

Annex II

Paris 3 June 1965

REPORT OF THE THIRD MEETING OF THE CONSULTATIVE COMMITTEE
FOR THE INDIAN OCEAN BIOLOGICAL CENTRE

PARTICIPANTS

The third meeting of the Consultative Committee was held in Ernakulam and Munnar, South India, during the period 7-16 April 1965. A list of participants is given below:

Mr. R. S. Glover, Chairman	- Consultative Committee.
Dr. M. E. Vinogradov	- Consultative Committee.
Professor S. Motoda	- Consultative Committee.
Dr. J. A. McGowan	- Consultative Committee.
Professor J. Krey	- SCOR.
Dr. N. K. Panikkar	- Director of IOBC, Advisory Board for IOBC, INCOR, CSIR.
Dr. R. R. Prasad	- Chief Scientist in charge.
Dr. S. Z Qasim	- Assistant Director of the Indian Marine IBP Laboratory, Head of Office of IOBC.
Mr. L. R. Kasturirangan	- Acting Assistant Curator, IOBC.
Dr. K. K. Tiwari	- Advisory Board for IOBC.
Mr. C. S. Nayar	- Secretary, Indian National Commission for Unesco.
Dr. A. Y. Evstafiev	- Unesco, Chief of Mission for India, Advisory Board for IOBC.
Dr. R. Serene	- Unesco - SEASCO, Singapore.
Dr. G. Hempel	- Unesco, Office of Oceanography.

On Friday, 17 April, members of the Consultative Committee discussed the work of the Centre with Dr. S. Hussain Zaheer, Director General of CSIR.

LECTURES AND SEMINARS

In accordance with the usual practice, members of the Consultative Committee gave lectures and seminars:

Thursday, 8 April. A symposium on "The trophic chain in the sea" was held in the Oceanographic Laboratory of the University of Kerala; it was attended by staff and students of the University, representatives of the Indo-Norwegian Project, the Central Marine Fisheries Laboratory and the staff of the IOBC. Lectures were given as follows:

Mr. R. S. Glover	-	Introductory Lecture: the use of models in studies of food chains.
Dr. S. Z. Qasim	-	The Indian marine IBP.
Dr. G. Hempel	-	The food and feeding of larval fish.
Dr. M. E. Vinogradov	-	The feeding of deep-sea plankton.
Professor J. Krey	-	Recent results of the METEOR expedition with reference to trophic relationships in the Indian Ocean.

Thursday, 15 April. Three lectures were given to the staff of IOBC:

Professor J. Krey	-	Comments on the use of the Indian Ocean Standard Net.
Professor S. Motoda	-	The estimation of primary and secondary production.
Dr. J. A. McGowan	-	Species interaction and patch permanence.

Thursday, 15 April. Group seminars were held in which members of the Committee jointed the sorting staff of IOBC. The group leaders were Mr. Glover, Dr. McGowan, Professor Krey and Dr. Tiwari.

SUMMARY OF DISCUSSIONS

On behalf of the CSIR of India, Dr. Panikkar welcomed the participants to Ernakulam.

In his reply, the Chairman expressed his pleasure that the Committee would have the benefit of the attendance of Dr. Tiwari (responsible for the marine section of the Zoological Survey of India) and of Dr. Qasim (Director of the new marine IBP Laboratory in Ernakulam). Collaboration between these organisations and the IOBC is highly desirable. The Chairman regretted the absence of Professor Krishnaswamy, whose advice as the first Indian member of the Committee would have been invaluable. It was unfortunate, also, that three other participants were unable to attend the first half of the meetings: Dr. Prasad through pressure of other work, and Professor Motoda and Dr. McGowan because of strikes of airline personnel and other travel difficulties.

The Chairman reminded the participants that the International Curator had completed his period of duty in Ernakulam and that Mr. Kasturirangan had performed the duties of Acting Assistant Curator during the previous two months.

The Committee wishes, unanimously, to place on record its sincere appreciation of the work of Mr. Vagn Kr. Hansen as the first Unesco Curator at the Centre (April, 1963 to March, 1965). In training the staff and setting up the administrative and scientific machinery for processing the samples, he has established a most promising growing point for future development.

The Committee received two reports: ■

The Indian Ocean Biological Centre. Report to the Consultative Committee. By Dr. N. K. Panikkar, Director, Indian Programme International Indian Ocean Expedition, CSIR, New Delhi.

Curator's Report on Activity at IOBC, April 1964 to March 1965. By Mr. Vagn Kr. Hansen and Mr. L.R. Kasturirangan.

1. Terms of reference and membership of the Consultative Committee. ■ ■

The Committee does not wish to recommend any changes in the five terms of reference listed in the Report of the second meeting of the Consultative Committee (IIOE Information Paper No.7, pp 1 and 2).

■ An extended version of Dr. Panikkar's report will be published by CSIR. An account of the activity of the Curator and of the history and general programme of the Centre with regard to the International Collections will also be published in due course.

■ ■ The final version of the terms of reference of the Consultative Committee, as decided by Unesco, June 1965, is given as Annex III of this Information Paper.

It is recognised that the "present and future scientific activities of the centre" (the fourth term of reference) will be centred around the International Collections.

The Committee recommends that its members shall serve for up to five years and that the chairman shall be elected to hold office for two years. It is recommended that the vacant place on the Committee shall be filled, bringing the number of members to the maximum of six, which was proposed at the second meeting and approved by SCOR and IOC.

2. Staff of the Centre.

The Committee is disappointed by the failure to confirm the appointment of Dr. Prasad as the full-time Assistant Director. The Committee repeats the strong view, expressed at last year's meeting, that it is essential to make a full-time appointment in the near future, and, in any case, before the new Curator takes up his duties.

It is also considered to be essential that the Indian authorities shall appoint a Curator or Deputy Curator as the counterpart of the International Curator. It is recommended that the Indian Curator shall visit institutions engaged on related studies outside India, and, especially, laboratories with experience in the collection and processing of large numbers of plankton samples.

The Committee welcomes the appointment of Dr. S. Z. Qasim (Assistant Director of the Indian Marine IBP Laboratory) as part-time Assistant Director of IOBC and Head of the Office of the Centre. This appointment will facilitate a close liaison between the IOBC and the IBP Laboratory.

It is noted that the number of sorters increased from 11 at the time of the second meeting (in March 1964) to 13 in April 1965. The Committee was informed that five additional sorters have been appointed and will join the staff in the near future. (At the second meeting in March 1964, the Consultative Committee had recommended a staff of 20 sorters.)

It is suggested that consideration be given to the possibility of promoting the three senior sorters in recognition of their long and valuable service and the part they are playing in the training and supervision of junior staff.

It is also suggested that the possibility should be explored of sending one or two senior sorters to the Danish Advanced Course in Marine Biology, coupled with periods of instruction in data handling and processing at the Oceanographic Laboratory, Edinburgh, and elsewhere.

The Committee recommends that - for work on the International Collections - six new Research Fellowships be created (three senior and three junior) and expresses the hope that members of the sorting staff will be eligible to apply for some of these posts.

The Committee welcomes the appointment of a librarian who will soon assume responsibility for the library of the three marine science laboratories in Ernakulam (IOBC, IBP and the Physical Oceanographic Laboratory).

The Committee recommends that a new post of draughtsman be created to help with the preparation of charts and other illustrations.

3. Buildings and equipment.

Although the buildings and equipment are adequate for the present stage of development, it is clear that more space and additional apparatus will be needed in the near future as the work progresses. In particular there will be a requirement for research rooms and equipment for visiting workers.

The Committee recommends that Unesco shall continue to provide equipment which cannot be obtained in India and, further, that the Office of Oceanography shall allocate a minimum of \$500 per annum for the purchase of consumable stores and small items of equipment not available in India, at the discretion of the International Curator.

Working conditions in the sorting room have been improved by the installation of additional fans. It is suggested that additional air-conditioners and de-humidifiers will be necessary in rooms containing sensitive equipment.

It is recommended that a photographic dark room be provided and that it shall be especially well equipped for photo-copying. This will be valuable for making copies of books, papers and identification keys and it will be essential for the preparation of duplicate copies of plankton analyses, charts and other data.

It is suggested that the Centre is rapidly reaching the stage at which simple workshop facilities will be needed for the maintenance and repair of equipment for such tasks as the manufacture of special boxes for the safe transport of plankton samples overseas.

It is noted that negotiations have been started for the purpose of 1.1 acres of land at Ernakulam. The Committee welcomes the proposal to build a laboratory on this site to house the IBP Laboratory, the Physical Oceanographic Laboratory and the IOBC.

4. Sorting methods.

It is emphasised that a standard basis of sorting is essential throughout the International Collections and, therefore, no changes should be made at present in the sorting procedure laid down by Mr. Hansen and endorsed at the second meeting of the Consultative Committee. (During informal discussions, the sorting staff suggested some additions to the procedure, particularly the possibility of making estimates of volume or dry weight of the sorted categories. The staff were requested to draft schemes for such amendments for submission to the new International Curator.)

5. Receipt of material for sorting.

With the exception of the Australian samples mentioned in the Second Report of the Committee, no material has been received for "contract sorting".

Although the general response to the request for standard samples has been satisfactory, there are many disappointing gaps in the collections because of the absence of standard samples from some participating countries.

There are large regions of the Indian Ocean in which sampling during the IIOE is either lacking or quite inadequate. Even in the better-sampled areas, there has been insufficient repetition of sampling to permit an analysis of seasonal variation.

It is agreed that National Coordinators shall be asked to remind their colleagues of these gaps in the Collections and to seek ways of filling them, either by providing material from existing national collection or by undertaking special sampling in the future. It is hoped that these requirements will be borne in mind after the IIOE whenever research ships pass through the poorly sampled areas and that, whenever possible, standard samples will be taken and despatched to the Centre for sorting. It is hoped that samples taken by Russian vessels with the Juday net during the early phases of the IIOE will be made available to fill gaps in the southern part of the Indian Ocean.

In general, the condition of the material sent to the Centre is satisfactory, but there are a few cases of inadequate preservation. Also, picric acid has been used occasionally as a colouring agent to check that preservative has been added. The Committee approves the use of a temporary dye as a visual check, but points out that picric acid damages delicate specimens.

6. Data processing and station lists.

Although the sorting of the samples of the IIOE is unlikely to be finished before 1968 (at the present rate of 50 samples per month) the Committee think it is essential that processing and distribution of basic data shall be started immediately with three objectives:

- (a) to provide donors of material with information about the composition of the samples in terms of the standard sorting categories.
- (b) to provide taxonomists with details of the numbers and distribution of samples available for their studies.
- (c) to provide fundamental information for the development of research projects within the Centre.

There was some discussion, in which members of the sorting staff took part, of ways in which these objectives might be realised. It is suggested that a geographical form of representation based on Marsden squares may be the most suitable form of presentation. It was agreed that the staff of the Centre will make tests of alternative methods before the new Unesco Curator takes up his duties. It was also agreed that, in addition to receiving routine data, donors of material will be kept informed about outstanding discoveries made from their material.

It is considered essential that a standard chart shall be used for biological, physical and chemical data from the IIOE. The Committee requests the assistance of Unesco and IOC in reaching an early agreement and suggests that supplies of charts should be made available, preferably free of charge, to participants in the Expedition.

The Committee recommends that a basic station list of material in the Centre shall be compiled as soon as possible and that it shall be brought up to date periodically. It is suggested that the Station List should be published as a Unesco Technical Report.

The Committee recommends that a careful appraisal should be made of the requirements for storage of data and the need for duplication of records as a precaution against accidental loss or damage.

7. Library and identification keys.

The Committee wishes to record its gratitude to all the donors of books and papers and to the University of Kerala for permission to use the library of the Oceanographic Laboratory. The library of the IOBC has been further improved through purchases made by CSIR. Many valuable and complete series, including most of the great expedition reports, are now available to the staff and visiting workers (see Annex 1).

Nevertheless, it is hoped that libraries and individuals will continue to send their duplicates and other spares to augment the library of the Centre. The Committee also asks laboratories and individuals to send copies of identification keys which have been prepared for internal use but not yet published. It is hoped that the Unesco Office of Oceanography will be able to assist in securing such material, for example from S. America and West Africa, and in obtaining English translations of keys.

8. Collaboration with the Zoological Survey of India.

The Committee hopes that there will be a mutual exchange of information on current and future research between IOBC and the ZSI. Holotypes from the International Collection will be deposited in the Indian Museum at Calcutta.

The Committee hopes that the staff of ZSI will be able to collaborate in the analysis of the material. The Zoological Survey could render particularly valuable services in providing library facilities for visitors working on the material of the International Collections and in the preparation of identification keys for plankton in the Indian Ocean. The Committee asked Dr. Tiwari to explore the possibilities of initiating such work in the ZSI.

9. Future Development of the Centre and the International Collections.

The Committee recognises the prime importance of assessing the potential natural resources of the Indian Ocean. It is emphasised, however, that such assessments will be dependent on the establishment of a sound basis of fundamental knowledge. Initially this foundation must be largely biogeographical and taxonomic. For this the Centre is in a unique position by reason of the International Collections, taken from a very wide area of the Indian Ocean.

The second stage of development will be the analysis of seasonal, annual and spatial variations in the abundance and composition of the plankton. For this it will be necessary to augment the International Collections with samples collected throughout the year. Consideration should be given, therefore, to the possibility of developing a long-term sampling programme.

In view of the magnitude of the problem, it is clearly desirable that such a programme shall be developed in collaboration with other institutes, inside and outside India. The recent German cruises in the Indian Ocean have shown the potential value of the Continuous Plankton Recorder in these waters and it is suggested that a more extensive feasibility trial should be started.

These biogeographical studies will raise many questions, demanding special ecological research, both in the field and the laboratory. It is highly desirable, therefore, that the Centre shall collaborate closely with other institutes engaged in related problems. Liaison with the IBP marine laboratory, the Central Marine Fisheries Laboratory, the University Oceanographic Laboratory and the Physical Oceanographic Laboratory (all in Ernakulam) would be especially valuable and it is assumed that there will be a very close association with the proposed new Indian National Institute of Oceanography. Members of the Committee pointed out that the plankton cannot be studied in isolation and there is an excellent opportunity to cover the whole spectrum of biological oceanography by an integration of research in Cochin.

Through their discussions, members of the Committee emphasised the potential value of the IOBC along three lines:

- (a) In providing a service for workers engaged on tropical studies everywhere, particularly in the resolution of taxonomic problems.
- (b) As a centre for research on the plankton of the Indian Ocean.
- (c) As a training centre, both for Indian recruits to marine biology and for workers from other countries who wish to specialise on tropical problems.

The Committee suggests that the IOBC could provide a service through its function as a sorting centre, by the provision of laboratory and library facilities for research and as a taxonomic data centre for the Indian Ocean. A profitable research activity would be the study and development of new methods of handling biogeographical data.

The urgent need to understand the ecology of tropical waters is recognised throughout the world, both for fundamental science and resource development. It is essential that laboratories of high standing shall be set up to train scientists from the temperate as well as tropical zones. Such training should be carried out in centres of active research and it is hoped that national and international organisations will follow the lead provided by Unesco in supporting the parallel development of research and training in the IOBC.

Organisations elsewhere may wish to set up plankton sorting centres for which the IOBC could serve as a model. The Committee took note of a recent recommendation of the 3rd Regional Meeting of Marine Science Experts in East and South East Asia in the following terms:-

"Recognising the valuable work undertaken at the Indian Ocean Biological Centre (IOBC);

Recognising the efficiency of the methods and techniques employed in plankton sorting at this Centre;

Considering the need in the near future of a similar establishment in the countries concerned with the Cooperative Study of the Kuroshio;

Desires Unesco to request Mr. Vagn Hansen, present Curator of the Centre, to prepare, possibly as part of his final report to Unesco, a comprehensive description of the system, methods and techniques of sorting work at the IOBC."

The Committee suggests that this need should be met through the publication by Unesco of a booklet describing the International Collections and their analysis at IOBC.

10. Taxonomic and biogeographical analysis of the International Collections.

The International Curator has prepared lists of experts who might be able to cooperate in the taxonomic and biogeographical analysis of the International Collections. However, with a few exceptions, it is impossible to issue material to specialists at this stage; the total work which will be needed to analyse each of the sorted categories is not known. Only two-thirds of the expected number of samples have been received in the Centre and only one quarter have been processed. The Committee asked the Assistant Curator to make a forecast, based on the samples sorted so far, of the expected order of magnitude of the total number of specimens in each of the 80 categories of the sorted material. As soon as these predictions are available, the Committee will approach individual experts and National Coordinators, soliciting their cooperation in the analysis of the material. Specialists will be requested to provide certain minimum information which will enable a quantitative biogeographical treatment of the results.

Although it will be necessary to distribute material to specialists working elsewhere, the Committee believes that, whenever possible, the work should be done in the Centre where activities can be coordinated with the biogeographical objective in view.

It is hoped that senior and junior scientists will work together in the Centre so that the twin objectives of training and research will be ensured. In other laboratories, also, young workers should have the opportunity to study the International Collections, providing that they are properly supervised and guided.

The Committee feels that priority should be given to the study of larval fish. Apart from their basic scientific interest, they should provide a useful first approximation to the distribution and abundance of potential resource stocks. It is recommended, therefore, that an attempt should be made to gather an international team of experts to work in the Centre for, say, three to six months. For example, it might be possible to assemble a group of specialists on tuna larvae with experience of the Atlantic and Pacific to join the experts already in Ernakulam. The members of such a group could also provide training of the highest standard for members of staff and visitors to IOBC. The Committee requests the assistance of the Office of Oceanography of Unesco in seeking the advice of prominent biologists on the development of such schemes, especially for the Clupeidae and Scombridae. It is hoped that international and national agencies will be prepared to sponsor such projects for these as well as other groups of meroplanktonic larvae and, especially, the decapods.

11. Other research activities.

The Committee urges strongly that the sorting staff should undertake research activities under the guidance of senior officers, visiting workers and the curators. A valuable preliminary activity would be the finer sorting of some of the standard groups. For example, group 46 (Copepoda) could be sub-divided into Calanoida, Harpacticoida and Cyclopoida, and finer sub-divisions may be possible (for example, Oithonidae, Corycaeidae and Oncaeidae). A group which might repay detailed study is the anguilliformes, but for this it will be necessary to invite an expert to work in Ernakulam.

The Committee feels strongly that an immediate start should be made to plot distributions. The first stage will be the charting of displacement volumes of the samples and the numbers of organisms in each of the sorted categories. It is expected that these charts will have considerable scientific value and they will serve, also, as valuable guides for further work on the Collections. The Committee points to the need for similar rough charts of physical and chemical variables including current systems.

It is suggested that the Collections might provide good material for a study of the relationship between size and dry weight of organisms in all stages of development over a wide area.

Apart from the value of this work in the study of energy and trophic relationships, it is likely that the size/weight conversion factors will be useful in other laboratories working on the Indian Ocean. The Centre possesses an analytical balance which is suitable for this work, but it will be necessary to construct an air-conditioned and "dry" balance room.

Among other research topics, it is suggested that it might be possible to investigate the differences between sampling by night and day, using the International Collections. The Centre might also undertake a general examination of sub-sampling methods in plankton studies.

The Committee considered, briefly, the question of the kind of gear which should be used by the Centre and associated institutions in future work. As the International Collections are based on sampling with the Indian Ocean Standard Net, there is a strong argument for the continuation of sampling with this net. However, insufficient work has been done on the sampling characteristics of the IOSN and its comparison with alternative samplers. The Committee recommends that the attention of the SCOR working groups on intercalibration and zooplankton methods should be drawn to the need for a well-designed and thorough programme of research on the sampling characteristics of the IOSN and alternative nets, including high-speed samplers. Pending such a study, the Committee suggests that the IOSN should be retained as the preferred sampler for augmenting the International Collections.

12. Constitution of the International Collections.

With many of the above points in mind, the Committee prepared a draft Constitution for the International Collections; see Annex 1. It was agreed that a booklet will be prepared, incorporating the Constitution and summarising the aims of the Centre and the obligations of participants in the programme. This booklet will be given to visiting workers and to specialists who apply for material from the Collections.

13. International Curator

The Committee discussed applications for the vacant post of Curator and requests the Office of Oceanography of Unesco to take all necessary steps to ensure that the new Curator is appointed by 1 June and will take up his duties not later than September 1965.

Draft terms of reference for the Curator were prepared; see Annex 2.

14. The fourth meeting of the Consultative Committee.

It is proposed that the next meeting shall be held at the end of February 1966, and that the first two or three days shall be spent in New Delhi where officials of CSIR and other governmental agencies can be consulted. Members of the Committee and other participants would then conclude the meeting during four or five days in Ernakulam.

Scientific Aspects of the Constitution for the International
Collections at IOBC

The International Collections consist of plankton samples taken from the research ships of various countries participating in the International Indian Ocean Expedition. Most of the samples were taken in the upper 200m with the Indian Ocean Standard Net, according to a standard procedure. It is envisaged that the Collections will be augmented by further samples taken after the end of the IIOE.

The primary aim of research on the International Collections will be the investigation of the distribution and abundance of the plankton in the Indian Ocean and the factors governing secondary production. This investigation will of necessity be based on taxonomic studies. The Consultative Committee of IOBC will invite experts to collaborate in the study of the material which will be pre-sorted by the staff of IOBC according to a standard procedure. Work on the various systematic groups may be done either at IOBC or in other scientific institutions to which material will be lent. Although the study will be primarily biogeographical and taxonomic, material will also be released for related studies. Any loan of material is subject to the following rules and conditions:

- (1) Samples will normally be lent to institutions only, rather than to individuals. Requests for samples should be made to the Curator of IOBC in a approved form containing a description of the proposed research project and naming the scientist who will be responsible for the material and the work which may be carried out by himself or by others under his supervision and guidance.
- (2) On receipt of the samples, the institution should give an estimate of the time needed for working up the samples. Every half-year a progress report should be given. Whenever the study is likely to last for more than two years, the Curator of the IOBC may ask that fractions of the samples already studied be returned to the Centre. The Consultative Committee will review the progress reports each year and reserve the right to withdraw the material in the case of undue delay or unsatisfactory treatment of the samples.
- (3) Institutions interested in a specific systematic group should be willing to work up all the samples of that group as collected during the IIOE and delivered to the International Collections. In general, team work on a national or international basis would be appreciated, as it may ensure speedier results, appropriate checking, and further training in taxonomy and systematics.

- (4) After the material has been studied, it should be returned, properly labelled, to the IOBC, where it will be kept for further studies and as a reference collection. If the institution wishes to retain specimens, it should apply for permission to the IOBC. The final report should contain the following information for each sample: number of specimens of each species; the size, sex and developmental stage of each specimen with notes on morphological anomalies and infestations.
- (5) In the case of new species, all type material should generally be given to IOBC, which will deliver the holotype to the Zoological Survey of India (Indian Museum). The Consultative Committee will formulate rules for the deposition of paratypes. One or more paratypes will be retained in IOBC and will normally not be lent outside the Centre.
- (6) Publication of the results should be given in one of the four official Unesco languages, or should contain a summary in one of these languages. The source of the material should be acknowledged and, if possible, five reprints should be delivered to the IOBC.

Advice on the scientific terms of reference of the Curator
at the IOBC

The Curator shall advise the Director of the IOBC and inform the Consultative Committee on matters regarding the International Collections. He shall train suitable counterparts in the conduct of work on the Collections. He shall execute the instructions of the Consultative Committee on the treatment, loan and further examination of the material in the Collections. In particular, he shall

- (1) supervise and provide training in sorting, cataloguing, data processing and evaluation of the International Collections in accordance with the procedure and programme approved by the Consultative Committee.
- (2) conduct taxonomic and biogeographical studies on the International Collections either independently or together with assistants or research fellows appointed by CSIR.
- (3) correspond with institutions and individuals regarding plankton samples for the IOBC and matters relating to the library, identification keys, etc.
- (4) provide scientific assistance to visiting scientists working on the International Collections.
- (5) assist such international working groups and training courses on plankton as may be sponsored by Unesco and held in the region.
- (6) prepare a booklet on the International Collections and the IOBC in consultation with the Director of IOBC and the Consultative Committee.
- (7) advise national and international institutions with respect to the establishment of similar sorting and taxonomic centres elsewhere.
- (8) maintain scientific contact and collaborate with other institutions and individuals engaged in marine research in the Indian Ocean region.

- (9) prepare an annual report on the current work and scientific results of the International Collections for submission to all countries which provide plankton samples. The Curator shall also find means of informing the donor directly of any outstanding results derived from samples collected by him.

In order to maintain technical efficiency of the sorting and other activities related to the International Collections and to ensure general continuity, it is understood that the Indian authorities will appoint a Deputy Curator.