ah Kow, Fishery Officer (Research) Dept. of Fisheries, Federation of Malaya and Singapore.

8 Some notes on Thynnichthys vaillanti W. de B. by H. Saanin, Inland Fisheries Service, Djakarta, Indonesia.

9 Contribution a la Connaissance des Engins de Peche du Vietnam par Tran-Van-Tri, Chef, Bureau des Peche et R. Serene, Directeur, Institut Oceanographique, Nha Trang, Vietnam.

10 Fishing Gear of East Pakistan by Nazir Ahmad, Deputy Director of Fisheries, Comilla, East Pakistan.

11 Fisheries in the Lake District along the river Kapuas in West Borneo by K. F. Vaas, Laboratory Inland Fisheries, General Agricultural Research Station, Bogor, Indonesia.

12 Non indigenous Marine Fishing Gear of Korea by Chyung Moon Ki, Fisheries Inspection Station, Pusan, Korea.

13 Fishing Boats of Pakistan by M. R. Qureshi, Director, Central Fisheries Department, Karachi, West Pakistan.

14 Equipment and Methods used in Oceanographic Investigation in the Philippines by T. G. Megia, Oceanographer, and A. R. Sebastian, Fishery Technologist, Bureau of Fisheries, Manila, Philippines.

15 Studies on the rate of growth of milkfish a "Bangos," *Chanos chanos* (Forskal) under cultivation by H. R. Rabanal, Fish Culturist, R. C. Esguerra, Assistant Fishery Technologist and M. M. Nepomuceno, Assistant Fishery Technologist, Bureau of Fisheries, Manila, Philippines.

16 Development of a coal tar net preservative by J. I. Sulit, Chemist, B. Datingaling, Assistant Fishery Technologist, Bureau of Fisheries, Manila, Philippines.

17 Studies on the preparation of salted fish paste (Bagoong) from dried dilis (Stolephorus indicus) by C. Martin, Chief, Division of Fisheries Technology and J. I. Sulit, Chemist, Bureau of Fisheries, Manila, Philippines.

18 Chemical studies and utilization of some Philippine Seaweeds by J. I. Sulit, Chemist, O. B. Navarro, Assistant Chemist and R. C. San Juan, Junior Chemist, Bureau of Fisheries, Manila, Philippines.

19 The different methods of processing fish by R. Lafont, Chief, Laboratory for Technology, Fisheries Research Institute, Phnom Penh, Cambodia.

20 Mechanics of Bagoong (Fish Paste) and Patis (Fish sauce) processing by U. Uyengco, Chemist, I. Lawas, P. R. Briones, Assistant Fishery Technologist, R. S. Taruc, Assistant Fishery Technologist, Bureau of Fisheries, Manila, Philippines.

21 Socio-economics by Nazir Ahmad, Deputy Director of Fisheries, Comilla, East Pakistan.

22 Soco-economic problems of the fishing industry in Uttar Pradesh and suggestions for betterment by D. S. Sonbaht, Assistant Fisheries Development Officer, Uttar Pradesh, India.

23 A preliminary study of the physical, chemical and biological characteristics of Singapore Straits by Tham Ah Kow, Fishery Officer (Research) Department of Fisheries, Federation of Malaya and Singapore.

24 HILSA TECHNICAL PAPERS.

PROGRESS OF HILSA INVESTIGATION IN INDIA FROM 1938-1950, A REVIEW
by N. K. Panikkar, Chief Research Officer, Central Inland Fisheries Research Station, Mandapam.

BIOLOGY OF THE HILSA
by S. L. Hora, Chairman, Hilsa Sub-Committee, Indo-Pacific Fisheries Council, Calcutta.

Technical Papers (continued):

MORPHOLOGICAL AND SEROLOGICAL CHARACTERS OF THE HILSA, HILSA ILISHA (HAM.) WITH REFERENCE TO RACIAL INVESTIGATIONS by T. V. R. Pillay, Asst. Research Officer, Hilsa Fish Enquiry, Indian Council of Medical Research, Calcutta.

TRENDS OF HILSA PRICES IN CALCUTTA MARKETS
by J. C. Biswas, President, Fish Retailers Association, Calcutta.

PROVERBS AND POPULAR SAYINGS CONCERNING THE HILSA FISH CURRENT IN BENGAL
by S. L. Hora,
Zoological Survey of India, Calcutta.

PAST, PRESENT, AND FUTURE OF THE HILSA FISHERIES IN THE MADRAS STATE
by P. I. Chacko, Madras.

DAMS AND HILSA FISHERIES
by K. Krishnan Nair

A PRELIMINARY BIOMETRIC STUDY OF CERTAIN POPULATIONS OF HILSA, HILSA ILISHA (HAM.)
by T. V. R. Pillay, Asst. Research Officer, Hilsa Fish Enquiry, Indian Council of Medical Research, All-India Institute of Hygiene & Public Health, Calcutta.

HILSA FISHERY IN BIHAR
by C. P. Varma,
Fisheries Development Officer, Bihar (India).

PALLA OF SIND
by M. Rahimullah Qureshi, Karachi.

HILSA FISHERY OF EAST BENGAL
by Nazir Ahmad, Pakistan.

SOME OBSERVATIONS ON PARASITES OF HILSA
by Y. R. Tripathi, Barrackpore.

HILSA INVESTIGATIONS AT THE CENTRAL INLAND FISHERIES RESEARCH STATION—AIMS & ACHIEVEMENTS
by S. Jones, Research Officer (Estuarine) Central Inland Fisheries Research Station, Barrackpore, (India).

25 Summary of the movement of Fishery Organization in Indonesia by C. M. Charidjie Kasuma, Pusant Djawatan Perikanan Laut, Djakarta, Indonesia.

26 Socio-economic uplift of the fishermen engaged in Roak fishing in Allahabad district, Uttar Pradesh, India, by B.S. Kaushiva, Deputy Director of Fisheries, U.P. Lucknow, India.

27 Investigations of indebtedness in a fishing village in the East Coast of the Madras state by K. N. Anantaraman, Director of Fisheries, Madras, India.

28 Note sur les relations entre employes te patron pecheurs a Nha Trang (Vietnam) par Tran Van Tri, Chef, Bureau des Peches a l'Institut Oceanographique et Nguyen Chan, Institute Oceanographique, Nha Trang, Vietnam.

29 Preliminary Report or a comparison of the stocks of Yellow Fin Tuna by W. F. Royce, Fishery Research Biologist, POFI Fish and Wildlife Service, Honolulu, T. H.

30 The Application of Science to Fisheries by A. Husain, Deputy Warden of Fisheries, Punjab, Pakistan.

31 A proposed system for cataloguing the books used in the fishing industries of South & East Asia by C. A. Gibson Hill, Raffles Museum, Singapore.

32 Preliminary bibliography of fishing gears and methods employed in the region covered by the Indo-Pacific Fisheries Council by T. W. Burdon, Deputy Director of Fisheries, Singapore.

33 Bibliography of Fishing Gear Preservative.

Technical Papers (continued):

IPFC/C52/TECH 34 A selected bibliography of native-built boats constructed adn used in the region covered by the Indo-Pacific Fisheries Council by C. A. Gibson-Hill, Raffles Museum, Singapore.

35 The Economic Marine Algae of Malaysia & Their Applications—III—The Rhodophyta by J. S. Zaneveld, Djakarta.

36 Notes on the Fisheries of Brunei Bay & Labuan Island by A. M. Anderson, Derek Headly and J. A. Tubb.

37 A note on the standardization of methods in quantitative planktological investigation with special reference to marine areas in the Indo-Pacific region.

38 Scheme of investigation on Sardine Fisheries with special reference to the oil sardine *Sardinella longiceps* submitted by the Indian delegate.

39 A note on the Tuna Fishery of India—submitted by the Indian delegate.

40 The Oil Sardine Fishery in India—A review by the Indian delegate.

Symposium Papers:

IPFC/C52/SYM 1 Campaign against indebtedness among fishermen of Bombay State—Role of Government effort recognized by S. B. Setna, Director of Fisheries, Bombay, India.

2 The Socio-economic programme with special reference to conditions in the Indo-Pacific region by G. L. Kestevan, Chief, Biology Section, FAO Fisheries Division, Rome, Italy.

3 The Application of Science to Fisheries by S. L. Hora, Zoological Survey of India, Indian Museum, Calcutta, India.

4 Application of Science to Fisheries by J. D. F. Hardenberg, Chief, Laboratorium Penjalidikan Laut Pasar Ikan, Djakarta, Indonesia.

Unnumbered:

Speech delivered Oct 19, 1952, over Station DZFM under the auspices of the Committee on Fish Conservation from the City of Manila by Dr. D. V. Villadolid.

Welcome address of the Honorable, the Secretary of Foreign Affairs, Joaquin M. Elizalde.

Greetings to the Delegates of the Fourth Meeting of the Indo-Pacific Fisheries Council by Dr. D. V. Villadolid (Director of Fisheries) Chairman, Indo-Pacific Fisheries Council, 1951-52.

Address given on October 19, 1952, over station DZFZM by Dr. Cecil Miles, Secretary, IPFC.

Address of Honorable Jose S. Camus, Acting Secretary of Agriculture and Natural Resources, at the Fourth Meeting of the Indo-Pacific Fisheries Council, University of the Philippines, November 6, 1952.

Extempore Papers:

IPFC/C52/X 1 Statement by Australia Delegation concerning proposed Indo-China Oceanographic Institute.

2 Motion for a resolution of the Council arising out of IPFC/C52/8

3 Technical Committee I—Sub-Committees

3Rev 1 ditto.

4 Address by Dr. D. V. Villadolid, Chairman, 4th Meeting, IPFC, on the International Institute of Oceanographic Research in the Indo-Pacific Region.

5 Technical Committee II—Sub-Committees

5Rev 1 ditto.

6 Supplementary Note from Technical Committee I

7 Resolution to be moved by the Korean delegate for addition to the Resolution contained in IPFC/C52/34 Rev. 3

8 Resolution by Chairman Technical Committee I

1. Indo-Pacific Fisheries Council Publications No. 1
   Fish-Culture in Brackish-Water Ponds of Java, by W. H. Schuster

2. Colony of Singapore *Fisheries Survey Report No. 1*
   An Introduction to the Fisheries Survey of the Colony of Singapore, with a Consideration of the Methodology Employed, Fisheries Department

3. *Annual Report of the Fisheries Department, Singapore*, 1951

4. *Indo-Pacific Fisheries Council Proceedings*
   Third Meeting—1st-16th February, 1951
   Madras, India—Sections II and III

5. *Indo-Pacific Fisheries Council Proceedings*
   Third Meeting—1st-16th February, 1951
   Madras, India—Section I

6. *Institut Oceanographique de Nhatrang* (Bureau d'Etudes des Peches) *Etudes sur les Techniques de Peche du Vietnam*, Contribution No. 8.

7. *A Bibliography of Philippines Fisheries*
   By Guillermo J. Blanco, M.S. (Univ. Washington), Zoologist and Heraclio R. Montalban, M.A. (Stanford), Chief Division of Fish Culture and Fisheries Biology

8. *Prospecting for Suitable Fishpond Sites*
   Fish Culture Series, Fisheries Leaflet No. 1, by the Bureau of Fisheries

9. *How To Acquire Public Lands for Fishpond Purposes*
   Fish Culture Series, Fisheries Leaflet No. 2, by the Bureau of Fisheries

10. Popular Bulletin No. 2
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    e) Fish Preservation
    f) General Condition of Social Economic Study regarding Japanese Fisheries
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TABLE OF CONTENTS