

INTERNATIONAL INDIAN OCEAN EXPEDITION

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B R I E F S U M M A R Y

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STATUS OF PARTICIPATION IN IIOE AS OF 4 APRIL 1962

As of this date the organizing and preliminary planning phase of the Expedition appears to be drawing to an end. Emphasis hereafter will be primarily on operational and scientific coordination in timing, in disciplines and in areas, and on refinement and amplification of plans in the light of increasing knowledge obtained about the Indian Ocean.

Thirteen ship-operating countries and seven non-ship-operating countries or governmental units are participating. 39 vessels are now scheduled to carry out work in the Expedition, and at least seven more vessels are likely to participate. Their cruises vary from a few months in length to several of well over a year and one of two years. Funding for next twelve months is generally adequate.

During the two years beginning June 1962, an average of at least seven ships will be operating at any one time in the Expedition, although in any given month this may vary from three to twelve or more vessels. Most scheduled effort now is in the months of December, January, February and March. Least ship activity occurs in April and May, in October and November. However, many cruises are scheduled to cover the same area in each monsoon.

Some areas are attracting appreciably more ships than others. Eighteen ships are scheduled to operate in the Arabian Sea, whereas only eight operate in the Bay of Bengal. Many fewer ship months are involved in the latter. Between 10° N and 10° S, fourteen ships operate in the western half and fourteen operate east of 78° E. Fifteen operate in the South West Indian Ocean and thirteen in the South East. There is much less intensive coverage in the region below 32° S than above, and very little below 40° S. However, twelve reconnaissance cruises to date by various nations have revealed problems attracting further investigation in most regions. On the basis of these, and the cruises now scheduled in the next two years, it is reasonable to expect an increasing activity running into 1965. Few nations have detailed plans now beyond early 1964.

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A slippage of approximately six months has occurred in a number of programs. This does not constitute a serious problem at this stage of the Expedition. At a later stage it might. Although full-scale financing for the immediate budget years has encountered some resistance no major reductions are in sight. Planning for subsequent years is developing in greater detail together with the identification and commitment of individual scientists. A number of new vessels will become available during the next several years and they are being scheduled for maiden cruises in the Expedition. Interest and backing for the Expedition seems to be developing at a satisfactory rate. UNESCO is supporting training and special scientific meetings, and assisting in support, with India, of an Expedition taxonomic center at Cochin.

The stage has now been reached when each nation must begin to interrelate its plans with those of others. Firm international commitments properly drawn up at a series of regional meetings as well as through correspondence, will be required to achieve maximum coordination of the Expedition in disciplines, areas and times.

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THE SITUATION IN THE NATIONS

UNITED STATES of AMERICA

ARGO enters the Indian Ocean again in June '62 for 12 months operations. Works Central and Southern regions in both East and West, alternating between Physics and Chemistry, and Geology and Geophysics, with full minimum program in all disciplines. HORIZON joins as shooting ship doing some Physics and Chemistry in September to end of year. BAIRD follows in '64 doing Geology and Geophysics in Southern half.

VEMA, having completed two reconnaissance cruises in the Indian Ocean, enters again in June '62 for 2 months in Western half. In early '62, she and CONRAD operate in similar area for 3 months. Primary emphasis Geology and Geophysics, although full minimum program contemplated all disciplines.

WILLIAMSBURG, concentrating primarily on Biology, operated by Woods Hole for the U.S. Biological Program, operates for 2 years ('63 and '64) on nine cruises, concentrating on the Western half of the ocean and the Bay of Bengal. Physics and Chemistry will also be major programs, together with Meteorology. A chartered auxiliary vessel will do Biology and Geology during most of this period in island groups of all areas except South East Indian Ocean.

ATLANTIS II, emphasizing Physics and Chemistry will operate in opposite monsoons in '63 and '65 in the Western half. CHAIN, emphasizing Geology and Geophysics, operates in the same area September to March in '63-'64 and '64-'65. Both vessels do minimum in other disciplines including Meteorology.

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Two weather ships, not yet funded, are planned for Equator below Bay of Bengal for '63 and '64. U.S. effort in meteorological program will be major, at IMC Bombay in conjunction with India and, it is hoped, UN Special Fund, in supplementing and coordinating analysis of tropical circulation and air-sea interface problems, on U.S. and other ships, and in conjunction with existing and amplified meteorological networks. A NOMAD automatic boat-type weather station for Bay of Bengal installation is scheduled for July '62 delivery there.

USS REQUISITE (Hydro) has made two cruises in upper Arabian Sea. USS SEERANO (Hydro) two in Bay of Bengal. She will return in 1962 to work in the Andamann Sea, along the Burmese Coast and on two sections across the Bay of Bengal to Vizapatnam and to Ceylon.

Assistance in filling some gaps in tide gauge network contemplated. U.S. Coast and Geodetic Survey (one vessel) plans to participate. Funding for '62-'63 looks reasonably satisfactory.

UNITED KINGDOM

HMS DALRYMPLE in Oct.'61 to Feb.'62 did magnetic surveys in the Red Sea and along the Arabian coast and sediments in the Persian Gulf. Probably similar program 1962-3.

HMS OWEN operating from last October to next May has done precise bathymetry, magnetism and gravity in area from Karachi to Gan to Mauritius to the Kenya coast and the Gulf of Aden including the Seychelles and three northeast-southwest sections across this area. '62-3 off Kenya coast with possibly two deep water oceanographic cruises. '63-4 and '64-5 in west Indian Ocean. No plans formulated.

RRS DISCOVERY February '63 to April '64 in northwest and western Indian Ocean to 78°E and southwest to 30°S. A full program in all disciplines with concentration on biology, physics and chemistry in two seasons along the Arabian coast and current in two seasons along the equator and geophysics in Arabian Sea.

UK is planning adequate to substantial effort in tide gauge and meteorological programs. Planning is substantial, full advance funding has not finally been decided. Level of cooperation is very high.

MANIHINE program (Zanzibar) is doubtful because of withdrawal of local support.

FRANCE

Three cruises completed by CMDT. ROBERT GIRAUD emphasizing physical oceanography in northwest Indian Ocean. Five vessels - CALYPSO, CMDT. ROBERT GIRAUD, a 22 m. biological vessel based at Tuléar (Madagascar), a new 70 m. oceanographic vessel, and a 35 m. new vessel destined for New Caledonia and operating enroute will work

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between December '62 and probably into 1964 from 30°S northward in the western part of the Indian Ocean, in the Arabian Sea, Persian Gulf, Gulf of Aden and Red Sea primarily doing physical oceanographic sampling and measurement and direct current measurements. Biology will be concentrated at Tulear and Nosy-Bé in the Mozambique Channel. Tide gauges will be maintained at Kerguelen and Amsterdam. No serious financial problems reported. Cooperation good.

PORTUGAL

One survey vessel ALMIRANTE LACERDA being converted and equipped for oceanographic work operating out of Lourenco Marques in Mozambique Channel and southward. Participation planned in meteorological and tide gauge networks. Overall participation presumably planned for life of Expedition into 1965. Financial problems unknown.

GERMAN FEDERAL REPUBLIC

A new research vessel will be laid down in 1962 and will operate in either '63 or '64 in the Arabian Sea and adjoining gulfs, etc. Largely in the boundary current regions in two monsoon seasons conducting research in all disciplines. No details of program or personnel currently available. Financing seems satisfactory and cooperation good.

UNION OF SOVIET SOCIALIST REPUBLICS

VITJAZ has completed two extensive cruises each of about 250 stations in both the Arabian Sea and the Bay of Bengal and south to about 20°S. Third cruise scheduled to depart from Djakarta in April or May '62 for about eight months operating in the east, central and southeast Indian Ocean with some evident emphasis on equatorial current studies and benthic studies although a full program in all disciplines is promised, without details. Financing problems, if any, unknown. Cooperation seems good since data from 250 stations of VITJAZ' Indian Ocean cruise is now held by NODC. No information on subsequent cruises or on cruises by other Russian vessels although they are in Indian Ocean.

JAPAN

Failure to obtain budgetary support for a five vessel expedition which would have been on station for 30 days each on meridional lines between 78°E and 114°E from 8°N in the Bay of Bengal to 32°S between December '62 and March '63 has resulted in the withdrawal of that program with its reasonably full disciplinary coverage. At the time of my visit to Tokyo in late February a limited program of two or possibly three vessels operating for the same length of time on station doing physics, chemistry and biology in an area which may extend only to 15° or 20°S and may go further north into the Bay of Bengal was re-instated. Geology and geophysics, much needed new equipment, and possibly meteorology were eliminated but cost of ship time to and from the Indian Ocean was assumed by non-Indian Ocean Expedition accounts. On 29 March announcement was made that UMITAKA MARU and KOYO MARU would participate in 1962-63.

Three Ministers of Government with whom I talked indicated that for 1963-4 and possibly '64-5 a full program comparable to Japan's original plan would be supported.

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Japan's effort in the Expedition probably least of any major oceanographic nation in spite of fact one fourth Japan's tuna catch comes from there. Every effort both internal and international required to stimulate Japan to mount program compatible with her abilities, economic interests and international responsibilities.

SOUTH AFRICA

Several cruises by NATAL (SAN) one by AFRICANA II (Fisheries Agency) in June-July '61 and trips by R/V JOHN D. GILCHRIST. AFRICANA II east to longitude of Mauritius, NATAL to 5-600 miles from east and south coast of South Africa. 1962 to early '63 eight two or three week cruises in varying disciplines plus basic general program by NATAL. Similar range and length of program emphasizing biology in June-July '62 by AFRICANA II. Coastal work by GILCHRIST. Every evidence South Africa will continue to develop its physical, chemical, biological and geophysical programs in Agulhas and Mozambique Current areas during life of Expedition into 1965. No serious financial problems evident although lack of funds for specific units of ship-board equipment (stable platform for gravimeter) and added laboratory funds (total analysis of all IIOE cores) limit expansion in these areas. Growing interest and high cooperation.

MOZAMBIQUE (see PORTUGAL)

MALAGASY REPUBLIC (MADAGASCAR)

Program closely allied with France providing bases for most French ship operation. Local participation in meteorological and tide gauge networks and hospitality, and local biological effort.

MAURITIUS

Local committee for liaison together with hospitality-courtesy. Also participation in meteorological network at Mauritius and Diego Garcia with U.S. assistance, tide gauge installation and operation, and assistance at small islands north and northeast of Mauritius.

BRITISH EAST AFRICA (TANGANYIKA, KENYA, ZANZIBAR)

With rapid political evolution current status of participation unclear. Zanzibar Marine Laboratory reported losing its local funding (70%) and research vessel MANIHINE. Meteorological participation particularly at Nairobi seems assured. Possibilities of Tanganyika active participation to be explored. Tide gauge program assumed satisfactory pending further investigation. Major participation in programs within region's capacities probably dependent on UK effort. Cooperation has been very good.

SEYCHELLES

UK installing radiosonde-rawind on Mahé. Accessibility difficult. Hospitality reported unparalleled.

SOMALIA

No direct contact although facilities for non-local tide gauge installation and upper atmosphere sounding and wind finding reported likely.

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ARABIAN PENINSULA

Only contacts through British (Colonial Office, Commonwealth Relations Office, and RAF). Most sites and facilities for radiosonde-rawind, radiation, and tide gauge measurements can be worked out with cooperation of British.

RED SEA and PERSIAN GULF

No formal negotiations with countries bordering these waters although Ethiopia has offered hospitality-courtesy. Israel is conducting a shallow water biological and geological study in the lower Red Sea and many nations are operating in transit through the Red Sea and into the Persian Gulf.

PAKISTAN

At least two vessels operating in both the Arabian Sea and Bay of Bengal above 15°N from 1962 through '64. Currently one survey vessel converted for deep sea research now in upper Bay of Bengal. Small craft probably to work on continental shelf. Total program afloat and onshore covers all disciplines with modest effort but substantial for Pakistan. Meteorological and tide gauge programs fit networks. Some financial problems in equipping second major vessel and obtaining top level government backing for program. National Committee most energetic and very high cooperation.

INDIA

Five vessels committed to program including INS KISTNA, Frigate currently being converted to full time oceanographic work and deep sea research across Arabian Sea and Bay of Bengal, plus 70' new Fisheries Research vessel with range to 200 miles from coast (approx.), plus three vessels for continental shelf operations around India.

KISTNA to work as far as 12°S in northwest end of Indian Ocean to Africa and Arabian Peninsula, through Laccadives and Maldives and to Andamans and Nicobars plus linked sections to 2-300 miles from India's coasts plus sections across Arabian Sea and Bay of Bengal. Programs planned in all disciplines.

India's submission of satisfactory formal request to the U.N. Special Fund for assistance on the International Meteorological Center at Bombay moving at less than desired rate. India committed in principal to such submission. The Special Fund and WMO await proper request to expedite matters.

Physical arrangements at Cochin together with staffing plans for plankton taxonomic center moving at less than desired rate. Information on developments last several weeks lacking. Situation probably reasonably satisfactory but requires constant follow-up and negotiation.

Mainland and island links in meteorological network all satisfactory as well as tide gauge plans including Laccadives installation at Androth.

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Negotiation in India for special treatment of semi-permanent U.S. personnel at meteorological and biological centers developing parallel to similar negotiation from U.S. side.

CEYLON

Limited formal participation through Ceylon National Committee has been assured by governmental endorsement. Such participation will probably take place through meteorological observation, some tide gauge observation and some hospitality. Limited local waters observations from small Fisheries Research vessels may occur.

MALDIVE ISLANDS

Preliminary contracts have been made through British channels to explore possibilities of temporary island stations and some logistic support. The results of these investigations will be reported later.

BURMA

There are good contacts with leading figures in both the past and present Cabinets. Local ad-hoc committee has been formed at government request to seek government sponsorship for participation. Burma's limited offering will include meteorological observation, some tide gauge observation and possibly ship courtesy. Some small effort in biology and hydrography, which might take place with Thailand and Malaya, can be developed. Burma's status in the Expedition should be clarified within the next few months.

THAILAND

Increased planning and government support of the Thailand effort has resulted in commitment of one 90 ton vessel to research off the west coast of Thailand and a plan for utilizing a new 350 ton vessel (if some additional equipment can be obtained) for similar work well toward the Andamans and Nicobars. If arrangements can be made with Burma and Malaya this vessel would also work on physical and chemical problems and with assistance, on biology and geology-geophysics problems, along the western coast of all three countries in the boundary current areas of the eastern part of the Bay of Bengal, helping to fill a major gap in geographic and seasonal coverage.

Thailand's meteorological participation will be substantial and they have available for partial support of the IMC at Bombay over \$50,000.

MALAYA

A responsible Executive Department is taking aggressive initiative in organizing a local committee to sponsor a Malayan program for the Expedition. Malaya has just formally announced participation in the Expedition. Biological, geological and hydrographic interest is substantial and Malaya is in a financial position to make considerable contribution on its own, or in conjunction with Thailand. Participation in meteorological and tide gauge networks is assured.

SINGAPORE

Although Singapore does not have a direct interest in the Indian Ocean it has already offered hospitality-courtesy to Expedition ships and will participate in the meteorological network.

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INDONESIA

There have been no recent developments reported from Indonesia except reconstitution of its National Committee. A 650 ton research vessel is being constructed in Japan for mid-62 delivery but local personnel to man the 30 odd scientific billets are not evident. If appropriate manning by key individuals from some other nations were possible, together with an expression of willingness from the Indonesian government, it could combine training and research effort in the southeast Asian area which is badly needed. Earlier reports have indicated Indonesia's willingness to install and operate meteorological and tide gauge stations.

AUSTRALIA

Australia's more or less regular Indian Ocean operations with DIAMANTINA and prospective occasional operations in the Indian Ocean with GASCOYNE apparently go forward in an area extending to about 80°E, 40°S and northward toward the Bay of Bengal.

To date Australia has announced no program in geology or geophysics but is reported to be planning a shipboard meteorological program in addition to contributing observations from existing shore and island meteorological stations.

Emphasis has been placed on biological, physical and chemical oceanography and bathymetry. Australia had planned to cover in the northern summer the same tracks as the Japanese covered in the northern winter. No knowledge of the affect of the changed Japanese program on Australian plans is at present available.

Australia may be able to install and operate tide gauges at Christmas and Cocos Keeling.

An intercalibration session at or near Fremantle on VITJAZ and an Australian vessel is planned for late June or early July. Indirect reports indicate that certain aspects of biological and chemical oceanography will be emphasized. Other participants are invited.

NATIONALIST CHINA

No recent reports or plans for participation are available. It is unlikely that a Chinese ship will participate but some scientists are reported to wish to avail themselves of training or to carry out their own research on other peoples' vessels.

ISRAEL

In addition to its current Red Sea investigations referred to above, Israel plans studies in the Gulf of Elath, in other parts of the Red Sea and hopes to send scientists on other nations' vessels.

DENMARK, NETHERLANDS, UNITED ARAB REPUBLIC, ITALY and ARGENTINA

These countries are reported to be sending one or more scientists either for special formal research or for training on ships of other nations. Trainees are also reported from Hong Kong.