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Hydrographic Department, Maritime Safety Agency

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I. SUMMARY REPORT OF THE 8TH SESSION OF THE INTERNATIONAL COORDINATION GROUP FOR THE COOPERATIVE STUDY OF THE KUROSHIO AND ADJACENT REGIONS(CSK), MANILA, PHILIPPINES, 6-10 MARCH 1972.
(SC-IOC/CSK(VIII)/4, Original: English)

As for this "Summary Report", reference is being made at present to the National Coordinators of Member States and to the participants of the 8th CSK Session, concerning any errors or misprints in the contents; but in haste, the whole text is printed in this issue of CSK Newsletter, as follows.

Item I Opening Ceremony

Dr. Alejandro R. Roces, Chairman, UNESCO National Commission of the Philippines, welcomed the participants on behalf of the local host agency.

Gen. Florencio A. Medina, Chairman, National Science Development Board (NSDB), then gave an address outlining the value of co-operative activities in scientific endeavor and wished success to the deliberations of the meeting.

Dr. Mamayev, on behalf of the Director-General of UNESCO then expressed his thanks to the host country and drew the participants' attention to the following major aspects of CSK: the need for the continuation of the study of the South China Sea; the need for the preliminary analysis of the already collected CSK data; the need for the selection of standard sections in the Western Pacific, which should be completed before 1973. He also pointed out the need for making arrangements for the 3rd CSK Symposium.

In view of the late arrival of the USSR delegation, it was decided that the formal opening of the 8th Meeting should be postponed until the morning of 7th March 1972 and that only informal discussions should be carried out during the interim period. During the informal meeting, those country reports already received from participating countries were distributed and preliminary arrangements made for the ordering of the subsequent sessions.

On the following day at the re-opening of the Session by the

Chairman, Prof. K. Wadati (International Co-ordinator for CSK), all delegates from the CSK participating Member States, except Indonesia, USSR, Malaysia, Singapore, People's Republic of China, Thailand, were present. The delegation from the USSR, however, joined the Session on the third day, having been delayed en route to Manila. A list of participants is attached to this Summary Report as Annex I.

Item 2 Adoption of the Agenda

The provisional agenda was adopted with a subdivision of Item 3 and transposition of the order of some of the other items for the sake of clarity. The Agenda as adopted is as follows:

1. Opening Ceremony
2. Adoption of Agenda
3. Progress Report of CSK activities since the 7th CSK Session:
 - (A) Reports of ICG/CSK Officers
 - (B) Reports of the National Coordinators
 - (C) Review of Recommendation of the 7th CSK Session
4. Preliminary discussions on the future of CSK
5. Preparation for the 3rd CSK Symposium
6. Next Session
7. Any other business
8. Adoption of Report
9. Closing Ceremony

After a short exchange of opinions, the Chairman suggested that Dr. J. C. D. Watts (U.K.) act as the rapporteur for the preparation of the summary report in collaboration with Dr. Mamayev (IOC).

Item 3 Progress Report of the CSK Activities since the 7th CSK Session

(A) Reports of ICG/CSK Officers

It was agreed that the Reports should be included in the Summary Reports of the proceedings as submitted. They are as follows:

1. Report of the International Co-ordinator

On the occasion of the 7th Session of the Intergovernmental Oceanographic Commission (Paris, Oct. 26- Nov. 6, 1971), an unofficial meeting was held on November 2 by

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the persons concerned of the five Member States: Japan, USSR, the Philippines, Thailand and Korea, and reports were made by the attendants concerning the relevant items which had occurred since the 7th Session of the International Co-ordination Group for the CSK.

As for the Proceedings of the 2nd CSK Symposium, the publication of the proceedings under the contract of UNESCO, with the editorship of Dr. Sugawara, Convenor of the Second Symposium, is scheduled for June 1972.

In conformity with the Recommendations 1.1 (d) and 1.5 of the 7th Session of the International Coordination Group for the CSK, the International Coordinator has received, from the Philippines and the USSR, their plans and programmes of regular observations on the selected standard sections in the Western Pacific Ocean for the period 1971 - 1973.

On 1 April 1971, Mr. Shigeo Hikosaka resigned his post of Director, Kuroshio Data Center, and Mr. Hideo Nitani succeeded him.

The International Coordinator designated Prof. I. A. Ronquillo of the Philippines, Assistant International Coordinator, as the Representative of the CSK to the 4th Meeting of the Council of the Southeast Asian Fisheries Development Centre (Manila, 18-22 January 1971).

Succeeding Dr. Deb Menasveta, Coordinator for the South China Sea Survey, who was transferred to the FAO, Dr. Serene, UNESCO regional expert in Marine Science, Singapore, has taken the responsibility of coordinator in the interim.

2. Report of the Assistant International Co-ordinator for CSK (Fisheries)

On March 26, 1971, a circular letter was sent to all National Coordinators and some Assistant National Coordinators. This letter reminded them to furnish their reports on the status of the CSK projects in their respective countries, particularly on the CSK selected fish species, not later than July 1, 1971. In this letter, their attention was also called to the agreement made during the 7th CSK Session in Tokyo, Japan, among those countries with skipjack (Katsuwonus pelamis) resources, to coordinate their activities with those of the U. S. Bureau of Commercial

Fisheries in Honolulu, Hawaii, U.S.A. None of the countries met the deadline in response to this circular letter.

A letter dated March 31, 1971 was sent to Dr. Frank Talbot of Australia, nominated author of the species synopsis for the Lutjanus spp, requesting him to submit a copy of the species synopsis before the first week of March 1972.

On April 1, 1971, a letter was sent to Dr. Wadati acknowledging with thanks the arrival of the UNESCO oceanographic equipment, i. e., a standard CSK plankton net and a flowmeter with calibration certificate from the Regional Marine Biological Centre in Singapore.

A similar letter as the above also dated April 1, 1971, was sent to Dr. Tham Ah Kow, Director of the Regional Marine Biological Centre, University of Singapore in Singapore.

On the same date, a letter of acknowledgement for the receipt of Airway Bill No. 127-00122205 for the package containing the net and flowmeter mentioned above was sent to Dr. Deb Menasveta, the National Coordinator for Thailand. The letter also informed Dr. Menasveta, among other things, of the circular letters already sent to the National Coordinators.

On July 14, 1971, a letter was sent to Dr. Kiyoo Wadati, the International Coordinator, CSK, transmitting to him two final copies of the paper read by me at the Seventh Meeting of the CSK in Tokyo, Japan.

After receiving Circular letter No. 365 from the Secretariat of IOC, announcing the 8th Session of the ICG for the CSK on March 6-10, 1972, together with the Provisional Agenda proposed by the International Coordinator for CSK, a circular letter dated January 7, 1972 was sent to all National Coordinators of the International Coordination Group of CSK(Fisheries) and to some Assistant National Coordinators. This was a second tracer to the first circular letter dated March 26, 1971, at the same time welcoming the delegates to Manila. To this circular letter, only the Hong Kong Government sent a response in the form of its Country Report.

Also on January 7, 1972, another letter was sent to Dr. Frank Talbot of Australia, requesting his species synopsis of the Lutjanus spp. In response to this, Dr. Talbot sent letter of regret dated February 4, 1972.

Recently, one coil cable for the hydraulic winch of our

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research vessel, RESEARCHER, arrived on board S. S. "Vince Everett". This shipment is a part of the grant-in-aid by UNESCO to the Philippine Fisheries Commission in its study of the South China Sea.

Two press releases were issued in connection with the 8th Session of the International Coordination Group for the CSK, one on February 16, 1972 and the other on March, 1 1972.

3. Report of the Director of the Kuroshio Data Center Cruise Plan and cruise report for CSK

CSK cruise plans/or cruise reports received by the Center from each participating country have been included in the CSK Newsletters.

CSK Newsletter

No. 31 to No. 35 of the CSK Newsletter were published from September 1970 to December 1971 by the Kuroshio Data Center.

Data Received

The lists of data received from the CSK participating agencies are included in the Newsletters.

The data for 1,424 oceanographic stations from 35 cruises were received by the Center from September 1970 to the end of December 1971, amounting to a total of 11,446 stations from 315 cruises.

Data Report of CSK

The data received by the Center are processed and printed as the Data Report of CSK.

From September 1970 to December 1971, 46 volumes containing 1,771 station data obtained from 48 cruises were issued and widely distributed throughout the world by the Center in addition to 219 volumes published through August 1970.

CSK Atlas

"CSK Atlas Vol. 5 for April 1967 - March 1968" was issued by the Center in November 1971 after approval of the National Coordinators. The next volume of this CSK Atlas is new under preparation at the Center.

Existing Oceanographic Station Data in the South China Sea

This publication was especially issued to assist the future CSK programmes in the South China Sea. It contains the list of existing oceanographic station data, amounting to about five thousand, held at the Japan Oceanographic Data Center, and the station maps in the South China Sea.

4. Report of the Director of the Regional Marine Biological Center, Singapore

During the period under review (1 April 1971- 31 January 1972), the sorting of plankton samples was the main function of the Regional Marine Biological Centre. The following plankton samples were received for sorting during this period:

(a) Republic of Korea	174 samples
(b) Thailand	90 samples
(c) Hong Kong	76 samples
(d) Malaysia	30 samples
(e) Republic of Singapore	20 samples

The total number of samples received is 390.

Primary sorting was completed for a total of 415 samples during this period. They are as follows:

(a) Republic of the Philippines	189 samples
(b) Republic of China	108 samples
(c) Japan	18 samples
(d) Thailand	32 samples
(e) Republic of Singapore	68 samples

Samples were sorted in the order in which they were received.

A total of 278 detailed sorting reports (Primary sorting) was completed and sent to the centres from which the samples originated. They are as follows:

(a) Republic of Korea	37 sorting reports
(b) Japan	231 sorting reports
(c) Thailand	10 sorting reports

From the time the Centre was started in 1968 to 31 January 1972, a total of 1479 plankton samples has been sorted under primary sorting procedure.

Experiments on the preservation of plankton organisms,

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designed by Dr. H. F. Steedman, have now been initiated. It is too early to report on detailed results, but it can be stated that some formulations of preservative fluids tried have already proved to be unsuitable whilst a few appear to be satisfactory. A progress report on these experiments will be issued later.

A study of the life history of a common inshore Calanid copepod, Paracalanus crassirostris Dahl in Singapore waters has been completed by the Supervisor of the Centre, Miss To Chang Man. This study has been accepted by the University of Singapore for the award of the degree of Master of Science to her.

The Plankton Methodology Cruise under the direction of Prof. S. Motoda is scheduled to start on 2 March 1972 and the participants are expected to spend 2-3 days sorting their plankton collections made during the cruise at the Regional Marine Biological Centre from 8-10 March 1972.

Except in one or two instances where amplification and clarification was required, no comments were forthcoming.

(B) Reports of the National Coordinators

The Chairman invited delegates to comment on their reports. In a few instances participants sought clarification on one or two points. The Reports of the National Co-ordinators, which were given orally, follow:

(1) Japan

(a) Cruise Report

Thirty-seven cruises were carried out or are being planned during the period April 1970 - March 1972.

(b) The South China Sea Survey

Participating ships from Japan in the South China Sea Survey are:

Oshoro Maru (Hokkaido University)	Nov. -Dec. 1970
Nagasaki Maru (Nagasaki University)	Jul. 1970
Kaiyo Maru (Fisheries Agency)	Oct. -Nov. 1970
Nagasaki Maru (Nagasaki University)	Aug. 1971
Oshoro Maru (Hokkaido University)	Nov.1971-Jan.1972
Kaiyo Maru (Fisheries Agency)	May -Jun. 1971
Kaiyo Maru (Fisheries Agency)	Oct. 1971

For the future it is scheduled that the Hokuho Maru (Ocean Research Institute, University of Tokyo) will, in the period from 11 May to 3 August 1972, make investigations with biological survey as the main object in the regions of the Sulu Sea, the Banda Sea, the Java Sea, the South China Sea, etc.

(c) Replacement of the Assistant National Coordinator

Dr. Kiyoshi Tanii resigned his post as Assistant National Coordinator for CSK of Japan, and Dr. Toshiyuki Hirano, Special Assistant Officer for Director, Research Department, Fisheries Agency, Ministry of Agriculture and Forestry has succeeded him.

(d) Zooplankton Sorting Service

The data and distributional maps of the standard zooplankton samples which has been collected in the period from April 1965 to March 1967 were published in February 1971 as follows:

"Data Report and Distributional Maps of the CSK Standard Zooplankton Samples" by Dr. Isamu Yamazi, Department of Zoology, National Science Museum, Ueno Park, Tokyo.

Furthermore, all the CSK standard samples sorted in Japan were sent by R/V Oshoro Maru to the Regional Marine Biological Centre in Singapore.

(e) Nomination for CSK Group of Senior Specialists

In compliance with Recommendation 2.8 of the 7th Session of the International Coordination Group for the CSK, the National Coordinator has nominated Prof. H. Irie, Nagasaki University as a member of the CSK Group of Senior Specialists.

(2) Republic of Korea

(a) Cruise Report in 1971

- i. 6 times (2, 4, 6, 8, 10, 12 months) synoptic observation in the adjacent sea to Korea (22 observation lines) and 6 times drift bottle experiments in the Southern sea of Korea were carried out.
- ii. In the trench of Korea strait (Tsushima strait) 2 times (October-December) hour-hour current observation by Ekman-Merz current meter was

undertaken.

- iii. In the Southern sea of Korea (6 observation lines) one cruise took place in September 1971 and the data (chemical and physical) collected during the cruise were sent to K.D.C. in January 1972.

(b) Future plan

- i. 6 cruises in the adjacent sea to Korea (22 observation lines) and 2 cruises and 6 times drift bottle experiments in the southern sea of Korea shall be conducted.
- ii. 4 times of hour-hour current measurements at 5 stations in the trench of Korea strait (Tsushima strait) shall be conducted.

(3) Republic of the Philippines

Since its last report in October 1970, Philippine activities connected with CSK Programmes and researches have been on a rather modest scale. These may be grouped into (1) oceanographic/biological researches mostly in Philippine waters, (2) near-shore cruises in waters bordering the South China Sea Region, (3) experimental fishing and fisheries biology, (4) processing of data gathered from previous cruises, and (5) preparation/planning of extensive hydrographic/oceanographic/biological cruises in the South China Sea Region.

(a) Researches/Surveys in Philippine Waters

The Philippine Fisheries Commission's R/V RESEARCHER conducted oceanographic/biological researches and exploratory fishing in the Southern Mindoro and Senirara Islands area from January 23 to February 1, 1970. Temperature, salinity and dissolved oxygen content determinations were made. Observations on plankton distribution were plotted. In this cruise, dragging of an otter trawl was made including biological analyses of the trawl catches.

In the Samar Sea, Carigara Bay and other inland seas, various cruises were also conducted at which standard oceanographic observations were made from July 2-24, 1970. Qualitative and quantitative plankton and benthos distributions were also observed and plotted. Echo surveys of the areas to determine both pelagic and demersal fish concentration were also conducted. During trawl experiments carried out

in these surveys, commercial size "Flower Shrimps" (Penaeus longistylus Kubo) were obtained at 70-100 fathoms depth.

The Coast and Geodetic Survey Ship ATYIMBA also conducted a hydrographic/oceanographic survey in Batangas Bay, Southern Luzon. Eight oceanographic stations were occupied and observations of temperature and salinity at standard depths were made. Bathythermograph observations were also conducted at stations and while underway.

(b) Experimental Fishing and Fisheries Biology

The other vessels of the Philippine Fisheries Commission have been conducting separate research cruises mostly on gear experiments or tryouts and fish searches using echo rangers (sonars and vertical sounders). Biologists joined these cruises to gather data and information on gear behaviour, fish distribution and oceanographic/biological conditions.

The fish caught from experimental fishing were analysed biologically. Biological studies of roundscads (Decapturus) and work on the taxonomy of anchovies (Stolephorus) are still going on. Data on the biology of sardines (Sardinella) are being processed.

(c) South China Sea Area and Adjacent Regions

In the area West of Lubeng Island and Mindoro, eight CSK stations were occupied from March 31 to April 7, 1971. Determination of temperature, salinity and dissolved oxygen content at standard depths were made; bathythermograph casts were also obtained. During this survey, vertical plankton sampling using the standard North Pacific Net (NORPAC), and horizontal (surface) sampling for fish eggs and larvae were conducted. Oblique plankton tows were also made. Tuna longline fishing was conducted west of Lubang and Cabra Island to gather biological data on tunas and similar species. An echo survey was conducted in Balayan Bay for possible otter trawl fishing in connection with the miralya (Slipmouth-Leiognathus) fishery in the area. Additional observations on fishery activities, fish schools, seaweeds, water visibility and transparency, bird flocks, etc., were also made.

(d) Processing of Data

The data gathered from previous cruises are now being

processed and will soon be published. Isothermal charts were prepared for standard depths. Isohaline charts for 0, 50, 75, 100 meter depths were plotted. Isopleth charts of dissolved oxygen content at standard depths also were drawn. Preliminary charts containing dynamic current contours at several reference levels were plotted. These charts and some others will soon be ready for printing and final publication.

(e) Preparation/Planning for Future Cruises

Several agencies are now in the midst of preparations for extensive investigations in the South China Sea Region. Among these are the Bureau of Coast and Geodetic Survey which intends to engage itself in the hydrographic/oceanographic surveys in the Western Coast of Palawan including the un-charted dangerous grounds in the South China Sea; the Philippine Fisheries Commission which has scheduled biological/fisheries investigations off the western coast of the archipelago including Sulu sea areas; the Weather Bureau which has plans to undertake synoptic meteorological studies, storm surge investigations and better forecasting techniques in the entire region; and, the Bureau of Mines Which is now laying extensive plans for marine geological and geographical surveys of Philippine waters.

These plans and programmes may not all be implemented this year or even next year, but when brought to a reality, would certainly add to the steadily increasing knowledge of the kuroshio and the Adjacent waters.

(4) Singapore

Work in connection with CSK was carried out in the Republic of Singapore by (a) the Marine Fisheries Research Department of the Southeast Asian Fisheries Development Centre operating in Singapore under the auspices of the Primary Production Department of the Ministry of National Development and (b) the Regional Marine Biological Centre operated by the University of Singapore under the Ministry of Science and Technology.

The work at the Regional Marine Biological Centre is limited to the study of the plankton of Singapore Straits and to the sorting of plankton samples sent by other countries participating in CSK. From the time the Centre was opened in March 1968 to 31 January 1972, the number of samples

which have been received for sorting as well as the number of samples sorted are as follows:

Country	No. of samples received	No. of samples sorted	No. of samples still to be sorted	Re- marks
Japan	436	436	0	
Republic of Korea	684	499	174	9 decayed
Hong Kong	127	49	76	2 broken
Republic of the Philippines	189	189	0	
Thailand	179	42	137	
Republic of China	108	108	0	
U. S. S. R.	93	0	93	
Malaysia	30	0	29	1 decayed
Singapore	200	156	44	
Total	2046	1479	553	

The samples of all countries are sorted in the order in which they are received. Sorting has so far been carried out to the stage of primary sorting to forty groups. With the increase in the number of samples, the task of checking the pH and condition of the sorted samples has also become more onerous. With a fixed number of sorters it may be expected that the sorting rate will become slower.

The Marine Fisheries Research Department of the Southeast Asian Fisheries Development Centre has continued to carry out the oceanographic and demersal fisheries resources survey in the South China Sea in 1971. The survey, totalling 62 navigational days, was conducted by the 390 ton R/V "Changi".

Oceanographic data such as temperature and salinity of seawater at various depths, transparency, plankton and bottom substrates were collected from 72 stations. Measurements on dissolved oxygen and nutrients of seawater were made occasionally.

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Trawl catchers of economically important demersal fish species such as Lutjanus spp., Nemipterus spp., and Saurida spp., etc. are being analyzed. Biological study on Lutjanus spp., which occupies more than 20% of R. V. "Changi's" trawl catchers, is in progress. The common species of the genus were sent to Dr. F. Talbot for confirmation of identification.

Immediately after each survey cruise the collected data were compiled and sent to the CSK Data Center in Japan.

The analysis of oceanographic and fishing data obtained in the past two years are being carried out. Some of the results were presented at the Second Congress of the Singapore National Academy of Science.

(5) United Kingdom (Hong Kong)

(a) Hydrography

In accordance with the proposals submitted at the 7th Meeting of the International Co-ordination Group for CSK, hydrographical observations were made bi-annually along two transects over the shelf area south of Hong Kong, and including the Synoptic Station No. 8 at 20°N, 116°E. Temperature and salinity data were forwarded to the Kuroshio Data Center, Japan, and plankton samples to the Biological Centre, Singapore. The results of the off-shore hydrological cruises have been submitted in the form of two papers for publication in the next two issues of the Fisheries Bulletin, which is published by the Department of Agriculture and Fisheries, Hong Kong.

In addition to the off-shore hydrographical programme, which of necessity has had to be limited in view of current staff shortages and a change of emphasis with regard to research policy, a seasonal study has been carried out in Hong Kong territorial waters of those environmental parameters of more direct concern to the potential mariculturist. Particular attention has been paid to the problem of pollution, and a measure of its degree is being obtained by comparing the normal seasonal fluctuations in the concentrations of nitrate, nitrite, ammonia and phosphate in unpolluted waters with those obtained from known polluted sources. From these comparisons, it is hoped that a basis may be derived to which analytical data may be referred (in the absence of bacteriological testing) in

the assessment of suspected polluted areas. The inshore study is also being supplemented with information obtained from drift bottle releases in an attempt to correlate the observations obtained from a series of shore based monitoring stations, sampled on a weekly basis.

(b) Mariculture

Work is continuing on the breeding and maintenance of the local edible oyster, using the traditional method of bottom culture and also by the more recently introduced method of suspension from rafts, with the object of improving yields and establishing the industry in other suitable areas within Hong Kong territorial waters. In the later context, it is proposed to carry out acclimatization experiments designed to determine salinity and temperature tolerances, so that the oyster may be introduced to areas more remote from the influence of the Pearl River, where the bulk of the industry is currently established.

Although it has not yet been possible to culture the more valuable local marine fish species in impounded coastal inlets, growth rates, and feeding experiments are being conducted as a temporary measure in cages suspended from rafts. In addition, disease arising from dietary deficiencies and pathogenic organisms is being studied, and it is proposed that this aspect of the work become the chief complementary investigation in the current mariculture programme of work.

(c) Inland Fisheries

Breeding of the commercially important Chinese Carps has continued although much damage was done to the breeding station at Au Tau during the passage of typhoon Rose in August, 1971, when nearly all the young stock from previous breeding experiments was lost. As in previous years, the station continued to provide technical advice to the local fish farmers and fingerlings for stocking the freshwater reservoirs.

(d) Marine Resources

A section of the Fisheries Research Division, has recently been established to study problems under this heading, and attention has chiefly been focused to data on feasibility studies in connection with the co-ordination of the work within the section, and with the other complimentary disciplines.

Work on the Saurida species (lizardfishes) is nearing completion and the available data is being processed. It is hoped that the results will be published in the very near future. Taxonomic studies on these and the other species of commercial importance to Hong Kong are being actively pursued as in the past.

(6) United States of America

As a part of the CSK programme, the United States is continuing to study the subpopulations of skipjack tuna in the western Pacific Ocean by immunological and biochemical methods and by investigating the possible separation of stocks by natural boundaries formed by ocean current systems in the Mariana ridge area.

In 1972 the National Marine Fisheries Service completed a one-year three-cruise resource assessment project in the area of the Trust Territory of the Pacific Islands. The results provide new information on the seasonal distribution and abundance of skipjack tuna and baitfish in the central and western Pacific. Exploratory and assessment studies have also been continued on fishes in the coastal and offshore waters of Guam.

Due to budgetary restrictions, the Coast Guard has been forced to terminate its operation at Ocean Station Victor, thus resulting in the discontinuation of the collection of oceanographic data on the Kuroshio current cross-sections by Ocean-Station vessels. Additional information from research cruises by vessels of the United States oceanographic institutions operating in the CSK area have been forwarded to the data center.

(7) Union of Soviet Socialist Republic

In 1971 the observations on standard sections were continued according to the programme of fixed (shortened) observations. In the expeditions the following research vessels took part: "Yu. Shokalasky", "Academician Shirshov", "Volna", "Orlik". Besides this the R/V "G. Nevelskoy" worked in the South China Sea.

The programme contained standard meteorological observations, oceanographical chemical and biological investigations at different depths, in accordance with the programme.

The programme of USSR shortened observations for 1971-

1972 and 1973 was published in the "CSK Newsletter" No. 35.

Scientific results of investigations according to the programme of CSK from 1965 to 1970 were published in a monograph "Oceanography of the Kuroshio Region" (Moscow, 1971)

(8) Republic of Vietnam

Two research vessels were engaged in the South China Sea investigation (in connection with UNDP) in 1971. They have covered an area of 45,000 square miles, which lies between 11° - 20° N and the 200m isobath. The number of stations amounts to 876. At each station, measurements of temperature and salinity were made; attention was also paid to the meteorological conditions. Release of drift cards was undertaken at 24 selected stations.

In fisheries, the programme was mainly devoted to the study of the abundance and distribution of demersal fish. Plankton samplings were seldom undertaken. Inventory of fauna and flora in coastal waters has been made.

In geology, bottom samples were collected in the Nha Trang Bay for grain analyses.

The Oceanographic Institute of Nha Trang has received a NORPAC net with flow-meter from RMBC, Singapore.

The species synopsis for Polynemus spp. group will be communicated to CSK participating countries as soon as Dr. Tran Van Tri (ANC) finishes it.

The oceanographic Institute of Nha Trang has acquired a new research vessel which will conduct surveys in the coastal waters in connection with CSK.

At the conclusion of the presentation of the Reports of the National Co-ordinators, the Chairman invited Mr. Pierre Rual of ORSTOM, Center de Nouméa, who was present at the Meeting as an observer from France, to inform delegates of the work being carried out by his organization. Mr. Rual briefly outlined his organization's chief current interests, which were particularly concerned with the oceanography and biology of the Western Equatorial Pacific in connection with the Yellow-fin and Alabacore tuna, and the various parameters liable to effect particularly their movements and stock density in the region north of New Guinea. Dr. Mamayev (IOC) suggested that a closer liaison between the activities of CSK and ORSTOM

would be desirable particularly since, as Mr. Rual pointed out, his organization's central area of interest is, in fact, near the origin of the Kuroshio current. Mr. Rual replied that his Centre would be only too willing to cooperate. A report on the investigations currently being carried out at ORSTOM is attached as Annex III to this Report.

(C) Review of Recommendations of the 7th CSK Session

The Chairman invited delegates to comment on the recommendations adopted at the 7th Session of CSK with a view to the amendment of any items which in the opinion of members might require re-assessment in the light of experience already gained from their implementation during the interim period. These items are dealt with under Section X of the Summary Report for the last CSK Session and the Chairman referred to each item in turn.

After considerable discussion in which there was an exchange of relevant information pertaining to each item, the delegates expressed various opinions with regard to the necessity or otherwise of amending the recommendations. Since it was felt that these differences of opinions were based upon differences in emphasis which the respective member countries placed upon the recommendations when related to their own research contributions to CSK, it was decided to convene an ad hoc working group consisting of Prof. Sugawara (Japan), Dr. Ino (SEAFDEC) and Prof. Ronquillo (Philippines), to examine the problem. The working group was requested to assess the various suggestions offered by the delegates with the object of co-ordinating these so that suitable amendments to the existing recommendations could be made, if this was found to be necessary.

The ad hoc working group, after having assessed the activities of CSK since its 7th Session in the light of the various opinions expressed by the participants, made the following general recommendations to the Meeting:

(1) General

- 1.1 CSK participating countries should continue further efforts for completing the preliminary analyses of the data collected and make a concerted action in the survey of the South China Sea. At the same time regular observations on the selected standard sections in the Western North Pacific Ocean should

be encouraged.

- 1.2 Countries participating the South China Sea Survey should comply as far as possible with plan as approved at the Sixth Session of ICG/CSK in Paris, and other CSK members shall also take an active part in this survey.
- 1.3 CSK participating countries were invited to undertake bathymetric studies in the uncharted areas of the South China Sea whenever possible.

After a short discussion, the above recommendations were adopted by the Session.

(2) Pollution

After an exchange of views, the recommendations of the ad hoc working group with regards to CSK activities in the field of pollution was adopted. This was as follows:

- 2.1 The CSK should approach the problem of pollution of the sea areas within its sphere of interest in accordance with the principles given in the Comprehensive Outline of the Long-term and Expanded Programmes of Ocean Research, the Report of GELTSPAP and Resolutions VII-22 and VII-27 of the 7th Session of IOC (Oct. - Nov., 1971). As a first step member countries should collect information so as to assess their specific pollution problems in order to provide a basis for further action. It is intended to set up an operational programme within the existing framework of CSK. It was felt desirable that the available information should be sent to Dr. T. Hirano (Japan) for processing. Record forms for the pollution information would be provided by Dr. Hirano by the end of May 1972, and the collected information should be made available to him within 6 months of that date.

(3) General Biology

The ad hoc working group, in reviewing the recommendations approved at the 7th ICG/CSK Session with respect to CSK activities in the biological fields, considered that the following amendments should now be made. These were adopted by the Session after one or two minor amendments:

- 3.1 Efforts should be continued to obtain a general picture of the distribution of plankton in the Kuroshi and South China Sea areas in space and time. The picture should cover both areas throughout the four seasons and taxonomic studies should be extended to important plankton groups.
- 3.2 In view of the need to obtain a clearer picture of the mechanism of metabolism, productivity and food-chains in the whole water column from the surface to the deeper layer in the Kuroshio and South China Sea areas, studies on phytoplankton pigments, primary production, suspended and dissolved organic matters, etc. should be emphasized in relation to environmental conditions. Studies on taxonomy, distribution, migration, life history, feeding, etc. of zooplankton and micronekton should be also emphasized.
- 3.3 Research vessels of the CSK participating countries or organizations, cruising in these water during 1972 should participate in the inter-calibration exercises that are being undertaken by Thailand and Malaysia.
- 3.4 Inventory of fauna and flora in the areas selected for synoptic surveys should be made and exchanged between participating countries.
- 3.5 The analysis of bottom sediments, the study of the bottom topography by echo sounder and the flow of surface water as determined by drift bottles should be undertaken.
- 3.6 The UNDP/SF-FAO Fishery Projects in Vietnam and the Philippines have cooperated wholeheartedly with the CSK project with respect to the collection of oceanographic and biological data in the areas within the scope of their projects in the South China Sea, and also in the exchange of scientific information derived from their surveys, and it is hoped that they continue to do so in the future.
- 3.7 Since the majority of the neritic copepods are small herbivores, it is recommended that both the Standard CSK net (mesh GG52) and another of finer

mesh (mesh = 0.1mm) net should be used at the same time to improve the assessment of standing crop of the smaller zooplankton organisms, the exact mesh of the finer mesh net to be determined by the "Methodology Cruise" (see No. 3.9 below).

- 3.8 It is recommended that phytoplankton samples should also be collected during surveys to determine the phytoplankton calendar of the South China Sea, and that the phytoplankton specialists (e. g. Prof. Marumo and Dr. Shirota) be requested to continue their studies and produce a handbook of illustrations of South China Sea plankton. It is also recommended that UNESCO and FAO be requested to provide funds for this edition of the handbook.
- 3.9 It is recommended that a Second Methodology Cruise based on a similar arrangement to the first one be carried out and that those who will be responsible for collecting plankton samples in the South China Sea Survey be invited to attend. It is requested that adequate funds for this project be provided if possible by UNESCO.
- 3.10 It is recommended that the CSK group of senior specialists, appointed to co-ordinate with the advisory panel for Unesco marine biological centres on the loan and further examination of samples constituting the CSK International Collection at RMBC in Singapore continue their work. This group will carry out its work by correspondence as far as possible, but if it is considered necessary to convene a meeting, it is requested that Unesco provide the necessary funds for members of the group to travel. The chairman of the group will be elected by its members.

(4) Fisheries

- 4.1 Efforts should be continued and strengthened in the evaluation of the oceanographic data collected in the CSK area and, particularly, in the South China Sea in order to shed light on the behaviour, distributions, etc. of commercially important species of fish inhabiting these waters, and to forecast the abundance of the exploitable fisheries resources in these waters.

- 4.2 In view of the important contribution of the fish egg and larval study to the prediction of the abundance and distributions of fish stocks, the development of specialists in the CSK participating countries for fish egg and larval studies and including sampling surveys should be encouraged.
- 4.3 The Assistant International Co-ordinator for Fisheries (AICF) should prepare a status report covering the CSK-selected species for submission to the next ICG/CSK meeting. Participating countries should be reminded to provide pertinent information to the AICF.
- 4.4 In addition to the CSK-selected species, the group agreed to include studies on squids and cuttlefishes.
- 4.5 The countries which have Decapterus fisheries should make efforts to initiate or strengthen research and investigations on the biology of these species.
- 4.6 FAO is further requested to continue making arrangements for the preparation of a species synopses of commercially important species of fish in the South China Sea, adjacent regions and in the Western North Pacific Ocean, and if possible to include species of cuttlefish and squids.
- 4.7 There continues to be a need to establish the population structure of the skipjack tuna in the Western North Pacific and adjacent regions. Countries that have interest in the utilization of the skipjack tuna resources in these regions are urged to collaborate in the immunological and biochemical studies on these species by sending blood samples to laboratories of the participating countries and organizations undertaking this type of research. Tagging experiments on skipjack tuna in the CSK area including the South China Sea and the exchange of scientific information pertaining to this species should be undertaken and encouraged. A regional programme along this line should be explored through UNDP.
- 4.8 Efforts should be continued in the clarification of the taxonomic status of Nemipterus spp. and

Saurida spp. in the Kuroshio areas and adjacent regions. In this connection, arrangements should be made for the preparation of a field key for these groups of fish. Taxonomic studies on Polynemus spp., Sciaenidae, and Lutjanus spp. should be initiated.

- 4.9 It is recommended that the studies of the trawl fisheries resources in the South China Sea be accelerated, based on the results of recent exploratory fishing surveys conducted by CSK participating countries and other organizations in the region.
- 4.10 The exploratory surveys of pelagic fisheries resources in the Kuroshio and South China Sea areas should be continued. Suitable types of fishing gear for the exploitation of these resources in the South China Sea should be developed.
- 4.11 Member countries of CSK are requested to send fishing exploratory data to the FAO Fishery Data Centre in Rome for proper storage and retrieval, so as to provide a readily accessible form of information to member countries.
- 4.12 The need for initiating and/or improving assessment study on the stocks of commercially important species of fish in the CSK region is reaffirmed.
- 4.13 There exists a great need for manuals on marine research in the developing countries of the CSK area and adjacent regions. It is strongly recommended that financial assistance be continued to be sought from FAO and UNESCO to publish an English version of the Japanese manual on fishery oceanography, so that the manual may be made available to all participating countries of the Kuroshio and adjacent regions. It is requested that UNDP provide funds for the translation and publication of the same manual in the respective languages of participating countries.

Item 4 Preliminary discussions on the future of CSK

The Chairman asked the delegates for their views on the future of CSK. The general opinion of the delegates was

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represented by the feelings expressed by Prof. A. Muromtsev (USSR) and Prof. K. Sugawara (Japan), who said that they would like to see CSK continue, and if possible, expand its sphere of interest both in the direction of the regions covered and also in the field of scientific investigation. To achieve this end, they felt that it might be desirable to interest other appropriate organizations in the work of CSK, and Prof. K. Sugawara (Japan) expressed the idea of setting up some permanent body similar to the ICES in the Atlantic Ocean regions for securing this important objective. After some discussions, it was finally decided that the future of CSK could be more conveniently discussed in depth at the 9th Session of ICG/CSK, and this should follow the 3rd Symposium, so that a greater amount of information would be available to assist the Session in their deliberations on this issue.

With regard to the proposed scope of the discussions at the 9th ICG/CSK Session, it was felt that it would be desirable to have three or four countries involved in the preparation and elaboration of the programme for future studies in the enlarged CSK regions, and that special emphasis should be given to pollution problems. It was proposed that scientists from Japan should be asked to prepare the programme for the pollution studies, and scientists from the Philippines (in collaboration with scientists from Japan) should be responsible for formulating a programme of biological studies. It was also proposed that the Union of Socialist Soviet Republic (USSR), in collaboration with Japan and the United States of America (USA) should be responsible for the preparation of programmes in the field of physical and chemical oceanography, together with meteorology. It was pointed out further that the advice of SCOR on these matters would be highly desirable.

In view of the fact that Dr. Deb Menasveta (Thailand) had resigned his position as Co-ordinator for the South China Sea Survey, the proposal of the International Co-ordinator (Item 3, A(1)) that Dr. Serene (UNESCO) should be his successor was given final approval.

Item 5 Preparation for the 3rd CSK Symposium

It was decided that the 3rd Symposium should be held prior to the 9th Session of ICG/CSK, not later than May 1973 and at the same venue as the latter.

Prof. I. Ronquillo (Philippines), with the assistance of Prof. K. Sugawara (Japan), agreed to be the convenor of the

Symposium. The convenor was advised to issue a request for contributions from intending participants at least six months before the date of the Symposium, even though the venue may not at the time be known. It was suggested that the circular request should give an account of the nature and scope of the Symposium and also the method of preparing and submitting the texts and abstracts of the papers. In the preparation of this circular, the experience of the convenor of the previous Symposium - Prof. Sugawara (Japan) - should be taken into account.

With regards to the nature and scope of the contributions, the majority of delegates were of the opinion that, although the symposium was to be held primarily to report the results so far achieved by CSK in the South China Sea, it should also accept contributions dealing with investigations carried out in the Kuroshio and adjacent regions as a whole. This would enhance the value of the Symposium in relation to the proposed discussions at the 9th ICG/CSK Session regarding the future of CSK as recommended under Agenda Item 4.

It was suggested therefore that the text of the circular should be forwarded to SCOR for comment and publication in the "SCOR Proceedings" so as to obtain as much publicity as possible. The convenor was requested to arrange preliminary contacts on this matter as soon as possible.

Item 6 Next Session

It was agreed that the 9th ICG/CSK Session should be held not later than May 1973 and that Hong Kong was suggested as the venue.

Dr. J. C. D. Watts (U. K. - Hong Kong) was asked by the Chairman to pass on to his government the recommendation and to advise in due course the International Co-ordinator for CSK of the outcome. In the event of Hong Kong being unable to comply with the request, it was decided that Singapore and Thailand should be approached as alternative venues.

Item 7 Any other business

Mr. Tapiador (IPFC) informed the Session that, at the official request of Thailand, FAO, with the support of the Danish Government (DANIDA), will hold a seminar in 1972 at Phuket, Thailand on fish taxonomy in Southeast Asia.

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CSK member countries will be invited to participate and provide ichthyological material on loan to the seminar. The purpose of the seminar was to provide a better basis for the identification of selected commercially important fishes occurring in the Southeast Asian region, and also to facilitate the production of internationally comparable statistical data.

Dr. T. Ino (SEAFDEC) asked whether there was any information available with regards to the progress made in the preparation of the book on Cephalopods by Drs. Voss and Williamson. Dr. J. C. D. Watts (U. K. - Hong Kong) in replying said that this publication was now in the press and should be available shortly for distribution.

Since it was the general opinion of the delegates that it would be desirable to interest as many organizations as possible in the work of CSK, it was decided to invite officially representatives from the South Pacific Commission, SEAFDEC and UNDP to be present at the 9th Session of ICG/CSK.

Item 8 Adoption of Report

The Chairman invited the delegates to comment on the Draft Summary Report of the proceedings. After a few amendments, the Draft Report was adopted as the final Summary Report of the 8th ICG/CSK Session.

Item 9 Closing Ceremony

The Chairman, on behalf of the delegates, expressed his thanks to the host country for their hospitality and assistance. He also expressed his appreciation to the staff of UNESCO for providing such excellent secretariat facilities during the course of the Session.

There being no other business the chairman closed the 8th Session of ICG/CSK on the morning of the 10th March 1972.

* * * * *

8th SESSION OF THE INTERNATIONAL COORDINATION GROUP FOR THE COOPERATIVE STUDY OF THE KUROSHIO AND ADJACENT REGIONS

Manila, Philippines, 6 - 10 March 1972

LIST OF PARTICIPANTS

JAPAN

Dr. Kiyoo Wadati (Chairman)
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Urawa, Saitama, Japan

Prof. Ken Sugawara
Japanese National Commission for UNESCO
Tokyo

Dr. Toshiyuki Hirano
Assistant National Coordinator
Fishery Agency
Tokyo, Japan

KOREA

Mr. Ki. Young Kim
National Coordinator
Fisheries Research and Development Agency
Pusan, Korea

Mr. Chang Ki Lee
Assistant National Coordinator
Fisheries Research and Development Agency
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Acting National Coordinator
National Committee on Marine Sciences, Member
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University of the Philippines
Quezon City

Prof. Inocencio A. Ronquillo
Assistant International Coordinator (Fisheries)
Assistant National Coordinator
Philippine Fisheries Commission
Intramuros, Manila

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Quezon City

Mr. Catalino Arafiles
Weather Bureau
Quezon City

Consultants:

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Consultant
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Bicutan, Taguig, Rizal

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Chief, Technical Studies Section
Division of Ports and Harbors
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VIET NAM

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Mr. Nguyen - Thuong Dao
Acting Assistant National Coordinator
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Nha Trang, Vietnam

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REPRESENTATIVES OF INTERNATIONAL ORGANIZATIONS

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Intergovernmental Oceanographic Commission
UNESCO,
Paris, France.

Dr. Takashi Ino,
Deputy Secretary-General
Southeast Asian Fisheries Development Centre
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Mr. D.D. Tapiador
Regional Fisheries Officer
and
Regional Secretary of IPFC
FAO Regional Office for Asia and the Far East
Bangkok, Thailand.

OBSERVER

Mr. Pierre Rual
Physical Oceanographer
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B. P. 4, Nouméa,
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List of

National and Assistant National Co-ordinators for CSK

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N. C.
A. N. C.

Indonesia

N. C.
A. N. C.

Japan

N. C.
A. N. C.

Dr. Kiyoo Wadati
Dr. Toshiyuki Hirano

Korea

N. C.
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Mr. Kiyong Kim
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Mr. Mario C. Manansala
Mr. Inoconcio A. Ronquillo

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U. S. S. R.

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Mr. Tran-Van-Tri

8th Session of the International Coordination Group
for the Cooperative Study of the Kuroshio and Adjacent Regions

Manila, 6 - 10 March 1972

Report on the French Activities in the Western
Equatorial Pacific

by

Mr. Pierre Rual
Physical Oceanographer
New Caledonia, France

For 8 years, the R. V. Coriolis has been cruising in the Equatorial and Sub-tropical Pacific, doing biological as well as physical oceanographic research. The object of the investigation was to study the physical environment together with the food chain leading to tropical tuna. The geographical area extends from north of French Polynesia (135°W) to north of New Guinea (160°E) and from the latitude of New Caledonia (20°S) to the latitude of the south of the Caroline Islands (5°N). The research is led by a multidisciplinary team including theoretical physicists, hydrologists, chemists, primary and secondary productivity biologists, planktologists, taxonomists, Some extensive research has been done on equatorial fertility, the equatorial current system, the equatorial phytoplankton zoo-plankton, micro-necton, fish larvae and on the vertical distribution of tropical tuna.

1971 Cruises

After 11 cruises between the New Hebrides and the Gilbert Islands (170°E), where a very detailed survey has been made, giving good evidence of new tropical and biological phenomena, we wanted to look for their zonal extension to the west.

Two cruises were planned, north of New Guinea between 140°E and 155°E, during the N.W. monsoon season (Jan. -Feb.) and the Trade - Wind season (June - July). The aim of the cruises was to study the effect of the reversal of the wind on the currents and on the physio-chemical properties of the waters, bio-chemical and primary production studies were also

undertaken.

1972 Cruise

A joint cruise with two ships, north of the Solomon Islands between 150°E and 175°E is planned to provide the link between our previous studies and the cruises north of New Guinea. Its aims are the same.

Future work

A study of the fertile region north of New Guinea is planned including vertical long-lining, mid-water trawling, and the normal plankton studies with complementary physio-chemical data acquisition and direct-current measurements.

(Attached station map is excluded from this Summary Report, because it was obscure.)

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II. UNESCO PLANKTON SAMPLING METHODOLOGY TRAINING CRUISE (CSK)

The following information was received by the Center from Dr. S. Motoda, Tokai University.

May 16, 1972

The training cruise was completed on board the F. R. V. Changi of the Southeast Asian Fisheries Development Centre, Singapore, commanded by Captain T. Hirota, from Bangkok to Singapore for a week from 2 to 8 March 1972 occupying 5 stations in the South China Sea. The shipboard training was directed by Dr. S. Motoda, Tokai University, Japan, with assistance of Dr. O. Suzuki, Mr. Chow Tien Pok, and Mr. Lim Pang Yong, Southeast Asian Fisheries Development Centre, Singapore. The participants were: Mr. O. H. Arinardi (Indonesia), Mr. Banchong Teinsongrusmee (Thailand), Mr. Chang Boo Jock (Malaysia), Mr. R. M. Chilvers (Hong Kong), Mr. Lim Lian Chuan (Singapore) and Mr. N. R. Metrillo, Jr. (Philippines).

The training programme consisted of flow-meter calibration, vertical haul with a pair of two nets; 0.35mm mesh CSK standard net and 0.10mm mesh net, and calculation of variance of catch between the time of the day and two kinds of net.

After disembarking at Singapore the participants attended shore training at the Regional Marine Biological Centre, University of Singapore, under the direction of Dr. Tham Ah Kow, Director of the Centre, for two days. Training on measurement of biomass of the samples and preliminary sorting of specimens was given to the participants.

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III. CRUISE REPORTS

The following cruise reports were received by the Center from the CSK participating agencies of Republic of Korea and Indonesia

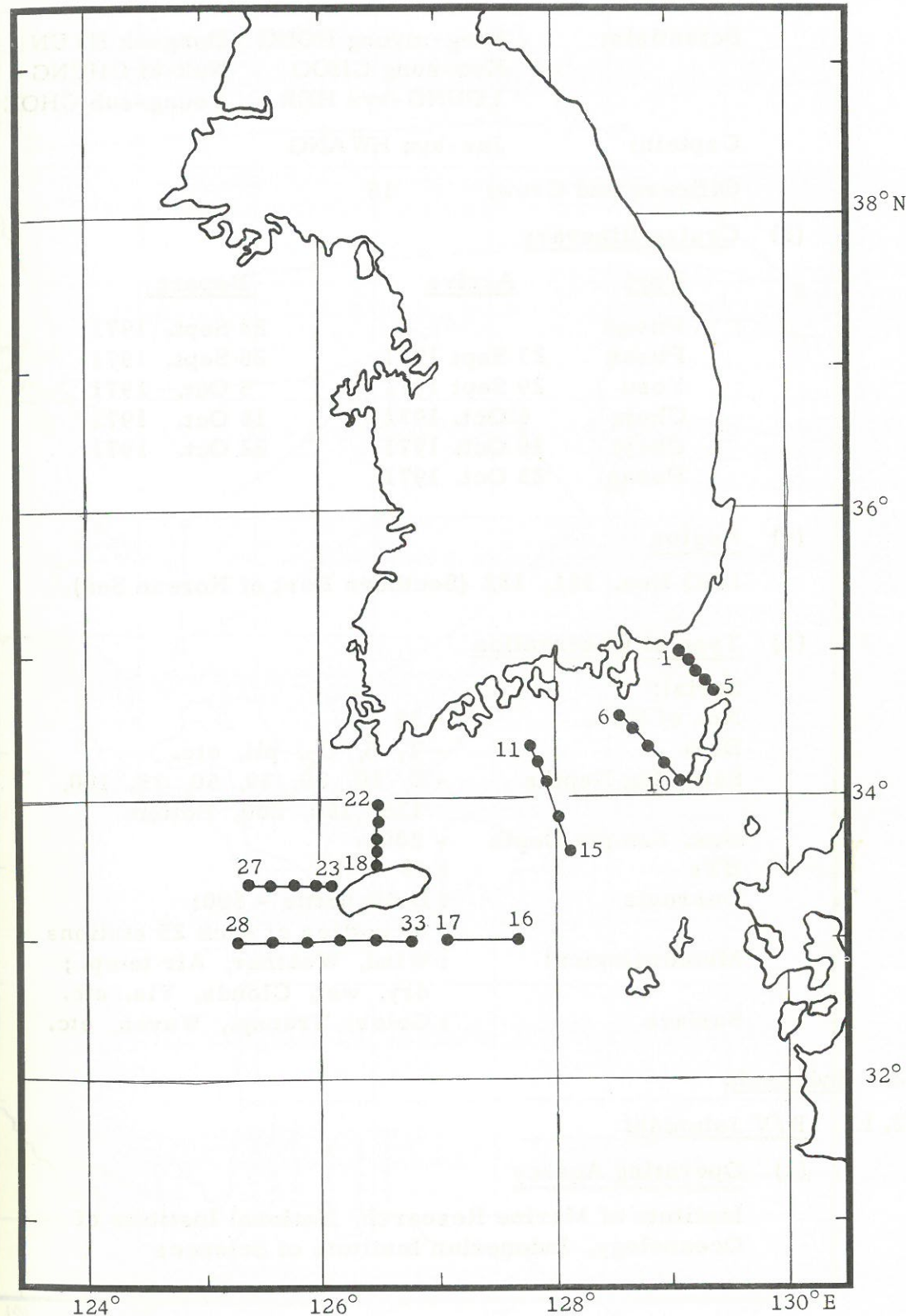
1. Republic of Korea

1.1 Suro No. 3

(1) Operating Agency

Hydrographic Office

Station Map of the "SURO NO.3", 23 September - 23 October, 1971



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(2) Personnel

Scientists: Sung-myong HONG Dong-ok HYUN
 Kyo-sung CHOO Nak-ki CHUNG
 YOUNG-kyu HER Young-sub CHOE

Captain: Jae-kyu HWANG

Officers and Crew: 18

(3) Cruise Itinerary

<u>Port</u>	<u>Arrive</u>	<u>Depart</u>
Pusan		23 Sept. 1971
Pusan	23 Sept 1971	28 Sept. 1971
Yosu	29 Sept 1971	5 Oct. 1971
Cheju	6 Oct. 1971	15 Oct. 1971
Cheju	16 Oct. 1971	22 Oct. 1971
Pusan	23 Oct. 1971	

(4) Region

MSQ Nos. 131, 132 (Southern Part of Korean Sea)

(5) Type of Observation

Serial:
 No. of Stas. - 33
 Data - T, S, O₂, pH, etc.
 Sampling Depths - 0, 10, 20, 30, 50, 75, 100, 125, 150, 200, Bottom
 Max. Sample Depth - 200m
 BTs : 43
 Currents : Drift bottle - 500:
 20 bottles at each 25 stations
 Meteorological : Wind, Weather, Air temp.;
 dry, wet, Clouds, Vis. etc.
 Surface : Color, Transp., Waves, etc.

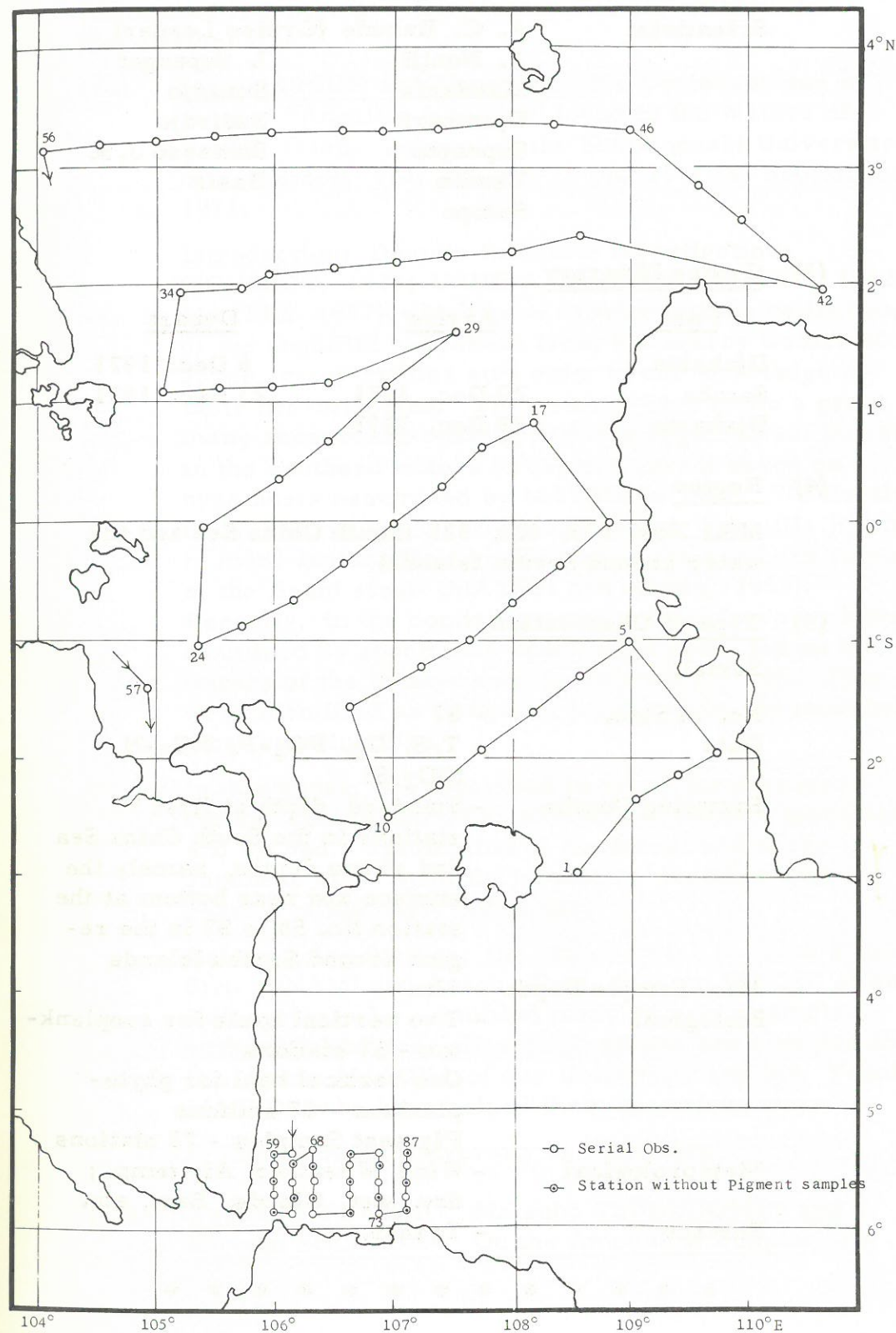
2. Indonesia

2.1 R/V Jalanidhi

(1) Operating Agency

Institute of Marine Research, National Institute of Oceanology, Indonesian Institute of Sciences

Station Map of the "R.V. JALANIDHI", 6 - 28 December, 1971



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(2) Personnel

Scientists:	A. G. Ilahude (Cruise Leader)	
	A. Nontji	I. Supangat
	Mardanis	Sunarjo
	Djumhari	Sudirdjo
	Suprpto	Sumarso J. S.
	Usman	Basir
	Sutopo	

(3) Cruise Itinerary

<u>Port</u>	<u>Arrive</u>	<u>Depart</u>
Djakarta		6 Dec. 1971
Sambu	20 Dec. 1971	23 Dec. 1971
Djakarta	28 Dec. 1971	

(4) Region

MSQ Nos. 025, 026, 325 (South China Sea and the water around Seribu Islands)

(5) Type of Observation

Serial:

No. of Stas.	- 87
Data	- T, S, O ₂ , PO ₄ -P, NO ₃ -N, SiO ₂ -Si
Sampling Depths	- Standard depth at first 57 stations in the South China Sea and at two depths, namely the surface and near bottom at the station No. 58 to 87 in the region around Seribu Islands
Max. Sample Depth	- 92m
Biological	- Two vertical hauls for zooplankton - 57 stations One vertical haul for phytoplankton - 87 stations Pigment Samples - 72 stations
Meteorological	- Wind, Wheather, Air temp. ; dry, wet, Clouds, Bar., etc.
Surface	- Transp.

* * * * *

IV. ABSTRACTS OF THE PAPERS ON CSK

(Continued from the previous issue, No. 36, of the CSK Newsletter)

(78) Isao MATSUI* and Toru TAKAI*: Leptocephalae of the Eel "Anguilla japonica" found in the Waters of Ryukyu Deep. Journal of the Shimonoseki University of Fisheries, Vol. 20, No. 1, pp. 13 - 18, September, 1971.

Introduction: Despite intensive investigations (SCHMIDT, 1925; UCHIDA, 1935; JESPERSEN, 1942; MATSUI, 1957) which have carried out the collection of the anguillid eel larvae from the nearby waters of Japan, many riddles still exist in our knowledge of their life-histories. The authors have made a great many researches bearing with the anguillid eel larvae in the southern waters of Japan Current based on a hypothesis assumed by MATSUI in 1957. We firstly found a larva apparently identified as "Anguilla japonica" in many leptocephalae collected in the northern region of the Bashi strait (MATSUI and others, 1968). Recently, in the continuous work of eel larva we have examined 23 specimens which were collected on the waters of the Ryukyu deep in February, 1956. They were identified as "Anguilla japonica" by the morphological examinations.

In this paper, we described in detail the measurements, counts and other characters in each specimen, and we had a assumption of the larval life to the Japanese ell, "Anguilla japonica", together with the results of the early collection.

Before going further, the authors wish to thank Prof. Siro MINAMI and Assoc. Prof. Makoto HIROSE of our University, who submitted many valuable samples with useful advice. Heartifelt thanks are also due to Dr. Kunio AMAOKA of our University and Mr. Yoshiro MASUDA who have helped them in various ways.

* Shimonoseki University of Fisheries

(79) Yasutake YUWAKI*, Matsuho TSURUDOME* and Kiyoshi SHIMADA*: On the Amount of Zooplankton

Biomass and the Upwelling Process in the East of TAIWAN. Memoirs of the Faculty of Fisheries, Kagoshima University, Vol. 20, No.1, pp. 111-118, December, 1971

Abstract: The upwelling area associated with the vortices are found along the eastern side of the Kuroshio in the east of Taiwan. One of them is located at around 24°N, on the south of the Ryukyu submarine ridge in spring and the location moves slightly southward in summer.

The relation between the zooplankton biomass and the upwelling process in spring and summer are discussed, based on the results of the Keiten Maru and the Kagoshima Maru cruises for CSK in 1966 - 1968. The relation between the two is clearly found, that is, the zooplankton biomass increases with decreasing value of dynamic depth anomaly in spring, while in summer it becomes obscure.

* Keiten Maru, Faculty of Fisheries, Kagoshima University

- (80) Tadao TAKAHASHI* and Masaaki CHAEN*: Oceanic Conditions near the Ryukyu Islands in Summer of 1965. Memoirs of the Faculty of Fisheries, Kagoshima University, Vol. 16, pp. 63 - 75, December 1967

Abstract: The general feature of oceanic conditions near the Ryukyu Islands in summer of 1965 is described, on the bases of the results of the Kagoshima-maru and the Keiten-maru cruises for CSK from 20°N to 32°N along the meridian of 125°E and 127°30'E. In the region around the edge of the continental shelf, the structure of the sharp transition between the Kuroshio water and the surface water from the Yellow Sea origin is revealed from the distributions of temperature and salinity and the aid of the temperature-salinity diagrams, which is more remarkable on 125°E. In the region between the edge of the continental shelf and the Ryukyu submarine ridge, isotherms and isohalines slope down toward the submarine ridge from the north in general, and some characteristic aspects related to the current structure are found. The current structure of the Kuroshio in this region is illustrated

by means of the dynamic method and the volume transport of the east component across 125°E is estimated to be ca $29 \times 10^6 \text{m}^3/\text{sec}$.

* Laboratory of Oceanography, Faculty of Fisheries, Kagoshima University

- (81) Tadao TAKAHASHI* and Masaaki CHAEN*: Oceanic Conditions near the Ryukyu Islands-II - Oceanic Conditions on 125°E in Spring and Summer of 1966. Memoirs of the Faculty of Fisheries, Kagoshima University, Vol. 18, pp. 99 - 114, December, 1969

Abstract: The general feature of oceanic conditions along the meridian of 125°E in spring and summer of 1966 is described, in the bases of the results of the Keiten-maru and the Kagoshima-maru cruises for CSK. A warm core is remarkable in spring in the region between the edge of the continental shelf and the Ryukyu submarine ridge, while it is less marked in summer. On the north of the warm core isotherms and isohalines over the continental slope decline sharply, especially in spring. The upwelling seems to take place on the south of the submarine ridge in spring and is not appreciable in summer. Saline water creeps further to the north on the continental shelf in summer than in spring. The volume transport of the east component of the Kuroshio in spring and summer is ca $31 \times 10^6 \text{m}^3/\text{sec}$. and $28 \times 10^6 \text{m}^3/\text{sec}$. respectively. Another eastward flow exists to the south of the submarine ridge in both seasons, shifting very much with season.

* Laboratory of Oceanography, Faculty of Fisheries, Kagoshima University.

- (82) Tadao TAKAHASHI* and Masaaki CHAEN*: Oceanic Conditions near the Ryukyu Islands-III - Oceanic Conditions along 125°E in Spring and Summer of Successive Four Years, 1965 - 1968. Memoirs of the Faculty of Fisheries, Kagoshima University, Vol. 20, No.1, pp. 31-54, December, 1971

Abstract: Oceanic conditions along 125°E in a region

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between 20°N and 32°N in spring and summer of successive four years, 1965-1968, based on the CSK data obtained by the Keiten Maru and the Kagoshima Maru, Kagoshima University. Generally speaking, variations of temperature and salinity in this section according to years are rather less remarkable, especially in summer quite few differences are found, with a few exceptions. However, eastward volume transport of the Kuroshio across this section in summer, referred to 1200 d. b. surface, shows large differences according to years with a maximum value of ca 39 X 10⁶m³/sec. in 1967 and a minimum value of ca 26 X 10⁶m³/sec. in 1968, while it is nearly same value of ca 30 X 10⁶m³/sec. in spring every year.

The core of the Kuroshio seems to be situated almost always at the middle point between the border of the East China Shelf and the Ryukyu Submarine Ridge, though the width and the thickness of the current are both variable considerably from time to time.

Another eastward current exists to the far south from the Kuroshio around 20°N-24°N latitude, which may be the Subtropical Countercurrent or may be not. Volume transport of this eastward current varies very much according to seasons or years, with a maximum value of ca 30 x 10⁶m³/sec. and a minimum value of ca 8 x 10⁶m³/sec., which may suggest remarkable fluctuations of the current direction because these values do not contain total transport but only eastward component.

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V. DATA RECEIVED

Catalogue of Data Received by KDC (JODC), 1 March - 31 May 1972

Date Received Mo. Day/Yr.	KDC Ref. No.	Ship Code #	Agency	Period	Area	No. of Stas.	Serial Data	BTS	Currents	Bottom Topography	Sediments	Biological
SINGAPORE												
03.10/72	STK004	CH	MFRD	02.04-02.10.1972	S. CHIN. SEA	7 T				D		F
INDONESIA												
03.10/72	42K004	SA	IMR	02.12-03.05.1971	S. CHIN. SEA							P
03.10/72	42K005	JA	HO	12.07-12.28.1971	S. CHIN. SEA	8 T S O	N3 SI PH			D		P
USSR												
04.03/72	90K035	OR	TINRO	07.30-09.04.1971	N. W. NORPAC	42 T S O P	N2 SI PH					
JAPAN												
03.21/72	49K138	IY	FSFRL	05.16-06.04.1971	S. CHIN. SEA			127				
05.25/72	49K144	KO	MMQJMA	07.01-08.11.1971	E. JAPAN	77 T S O P	SI			D		
05.25/72	49K145	SH	MMQJMA	07.19-08.17.1971	S. JAPAN	51 T S O P	N2 N3 SI			D		
05.25/72	49K146	CH	MMQJMA	07.19-08.13.1971	F. CHIN. SEA	30 T S O	N2 N3			D		
05.25/72	49K147	SI	MMQJMA	07.22-08.28.1971	JAPAN SEA	69 T S O P				D		
SINGAPORE												
USSR												
OR: Orlick												
IY: Kaiyo Maru												
KO: Kofu Maru												
SH: Shumpu Maru												
CH: Chofu Maru												
SI: Seifu Maru												