I. GENERAL PROGRAM

A. The Biological Oceanographic Ship Cruises:

The R/V ANTON BRUUN, recently turned over to the National Science Foundation by the Navy, has been designated as the research vessel of the U.S. Program in Biology. The 243-ft. vessel, formerly the presidential yacht WILLIAMSBURG, has been refitted and converted for oceanographic research at the Maryland Shipbuilding and Drydock Company of Baltimore, Maryland. Responsibility for operation of the vessel during its participation in the Indian Ocean Expedition has been assigned to Alpine Geo-physical Associates, Inc. of Norwood, New Jersey.

During its period of participation in the Indian Ocean Expedition, the ANTON BRUUN will be based temporarily at Bombay since most of the planned cruises will either originate or terminate there. Also stationed in Bombay is Dr. T. S. Satyanarayana Rao, on leave from Andhra University, who has been designated as a liaison officer. In addition to his other duties, Dr. Rao will assist participants with Customs problems, local and return travel arrangements, shipment of specimens, etc. He will maintain office space at the Bombay University Club House, B Road, Churchgate, Bombay 1, India.

The tracks for the nine cruises planned earlier remain essentially unchanged. The scheduled times for two cruises (4 and 5) were transposed to accommodate the research interests of the participating scientists from the Bureau of Commercial Fisheries. A complete cruise schedule for the ANTON BRUUN is shown below.
Tentative Cruise Schedule of RV ANTON BRUUN

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
<th>Location</th>
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<tbody>
<tr>
<td>25 January 1963</td>
<td>Lv U.S.</td>
<td>Gibraltar</td>
</tr>
<tr>
<td>8 February</td>
<td>Arr</td>
<td>Gibraltar</td>
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<td>11</td>
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<td>16</td>
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<td>17</td>
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<td>28</td>
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<tr>
<td>29</td>
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<tr>
<td>21 April</td>
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<tr>
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<td>1 May</td>
<td>Arr</td>
<td>Madras, India</td>
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<td>2</td>
<td>Lv</td>
<td>Madras</td>
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<td>7</td>
<td>Arr</td>
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<tr>
<td>17 May</td>
<td>Lv</td>
<td>Bombay</td>
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<tr>
<td>19</td>
<td>Arr</td>
<td>Colombo, Ceylon</td>
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<td>22</td>
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<td>Colombo</td>
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<tr>
<td>27 June</td>
<td>Arr</td>
<td>Port Louis, Mauritius</td>
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<tr>
<td>2 July</td>
<td>Lv</td>
<td>Port Louis</td>
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<tr>
<td>22</td>
<td>Arr</td>
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<td>1 August</td>
<td>Lv</td>
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<tr>
<td>21</td>
<td>Arr</td>
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<tr>
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<td>Port Louis</td>
</tr>
<tr>
<td>16 September</td>
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<td>Tamatave, Madagascar</td>
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<tr>
<td>27 September</td>
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<td>Tamatave</td>
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<tr>
<td>11 October</td>
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<td>Aden</td>
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<tr>
<td>15</td>
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<td>5 November</td>
<td>Arr</td>
<td>Karachi, Pakistan</td>
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<tr>
<td>10</td>
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<td>Karachi</td>
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<tr>
<td>1 December</td>
<td>Arr</td>
<td>Bombay</td>
</tr>
</tbody>
</table>

- OVERHAUL -
CRUISE 5: 13 January 1964
- Lv Bombay
- Arr Victoria, Seychelles
- Lv Victoria
- Arr Port Louis, Mauritius
- Lv Port Louis
- Arr Diego Garcia, Chagos
- Lv Diego Garcia
- Arr Cochin, India
- Lv Cochin
- Arr Bombay

CRUISE 6: 9 April
- Lv Bombay
- Arr Port Louis
- Lv Port Louis
- Arr Durban, South Africa

CRUISE 7: 12 June
- Lv Durban
- Arr Lourenco Marques, Mozambique
- Lv Lourenco Marques
- Arr Tulear, Madagascar
- Lv Tulear
- Arr Durban

CRUISE 8: 6 August
- Lv Durban
- Arr Beira, Mozambique
- Lv Beira
- Arr Mozambique, Mozambique
- Lv Mozambique
- Arr Zanzibar, Zanzibar
- Lv Zanzibar
- Arr Tamatave, Madagascar

CRUISE 9: 3 October
- Lv Tamatave
- Arr Port des Galets, Reunion
- Lv Port des Galets
- Arr Victoria, Seychelles
- Lv Victoria
- Arr Diego Garcia, Chagos
- Lv Diego Garcia
- Arr Bombay
On each cruise, stations will be occupied at intervals of 2 to 5° latitude on the meridional sections and more frequently on the coastal cruises. The basic program at each station will consist of the following:

1. Hydrographic cast to 1000 meters for temperature, salinity, dissolved oxygen, phosphate, nitrate, nitrite, silicate, ammonia.

2. Van Dorn bottle cast to depths of penetration of 100, 50, 25, 10, and 1% of incident light for pigment analysis and for 24-hour simulated in situ and 4-hour incubator Cl4 uptake experiments.

3. Submarine light penetration at all daylight stations.

4. Vertical plankton haul from 200 meters with standard IOE net (mesh aperture = 0.330 mm) for deposition in International Taxonomic Center at Cochin, India.

5. Vertical micro-plankton haul from 200 meters with No. 25 mesh net.

6. Oblique plankton tow with Bé sampler from 2000 meters or greatest depth possible in shallow water.


Additional work to be undertaken will vary depending on each cruise. Guided by the interests of the scientific parties on each cruise, extensive sampling will be done with different types of gear as follows:

Cruise 1. Gulf of Mexico shrimp trawl, occasionally dredges.
Cruise 4. Gulf of Mexico shrimp trawl, occasionally dredges.
Cruise 7. Piston corer, Menzies trawl, Campbell grab.
Cruise 8. Gulf of Mexico shrimp trawl, dredges.
Cruise 9. Gulf of Mexico shrimp trawl, dredges, midwater trawl.

To permit the greatest continuity and degree of consistency in the results, a permanent scientific staff of eight will be on board and will have responsibility for making the hydrographic casts, bathythermograph observations, plankton tows, physical and chemical determinations (temperature, salinity, light penetration, dissolved oxygen, phosphate, nitrate, nitrite, silicate, ammonia), and productivity measurements. The permanent scientific staff, composed mainly of graduate students in biology or oceanography, has undergone a special three-month course in oceanographic methods and theory at the Bermuda Biological Station from Dr. David Menzel, Director of the Training Program, Dr. Francis Richards (University of Washington), Dr. Maxwell Doty (University of Hawaii), Dr. Harold Humm (Duke
The facilities on board the **ANTON BRUUN** which are of particular interest include:

1. **Scientific equipment, supplies, and facilities.**

   Sampling equipment includes teflon-coated Nansen bottles, reversing thermometers, 2 1/2 liter PVC Van Dorn-type samplers, a 16-liter plastic sampler, No. 3, 20, and 25 mesh plankton nets of various sizes, including the Bé-design opening-closing plankton samplers, IK midwater trawls, bottom trawls (Gulf of Mexico shrimp trawls), Phleger corers, various dredges, grabs, snappers, and other bottom sampling gear, and various submarine photometers.

   There is a deep sea trawl winch with 1/2 inch wire and a hydrographic winch with 5/16 inch wire rope and an extra drum of 5/16 inch five-conductor cable. Both are capable of reaching bottom anywhere in the Indian Ocean. There are two bathythermograph winches and two Japanese long-line haulers. For echo-sounding, there is an Alden precision echo sounder (PGR) and a Kelvin-Hughes combination echo sounder and Asdic-type fish finder.

   Specimen containers range from vials to 55 gallon plastic-coated steel drums with a large variety and quantity of jars, bottles, cans, and drums of intermediate sizes, plastic bags, cheesecloth, preservatives, etc.

   There are three laboratories with combined space of over 1000 sq. ft. and four large scientific storage rooms below decks. The laboratories are equipped with hot and cold fresh water, sea water pumped from overside and distributed in all-plastic system, a chemical hood, refrigerator, deepfreeze, two Precision BOD incubators, two small steam autoclaves, a sterilizing and drying oven, an illuminated culture cabinet, two Beckman DU spectrophotometers, a Turner fluorimeter, piped butane gas, a glass still and ion-exchange system for distilled water (also obtainable in good quality directly from the ship's evaporators), and a variety of good optical equipment including both compound and stereoscopic microscopes and photomicrographic equipment.

   Below deck is a large (1000 sq. ft.) scientific freezer for specimen storage. On deck is an aquarium, 8 ft. long, 4 ft. high, and two ft. wide, which can be divided into five separate compartments. Seawater may be circulated from over the side continuously or may be recirculated through a filtered, plastic system, and either cooled or heated and delivered to
the individual compartments at any desired temperature.

There is also a well-equipped scientific office with desks, file cabinets, typewriters, calculator, photo-copying machine, and other office supplies.

A complete list of the scientific equipment and supplies is appended. Some of this will be more or less in continuous use by the permanent scientific staff in carrying out the routine chemical and hydrographic measurements, but all equipment will have at least limited availability for general use. While we have tried to anticipate the needs of all participants, many items will have to be restocked from time to time. The fact that the initial supply indicated in the inventory may be adequate for one's needs is no assurance that the entire stock will be available since other people may have similar needs or the supply may be depleted. Consequently, it would be very desirable for participants to furnish a list of their specific needs. Also if a major piece of equipment required is not on board or if a particular piece will be used so intensively that it will not be generally available to others, we should be notified well in advance in order to make necessary arrangements. It should be noted that even the most trivial items can become critical if they become exhausted since restocking takes such a long time. Shipping deadlines require 40 days for India and 60 days for Madagascar and South Africa.

2. Scientific Library:

The costs of acquiring a scientific library satisfactory to all participants are prohibitive, and only the general texts shown in the appended list are available.

3. Photographic Equipment and Darkroom Facilities:

Photographic gear includes an Omega enlarger and standard darkroom accessories, an MP-3 Industrial Polaroid Camera with attached lights and designed to take regular Polaroid roll film, 4 x 5 sheet film, and 120 roll film. The unit is also adapted to take a 35 mm. Miranda DR camera with a bellowscope.

Messrs. Richard Meyer and Alan K. Pease, two members of the permanent scientific staff, will be in charge of the photographic equipment and darkroom facilities, and will issue film for scientific purposes. The different types of film available are included in the list of supplies.

4. Living Accommodations:

Staterooms assigned to the scientific party will accommodate four people (two double bunks). Each room has closets, drawers, desk, and washroom facilities, including shower. Bedding will be provided.
5. Recreational Facilities:

A recreational library composed mainly of paperbacks donated by various individuals and purchased by the Program will be in the wardroom. Also available are assorted card games, chess, checker, scrabble sets, etc. Movies will be shown occasionally and taped music will be available also.

6. Medical Facilities:

Mr. Sidney McGuire, a member of the permanent scientific staff, will be responsible for administering first aid. The routine drugs and medicines will be on board, but anyone requiring special medications or regular usage of a particular medication should provide these for themselves.

7. Miscellaneous:

Laundry facilities are available on board.

Electricity on board is mainly 110 volt DC. Limited AC is available in certain areas of the ship.

Items such as cigarettes, soap, razor blades, etc. will be sold on board.

B. Auxiliary Ship Cruises:

Due to the interest shown in making collections and observations in and around the island groups and in the shallow water areas of the Indian Ocean, arrangements have been made through Dr. Rolf Bolin of Stanford University to have TE VEGA operate in the Indian Ocean for approximately one year.

TE VEGA, a 135-ft. two-masted schooner, will make three cruises scheduled as follows:

Cruise A. October - December, 1963. Singapore-Colombo, Ceylon: Stops along island groups off the Malay Peninsula and/or those off Sumatra.


Since TE VEGA is primarily a teaching facility, only six participants in the U.S. Program in Biology can be accommodated on each of the three cruises. The ship will be equipped with small boats, limited laboratory space, a darkroom, SCUBA, a winch for dredging and trawling at depths of 100 fathoms or less and general collecting gear.
C. Land-Based Operations:

For those scientists interested in carrying on studies at shore laboratories, arrangements have been made to accommodate participants at the Centre d'Oceanographie et des Pêches at Nossi Bé, Madagascar, and at the Central Marine Fisheries Research Institute at Mandapam Camp, India.

1. Centre d'Oceanographie et des Pêches

Nossi Bé, the island on which the Centre d'Oceanographie et des Pêches is located, is situated a few miles off the northwestern coast of Madagascar. Nossi Bé (also spelled Nosy Bé) has a stable climate, with a rainy, warm season from October - April and a very pleasant dry, cool season from May - September. The annual mean temperature is 26° C. The mornings in the dry season are generally calm, with little wind, but in the afternoons a light northwesterly breeze usually arises. Conditions for littoral collecting are good almost every day. The difference between the lowest and highest tides is 4.44 meters, with an average of 2.22 m. The water temperature is 27 - 28° C in the warm, rainy season (February) and 24-25° C in the cool, dry season (August). These temperatures are a little lower than those of the Red Sea and the Maldive Islands, and about the same as Torres Straits. Such temperatures allow the growth of reef corals. In general, the sea water around Nossi Bé is clear.

Nossi Bé is about 26 x 20 kilometers and has several extinct volcanic craters. The volcanic soil allows excellent crops of sugar cane, vanilla, black pepper, ylang ylang, and coffee. On the shores of the island may be found rocky beaches, sand flats (sometimes with grass, broken shells, or coral), muddy areas, mangroves, and coral beaches. Neighboring islands such as Nossi Komba, Sakatia, and Nossi N'Tangam provide still more varied environments. Along the shores there are coral formations where snorkeling or aqualunging is readily possible. (There is very little danger from sharks in the region.) Dredging with a hand dredge is possible in the shallow waters. The continental platform lies about 20 km west of Nossi Bé, and beyond it the water of the Mozambique Channel deepens rapidly. The water over the platform itself is not much deeper than 30-40 meters.

The Centre d'Oceanographie et des Pêches is operated by the Institut de Recherches Scientifiques de Madagascar (with headquarters in Tananarive), under the direction of the Office de la Recherche Scientifique et Technique Outre-Mer (with its office in Paris). Dr. M. Angot is the Director of the Centre.

Dr. Arthur G. Humes, Professor of Biology at Boston University, has been designated as Leader of the U.S. party at the Centre. He will act as Liaison Officer, arrange for housing accommodations, assist with transportation and shipping problems, handle all official financial transactions, and in general be responsible for participants stationed at the Centre.
Accommodations:

Accommodations for visiting scientists include a house with four bedrooms, living room, dining room, baths, and kitchen. Meals will be prepared and served at the Centre. Sheets and pillowcases will be provided. Laundry service may be provided. During the dry season, fresh water may be limited since it is entirely rainwater collected in cisterns.

Per Diem Allowance:

During their stay at the Centre, participants will be allowed a per diem allowance of $2.00 for incidental expenses. Food and lodging costs will be paid directly by Dr. Humes.

Laboratory Facilities:

These include a laboratory building with aquarium, library, and several laboratory rooms, a physical oceanography laboratory, a garage and workshop, and an office. There is a stone pier in front of the laboratory to which small boats may be moored.

A Land Rover, Zodiac inflatable rubber boat, and outboard motor, compound and stereoscopic microscopes, dredges, and other items are being shipped to supplement the available facilities and equipment at the Centre. Also at the Centre are a 25 ft. launch; a smaller research vessel (45 ft. long, 60 hp engine, auxiliary sail) with echosounder, winch for hydrological work, winch for long-lining, and berths for two; workshop; balances, pH meter; spectrophotocolorimeter; centrifuge; incubator; culture room; assorted glassware, etc. Routine supplies and minor equipment are also being shipped.

Travel:

Travelers to Madagascar arrive first at the airport at Arrivonimamo, about an hour's drive from Tananarive. Buses will take passengers to the city, where it may be necessary to wait a day or two for a plane to Nossi Bé. Good hotels are available in Tananarive. Sightseeing should include the Queen's Palace and the Institut de Recherches Scientifiques. Ambitious visitors may want to hire a car to go to the old palace of Andrianampoinamena at Ambohimanga, an hour's drive outside the city. Flights from Tananarive to Nossi Bé often go via Majunga, and take several hours.

If notification of the exact time of arrival is given to Dr. Humes at the Centre d'Oceanographie et des Pêches ahead of time, arrangements will be made to meet visitors at the airport, a few miles from Hell-Ville. If this is not possible, there is a car to bring travelers to Hell-Ville, where they may then contact the laboratory. The Centre is located about two miles from Hell-Ville.
Recreational Facilities:

Most of the social life centers around entertaining friends at cocktails or dinners. There is a small cafe at Ambatoloaka, a few miles from Hell-Ville, where one may get a good meal in very pleasant surroundings.

There are two motion picture theatres in Hell-Ville, one showing French films or American films with French subtitles, the other showing a mixture of French and Italian films.

Miscellaneous:

Visiting scientists should plan on having clothing for tropical living. Mosquitoes are a minor problem except in the rainy season. Shorts, sport shirts, and sandals or tennis shoes are the usual working attire. One suit would be desirable for special occasions. A light weight hat or cap for protection against the sun and light weight rain gear are necessary. Sun burn lotion is advised.

There are small shops in the town of Hell-Ville where one can buy different items of clothing, drugs, hardware, etc., but it is better not to depend on finding a particular item since the variety is limited.

Also located in Hell-Ville are the following:
A post office (airmail letters reach the U.S. in about four days).
The Banque de Madagascar where Traveller's Cheques can be cashed.
A very small hospital (a French doctor is available).

Electricity at the Centre is 120 V. 50 cycle A.C.

Central Marine Fisheries Research Institute, Mandapam Camp:

The Central Marine Fisheries Research Institute is under the Union Ministry of Food and Agriculture and conducts research pertaining to marine fisheries. This Institute was started in February 1947 with temporary accommodation in the University Research laboratories at Madras. Subsequently, with the acquisition of the Naval Hospital buildings put up during World War II, the Headquarters of the Institute was set up at Mandapam Camp in 1949.

In addition to the Headquarters at Mandapam Camp, the Institute maintains three sub-stations at Bombay, Kozhikode and Ernakulam; Research Units in Kandla, Karwar, Mangalore, Tuticorin, Madras, Waltair and Calcutta and Survey Research Centres in Jarnagar, Veraval, Surat, Dahamu, Alibag, Ratnagiri, Malvan, Ganguili, Cannanore, Alleppey, Neendakara, Cape Comorin, Vizhingam, Adirampatnam, Nagapatnam, Port Novo, Pondicherry, Kothapatnam, Kakinada, Masulipatnam, Calingapatnam, Gopalpur, Junput, Minicoy (Laccadives) and Fort Blair (Andamans).
In the three sub-stations, the major emphases are: Bombay - off-shore fisheries and prawns; Kozhikode - fishery biology with special reference to sardines and mackerel; Ernakulam - prawns, oceanographic studies and off-shore fisheries.

At the headquarters at Mandapam, the emphases are on marine biology including productivity studies, fish-farming and physiology, fishery survey and statistics, and algology. A list of the scientists at Mandapam Camp and their fields of interest are shown on the following page.

Most of the members of the scientific staff of the Institute are members of the Marine Biological Association of India which has its headquarters at Mandapam Camp and also of the Zoological Society of India which has a local branch there. The Indian Journal of Fisheries is published from the Institute on behalf of the Ministry of Food and Agriculture, and the Journal of the Marine Biological Association of India is also issued from there.

Mandapam Camp is about 2 km. in width, located in the southeast coast of Madras State directly across from Ceylon. Being a narrow strip of land with the Gulf of Mannar on one side and Palk Bay on the other, the climate of Mandapam Camp though warm is not oppressive. The temperature range is between 25 and 30° C and no warm clothing is necessary during any part of the year. The months of November through February are quite pleasant. Occasional rains occur during October and November.

The laboratory at Mandapam Camp is about 645 km. by rail and about the same distance by road from Madras. The Madras Government Biological Research Station at Krusadai is about 11 km. away. Two important centers of Hindu pilgrimage, Dhanuskodi and Rameswaram, are only 35 and 26 km. away, respectively. Madurai, another center of Hindu pilgrimage and where the nearest airport and city are located is about 140 km. away by rail or road. The nearest shopping center is Ramanad (about 35 km. away in the direction of Madurai) where there is also a branch of the State Bank of India.

In an area of about 100 acres in the immediate vicinity of the Research Institute, a residential colony consisting of 68 units for the various categories of staff has been built. The office laboratory, workshop, aquarium, etc., are situated in the old colony where there is provision to accommodate about 51 families. The Marine Fisheries Post and Telegraphs office with Savings Bank facilities is housed in a portion of the laboratory buildings. There is a Guest House consisting of eight rooms and common dining hall and lounge with facilities for Indian or European type Mess.

Medical treatment of the staff at Mandapam Camp is handled by the District Headquarters Hospital at Ramanathapuram, the Ceylon Quarantine Camp Hospital at Mandapam Camp, and the Local Fund Dispensary at Mandapam. The doctor from the Local Fund Dispensary visits the Institute thrice a week to attend to the needs of the staff. We are looking into the possibility of having our participants included in this arrangement.
Travel:

The best way to reach Mandapam Camp is to fly from Bombay to Cochin and then from Cochin to Madura on the same day. From Madura to Mandapam, rail transportation is available. If sufficient notice is given to Dr. T. S. S. Rao at Bombay, participants arriving at Madura will be met and driven to Mandapam Camp by auto.

Another way is to fly from Bombay to Madras by the morning Viscount flight which reaches Madras at about 11:00 a.m. and proceed to Mandapam by train which leaves Madras on the same night at about 7:00 p.m. The train reaches Mandapam the next day at about 2:00 p.m.

Accommodations:

Participants will be housed in the new Guest House which is situated very close to the laboratories. Each person will be allotted a single room with bath attached, but there is no special arrangement for hot water baths. Occasionally, when the demand for housing might be great, two people may have to share a room.

Meals in the Guest House will usually not cost more than $2.50 a day which will include morning tea, breakfast, lunch, evening tea, and dinner. The type of food will compare favorably with that served in any first class hotel in India.

Mandapam Camp is a "dry" area and accordingly, alcoholic drinks are not served in the Guest House. However, foreigners who can get permits on the basis of formal application can stock their own drinks and have them in their rooms.

There are no movie houses showing English movies in the immediate neighborhood. Recreational facilities are provided through a Recreation Club and a Welfare Club.

Per Diem Allowance:

During their stay at Mandapam Camp participants will be allowed a per diem allowance of $4.00 for every 24 hours or major fraction thereof.

Laboratory Facilities:

a. Running sea water.
b. Microscopes, compound and stereoscopic.
c. Ordinary glassware such as the jars, beakers, dishes, etc. Pyrex glassware is not available.
d. Ordinary chemicals, including formaldehyde, will be available but not analytical grade reagents.
e. Running sea water system with an aquarium for keeping marine organisms as well as two large open-air tanks to keep large animals like dugongs.
f. Gas supply.
g. Fresh water connections.
h. Dark room facilities for photography and projection equipment for 16 mm sound films and standard sized slides.
i. Visitors museum displaying marine organisms of popular interest.
j. Reference museum of marine fishes and other specimens for research workers.
k. Library with extensive collection of books, periodicals, and special publications dealing with marine sciences in general and fisheries in particular.
l. An experimental fish farm for research studies.
m. Work shop for fabricating simple equipment and repair of jeeps, boats and motors.
n. A jeep and a jeep station wagon.
o. Electrical current is AC-220 V. A stepdown transformer will be required for any 110 V. equipment.
   1 locally built boat about 18 ft. long with 15 h.p. kerosene engine, the "Sagitta".
   1 large inflatable rubber boat (Zodiac) with outboard motor.

List of scientific staff at Central Marine Fisheries Research Institute, Mandapam, and their specialisation

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<th>No.</th>
<th>Name</th>
<th>Specialisation</th>
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<tr>
<td>1.</td>
<td>Dr. S. Jones, Director</td>
<td>Fishes</td>
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<tr>
<td>2.</td>
<td>Dr. R. Raghu Prasad</td>
<td>Plankton &amp; productivity</td>
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<tr>
<td>3.</td>
<td>Dr. R. Velappan Nair</td>
<td>Fishes</td>
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<tr>
<td>4.</td>
<td>Mr. S. K. Banerji</td>
<td>Statistics</td>
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<td>5.</td>
<td>Mr. K. Virabhadrach Rao</td>
<td>Molluscs</td>
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<td>6.</td>
<td>Mr. D. Chakraborty</td>
<td>Statistics</td>
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<td>7.</td>
<td>Dr. V. S. Durvee</td>
<td>Physiology</td>
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<td>Mr. P. T. Thomas</td>
<td>Fishes</td>
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<td>Dr. R. Prasanna Varma</td>
<td>Marine Phyology</td>
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<td>Mr. P. V. Ramachandran Nair</td>
<td>Phytoplankton &amp; productivity</td>
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<td>Mr. K. Rangarajan</td>
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<td>Mr. P.S.B.R. James</td>
<td>Fishes</td>
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<td>16.</td>
<td>Mr. A. D. Ravi Shankar</td>
<td>Statistics</td>
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<td>Mr. C. R. Shanmughavelu</td>
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<td>Mr. M. Kumaran</td>
<td>Fishes</td>
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<td>Mr. G. P. Kumaraswamy Achari</td>
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<td>Mr. S. Venugopala Pillai</td>
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<td>Mr. K. Sudhakar</td>
<td>Fishery Survey</td>
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Other Scientific Workers

1. Dr. E. G. Silas
2. Mr. A. N. P. Ummerkutty
3. Mr. Hardevsingh Toor
4. Mr. C. A. Padmanabha Rao
5. Mr. K. Prabhakara Rao

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
MANDAPAM CAMP
AND ITS
SUBORDINATE ESTABLISHMENTS

Fishes
Copepods
Fishes - Lethrinids
Copepods
Molluscs
II. SCUBA DIVING

SCUBA will be available on board the ANTON BRUUN, TE VEGA, and at the Centre d'Oceanographie et des Pêches at Nossi Bé, and may be used by participants under certain conditions. All participants who anticipate using the SCUBA must undergo a special physical examination. A form to be filled out by the examining physician and returned to this office is enclosed. Participants will be reimbursed for the cost of this examination upon submission of receipt along with his expense account.

Since all diving should be done under the "buddy" system, participants on the ANTON BRUUN must be accompanied in their diving by one of the trained divers on the permanent scientific staff. Arrangements for people who wish to dive either from TE VEGA or in the Nossi Bé area will be made as the occasion arises.

Before a participant is allowed to use the SCUBA, he must convince Mr. Richard Meyer on the ANTON BRUUN, Dr. Rolf Bolin on TE VEGA, or Dr. Arthur Humes at the Centre d'Oceanographie et des Pêches at Nossi Bé, or their delegated representatives, that he is familiar with and capable of using the SCUBA. Any certificates awarded to participants upon completion of a SCUBA training course should be brought along as evidence of experience with the gear. Finally, participants will be required to sign a release form before they will be granted the use of the SCUBA.

These conditions are not meant to be unnecessarily stringent and are made only in the interests of protecting the safety of the participants who wish to dive.
III. PASSPORTS AND VISAS

All participants will be required to have a valid passport. In the United States application should be made according to the general instructions contained in the enclosed pamphlet issued by the State Department ("You and Your Passport"). Receipts for passport photos, passport and visa fees should be obtained and submitted to this office for reimbursement. It is advisable to take along some extra passport photos.

Participants should obtain visas for the countries in which they plan to enter for purposes of joining or leaving the research vessel, and for countries in which they plan to enter for studying at the shore stations. At ports of call scheduled for the research vessels, it is advisable and in some cases essential to have visas for the countries involved to permit leaving the immediate port area.

Visa applications for India or Madagascar or both are enclosed for your use. Participants scheduled on Cruises 6, 7, or 8 will need visas for the Union of South Africa. Applications can be obtained from the Consulate General of the Union of South Africa, New York City, New York. There is currently no charge for the South African visas.

Visa applications for India should be submitted in duplicate to:

The Indian Embassy
(Attention: Miss S. Mansingh)
2107 Massachusetts Avenue, N.W.
Washington, D.C.

The applications should be accompanied by:

1. Four passport sized photographs (recent front view, plain background) signed by the applicant on the reverse.
2. A valid passport,
3. Prepayment of visa fees (only postal money orders drawn in the favor of the Embassy of India will be accepted). The fee for an entry visa is $2.00, plus an additional $0.70 to cover registered mail charges. Amount of the fee for non-U.S. citizens can be ascertained from any of the Indian Missions in the United States or abroad.
4. A letter certifying the applicant as an official participant in the International Indian Ocean Expedition (enclosed).
5. A covering letter from the applicant giving full details of travel and stay in India.

The above requirements apply to the granting of short term visas, valid for periods of stay up to six months. Requests for longer periods of stay may involve some delay.

In the covering letter, participants should also request a copy of "India, Tourist Information".
Visa requirements for Madagascar:

For visits of less than 30 days, visa applications do not need to be submitted in advance. Visas will be issued at the port of entry upon presentation of a valid U.S. passport. This applies to those participants either joining or leaving the ship in Madagascar.

For visits of 30 days or more, visa applications should be submitted in duplicate to:

Embassy of Madagascar
2374 Massachusetts Ave. N.W.
Washington 8, D.C.

The applications should be accompanied by (1) a valid passport, (2) two passport-size photographs signed on the reverse side, and (3) a postal money order for $2.00 payable to the Embassy of Madagascar.

Visas for 3 months or less will be issued directly by the Malagasy Embassy in Washington with little delay. Visas for more than 3 months will require authorization from the Minister of Foreign Affairs in Madagascar, necessitating some delay.

NOTE: PROCEDURES FOR OBTAINING VISAS AND REGULATIONS PERTAINING TO VISAS REQUIREMENTS DESCRIBED HEREIN ARE APPLICABLE ONLY TO U.S. CITIZENS. NATIONALS OF OTHER COUNTRIES SHOULD CONSULT THEIR LOCAL EMBASSIES AND CONSULATES FOR RULES, REGULATIONS, AND APPLICATIONS REGARDING VISAS.

IV. IMMUNIZATIONS

All participants are urged to obtain immunization against smallpox, cholera, tetanus, yellow fever, typhus, typhoid, paratyphoid, diphtheria, and polio. Many of these are required, and all of them are strongly recommended. For convenience, they should be recorded in the enclosed "shot book".

Participants will be reimbursed for costs of all immunizations upon submission of an expense account with receipts attached.
V. INSURANCE

Since official participants are not deemed to be employees of the U.S. Program in Biology or its sponsoring and supporting agencies, and consequently, do not receive benefits under Workman's Compensation or similar Acts, the U.S. Program in Biology will provide both life and medical insurance for all participants.* A person will be insured from the date of departure from the city of his residence to the date of return to his city of residence. Coverage will continue during normal stopovers, not exceeding 48 hours per stopover enroute to or from his residence, except when a stopover is extended because of flight cancellations or other conditions beyond the control of the participant.

A. Coverage:

Coverage is subject to the limitations set forth in a master contract, and will include the following:

1. Life insurance $ 10,000
2. Accidental death & dismemberment 10,000
3. Blanket medical expense 1,000 (subject to a $25 deductible clause, and subject to a hospital room and board limitation of the hospital's normal semi-private room accommodation or $25 a day, whichever is less.)

B. Beneficiary nomination:

Beneficiary nominations should be made in duplicate and returned to this office. On the forms enclosed for this purpose are examples from which appropriate designations can be selected.

C. Instructions for handling medical claims:

A form for submitting a medical claim is enclosed. It should be kept in a safe place with other important papers you plan to take with you. Additional forms may be obtained from Dr. T. S. Satyanarayana Rao at Bombay, Dr. Arthur G. Humes at Nosy Be, or the offices on the ANTON BRUUN and TE VEGA.

The form should be completed by you and the attending physician, and submitted to the American Life Insurance Company, 825-827 Washington Street, Wilmington 1, Delaware when (1) treatment is completed, or (2) within 90 days from the date of injury or date of sickness contracted, if treatment is not complete, whichever period is less.

Be sure to submit all bills or receipts carefully itemized. Only in this way can the handling of claims be expedited.

*(except for some government employees.)
VI. TRAVEL

A representative of either Air-India or Pan American World Airways will contact each participant (excluding government employees) approximately one month prior to the estimated sailing date. He will have instructions to issue a round trip, jet economy ticket via only the most direct, economical route from the participant's city of residence to his foreign destination. For example, persons living east of the Mississippi River will fly via the east coast and Europe while those living west of the Mississippi will fly via the Pacific Ocean. If a round-the-world ticket is the most economical ticket, it will be issued. However, if any participant would prefer to travel via any other route, he is free to do so providing he pays the excess charge. Each participant is allowed a one day stopover enroute to and from the Indian Ocean area if he is going via Europe, and a two day stopover if he is travelling via the Pacific - any longer stopovers must be made at his own expense.

It is suggested that the return portion of the ticket be left open. Our Scientific Liaison Officer, Dr. T. S. Satyanarayana Rao, in Bombay will make the necessary reservations when the return date is made definite.

Each participant should plan to join the ship at least two-three days before the sailing date. at Bombay

Participants entering India will be met at the airport by an agent who will help them through Customs and arrange for housing. He will also help people make reservations for internal travel in India.

This office should be kept informed of travel itineraries in order that we may reach you at any time in case the sailing date of the ship is changed.

Excess baggage allowances:

Scientific equipment should be shipped to the Indian Ocean region (see section on shipping) and only in exceptional cases and by prior agreement may it be carried as excess baggage due to the high cost of the latter.
VII. SUBSISTENCE

Per diem in lieu of actual subsistence will be granted to participants in the field at rates not to exceed the official rates established by the U. S. State Department for the various areas. Participants are urged to bring sufficient personal funds to cover anticipated subsistence expenses and then to file an expense account upon completion of their participation. However, travel advances will be granted upon written request.

Since the rates vary considerably from area to area, the total amount allowed to each participant will be calculated in this office upon submission of his itinerary. In general, however, the tentative ground rules for per diem allowances are as follows:

1. While actually traveling to or from the Indian Ocean area, participants will be allowed $10.00 for every 24 hours or major fraction thereof.

2. Enroute to and from the Indian Ocean area, a one or two day stopover at $15.00 per day will be allowed to permit the traveler to break up the trip. As explained under TRAVEL, participants will be permitted to prolong their stopovers at their own expense.

3. Per diem will not be allowed either on board the research vessels or at ports of call since food and room accommodations are provided on the vessels.

4. Participants who arrive at a port to join the research ships are expected to live on board while waiting for the cruise to start. If, however, accommodations are not available, per diem will be allowed at the rate established for the particular port.

5. At the Centre d'Oceanographie et des Peches at Nossi Be', costs for food and accommodations will be handled by Dr. Arthur G. Humes, Leader of the U.S. party there. Accordingly, per diem will be granted at the rate of $2.00 for every 24 hours or major fraction thereof.

6. At the Central Marine Fisheries Research Institute at Mandapam Camp, arrangements for housing have already been made. A per diem allowance of $4.00 for every 24 hours or major fraction thereof has been established for those participants scheduled at Mandapam Camp. As noted in the section on Mandapam Camp, costs for food should not exceed $2.50 per day.
VIII. SHIPMENT OF SCIENTIFIC EQUIPMENT AND SUPPLIES

The Indian Government must receive advance notice of all shipments entering India for the International Indian Ocean Expedition if they are to be imported free of duty, and a guarantee for their re-export must be given. Therefore, anyone desiring to ship scientific equipment and gear to the Indian Ocean must notify this office well in advance with a detailed list of the equipment, the manufacturers, serial numbers, if any, and ten copies each of the invoices and packing slips. We will then forward more specific shipping instructions and shipping tags. The approximate shipping time to India is 40 days and to Madagascar, 60 days, but a generous leeway should be allowed.

Return shipments, including specimens, will be automatically handled through our agents.

IX. DISPOSITION OF COLLECTIONS

Recommendations for the distribution and disposition of collections submitted by the Advisory Committee on Systematics, with Dr. F. M. Bayer of the University of Miami as Chairman of the Invertebrate Section and Dr. E. A. Lachner of the U. S. National Museum as Chairman of the Vertebrate Section, have been accepted by the U. S. Program in Biology. A copy of the statement and recommendations is appended.
APPENDIX I

A statement and recommendations for the distribution and disposition of collections and data, U.S. Program in Biology, International Indian Ocean Expedition.

A. Introduction

With the initiation of field activity of the U.S. Program in Biology, International Indian Ocean Expedition, we wish to inform all participating and cooperating scientists of the general policies concerning biological materials resulting from the Expedition. These policies are related to the collecting, processing, distribution and permanent disposition of scientific specimens and data, and the dissemination of research results.

Participating scientists will be given the greatest possible latitude in the use and disposition of their material, consistent with the fullest utilization of scientific data and the permanent preservation of biological specimens. Participants who assemble collections of organisms for specific research undertakings will be under only minimal restrictions in regard to the use and disposition of their material. However, they will recognize the need for placing their basic data on permanent file for future research, and for permanently preserving supporting "voucher specimens" of their study material.

The principal permanent depository of natural history materials obtained at the expense of the U.S. Government is the U.S. National Museum. It has outstanding facilities for the permanent preservation of specimens of all kinds. Its facilities and collections are available to all qualified scientists. Other depositories of nationally and internationally recognized competence may participate in the permanent storage of expeditionary materials in one or more areas of interest.

B. Processing of materials and data through the National Sorting Center

The Smithsonian Institution maintains in Washington, D.C., a processing laboratory for the handling of general collections of biological materials including the uncommitted collections resulting from the U.S. Program in Biology, International Indian Ocean Expedition. This laboratory, called the National Sorting Center, maintains a staff of trained biologists who will sort the major groups of organisms from general collections for referral to collaborating specialists. Also it will maintain on permanent file all pertinent data concerning biological collections obtained by the Expedition and these will be made readily available to all participating scientists. With the cooperation of the Systematics Advisory Committee, this Sorting Center will maintain contact with specialists in a wide variety of disciplines and will solicit the cooperation of systematists for the study of Indian Ocean material.

The Sorting Center has no permanent function as a depository. Incoming materials are not treated as a part of the Smithsonian collections. Its major purposes are to maintain data storage files in a readily accessible form, to promote the prompt study of marine biological materials through efficient sorting and processing of collections, forwarding data and collections to qualified scientists, and soliciting prospective scientists and students to work up miscellaneous unrequested groups.
C. Disposition of Collections

Cruise collections and specific material. - All cruise collections, except for the specific material that is selected by a scientist on board ship, will go to the Sorting Center. The specific material required by the scientist for his approved research, may remain in the custody of the scientist until completion of his studies although he may send it to the Sorting Center with the other cruise collections, where it can be mailed to him at a later time upon his request. A complete record of the scientist's material will be made before its separation from the main collections throughout the cruise and filed with the Sorting Center at the termination of the cruise. Upon completion of his studies, the scientist will deposit a representative series or sample of his collections with the U.S. National Museum and to at least one other cooperating museum selected upon the general recommendations of the Advisory Committee on Systematics. On the latter distribution the Committee will consider areas of taxonomic interest and curatorial competence of the several recognized depositories and institutions in the United States, as a safeguard for future systematic and/or morphological studies. Arrangements for an additional series or sample may be considered by the Committee for permanent deposit in an institution within a pertinent area of scientific interest located in the geographical confines of the Indian Ocean. A scientist not engaged at one of the cooperating institutions may retain a representative series, or sample of each form, for his institutional interest.

After an adequate series or sample has been selected from each haul for systematic purposes, additional specimens may be taken by other investigators for their various studies in osteology, histology, anatomy, food analysis, etc. A complete record of this material also will be filed at the end of the cruise with the Sorting Center, but the investigator need not maintain any further responsibility to the Center or the Committee for this material unless he considers it desirable.

Type material. - The distribution of type material involving new taxa for the entire program will be as follows: Holotypes and all other primary types will be sent by the scientist for permanent disposition to a recognized American institution selected by the scientist from a list of several screened by the Committee. Again, both the scientist and the Committee will consider the centers of subject interest and long-range curatorial competence and practices of the institutions. Where possible, a paratypic series or specimens involving secondary types of each form will be sent by the scientist to the U.S. National Museum and additional series to at least two other cooperating United States institutions from a list recommended by the Committee.

Special Collections. - All special collections made by field scientists, such as those made from shore-base operations, remain temporarily in the custody of the scientists. Investigations of such collections, frequently composite ones, may involve quantitative, qualitative and ecological studies. A reasonable length of time will be allowed the scientist to complete such studies. Upon the recommendation of the Committee these collections then will be deposited at the Sorting Center, at which time the respective groups will be made available to scientists already assigned to their study or to competent workers who may be solicited by the Committee. Upon the completion of these group studies a distribution and permanent disposition will be effected as outlined above.
General collections. - All other general collections not specifically related to any approved proposal or special study of the Program shall be treated as general Expedition material. This material will be forwarded to the Sorting Center by the collector where it may be evaluated for its fullest scientific purposes and made available to appropriate workers. Other scientists whose research requires authoritative determination or verification of specimens should make arrangements through the Sorting Center for possible assignment of such work to collaborating specialists. It is hoped that scientists will accept this responsibility for Indian Ocean material involving groups of their specialty.

Residual collections. - Residual collections not committed and not requested for study by specialists shall either (1) remain on deposit at the Sorting Center until such time as competent specialists may be found to study them or make application for them, or (2) after extended storage at the Sorting Center be distributed on an equitable or compatible basis to cooperating institutions after appropriate arrangements have been made by the Committee.

D. Responsibility of cruise leaders, scientists and cooperating institutions

Complete field data and records concerning the transfer and distribution of all collections related to the Expedition will be maintained for permanent reference at the Sorting Center. It will be the responsibility of the cruise leader and/or chief scientist to see that comprehensive field records are made whenever necessary and that the type of data as well as the selection and preservation of material is adequate and fulfills the general requirements issued by the Program Director.

Participating investigators should give their special collections adequate packing to insure safe transshipment to home laboratories. The success of studies may depend upon the care with which material has been handled.

No distribution of collections will be made to cooperating institutions for permanent disposition without formal acceptance and unless certain reciprocating obligations are recognized by proper institutional authorities. All permanent depositories shall house and curate the collections adequately for posterity. The collections shall be made available for study in accordance with the requests and needs of competent scientists. Cooperating institutions housing permanent material need not file any further records with the Sorting Center with regard to any future activity concerning these collections. However, in the event that an institution finds that it cannot continue to maintain these collections, another depository will be sought with the cooperation of the Sorting Center.

E. Support of research

Additional support of approved research proposals related to Indian Ocean materials after field operations cannot be obtained at present through the funding arrangements of the U.S. Program in Biology, International Indian Ocean Expedition, but it may be sought from appropriate programs of the National Science Foundation when and if required.
F. Publication of research

Although participants are free to publish their results in journals of their choice, there are tentative plans to establish a series of reports designed specifically for the publication of research resulting from U.S. participation in the International Indian Ocean Expedition. This would be handled through the editorial department of the Smithsonian Institution. Papers of immediate interest, faunistic and floristic reports, and detailed monographs of particular systematic groups or specific subjects, will be considered appropriate for inclusion in these reports.

A special series of volumes in an attractive format reserved for the prompt publication of research in the marine sciences for which support may not otherwise be obtainable, is also planned for participants in the U. S. programs of the International Indian Ocean Expedition.
ADDENDA TO NEWS BULLETIN FOR PARTICIPANTS, U.S. PROGRAM IN BIOLOGY,
INTERNATIONAL INDIAN OCEAN EXPEDITION

A. Additional information on visas of United States passports.

The information below, through item 12, was extracted from the informational leaflet, Fees Charged by Foreign Countries for the Visa of United States Passports (State Department, M-264, 2-26-62). It applies primarily to United States citizens traveling as tourists. The fees listed are not modified to reflect adjustments in rates of exchange.

Proof of citizenship: A native-born citizen should have in his possession his birth or baptismal certificate or some other personal document which would be helpful in establishing that he is a United States citizen such as an affidavit of his birth executed by his parents or some other person having personal knowledge of the date and place of his birth. A naturalized citizen should carry his naturalization certificate. Cards showing club membership, insurance policies, driving permits, and other documents of this nature are useful for identification purposes.

INFORMATION ON VISA REQUIREMENTS AND FEES IS SUBJECT TO CHANGE. THEREFORE, IN ORDER TO AVOID ANY POSSIBLE INCONVENIENCE; PERSONS PROCEEDING ABROAD SHOULD CHECK THE PASSPORT AND VISA REQUIREMENTS WITH THE CONSULAR OFFICIALS OF THE COUNTRIES TO BE VISITED. Consular representatives of most foreign countries are located in principal cities throughout the United States, particularly at New York, Chicago, San Francisco, New Orleans, and Washington, D.C. In many instances travelers may be required to obtain visas from the consular office in the area of their residence. The addresses of foreign consular offices in the United States may be obtained by consulting the CONGRESSIONAL DIRECTORY, which is available in most libraries.

1. Singapore, State of

Apply for visa from British consul. United States citizens do not require visas for temporary visits (other than residence or employment) to enter Singapore.

2. Ceylon

Visa is not required by bonafide tourist for stay of less than 30 days if in possession of a valid passport and onward transportation. A visit visa - 42 cents issued for stay of 6 months to individuals who enter on business. Apply at Embassy of Ceylon, Washington, D.C. or at any British Consulate.

3. Malaya, Federation of

A visa is not required for a temporary visit. Visit passes are issued gratis upon arrival. Apply for a visa at Embassy in Washington, D.C.

4. Indonesia

Tourists may obtain tourist visa valid for six months and permitting a stay of 30 days and single entry; immigration fee of $2.20 for each person included in passport and chancery fee of $1.10 per passport. Obtain visa from Consuls of Indonesia in New York or San Francisco.
5. Burma

Tourist transit visa valid for stay up to 10 days, $1.05 for bonafide tourists; ordinary transit visa valid for a stay up to 10 days enroute to destination, $2.10 for all travelers not strictly bonafide tourists; tourist entry visa valid for a stay of from 10 days to 30 days, $3.15 applicable to bonafide tourists. These carry privilege of extension after arrival upon application to Immigration Authorities. No visa required of bonafide air tourists for stay of 3 days holding onward air reservations.

6. Thailand

A visa is not required of a traveler visiting temporarily as a tourist, transit, or non-immigrant visitor.

7. Reunion (France)

Visa not required for a stay up to 3 months in Reunion.

8. Comoro Islands (France)

Visa is required. Non-stop transit, $1.23 single entry; transit visa with stopover from 1-90 days, $2.45; round trip transit visa, $3.68; multiple trips, $4.06. Visa valid 3 months for multiple trips, $4.06; visa valid 1 year for several trips of less than 3 months each, $8.12; entry visa for stay of more than 3 months, $8.12.

9. Aden

$2.00 - valid for a stay up to 3 months and can be obtained from nearest British Consul.

10. Pakistan

Gratis. Valid for 48 months, multiple entries. Visa may be obtained from Pakistan Embassy, Washington, D.C., or the Pakistan Consulate General in New York City or San Francisco. In areas remote from these places, visas may be obtained from British Consuls.

11. Union of South Africa

Gratis. Valid 1 year and multiple entries. Apply for visa of ordinary passport to Consulate General of Union of South Africa, New York City.

12. Mozambique (Portugal)

$2.06 - valid for 90 days. Apply to any Portuguese Consulate or to the Portuguese Embassy, Washington, D.C.

13. Zanzibar (Great Britain) - From personal communication British Consulate, Boston, Massachusetts.

Visa required. Apply at nearest British Consulate.

14. Mauritius (Great Britain) - From personal communication British Consulate.

Visa not required for visits up to 6 months.
15. Chagos Islands (Great Britain) - From personal communication British Consulate.

Visa required.

16. Seychelles Islands (Great Britain) - From "Immigration Formalities, Seychelles" issued by Tourist & Information Department, Seychelles.

Bona fide tourists will be issued with a visitor's pass, free of charge, on arrival in the Colony, by the Principal Immigration Officer. They should be in possession of valid travel tickets to their ultimate destination. Persons who do not hold onward or return travel tickets may be requested to deposit a sum not exceeding Rs. 2,000 with the Principal Immigration Officer. Visitor's passes are issued for periods not exceeding six months and on condition that the holder does not accept employment in the Colony.

Visitor's passes are normally issued to persons arriving in the Colony for the purpose of spending a holiday, travelling for business, trade or profession, or investigating the possibility of settlement in the Colony.

In-transit passes are issued for persons visiting the Colony in transit to a destination outside the Colony. Passes are issued on arrival by the Principal Immigration Officer providing the traveller is in possession of valid documents, travel tickets, passport and/or visa where necessary, for their ultimate destination. An in-transit pass entitles the holder to remain in the Colony for a period not exceeding two months.

NOTE: Passengers in direct transit will normally be permitted to land at any time during their ship's stay in port without formality.

For full information about current procedures and formalities, inquiry can be made to the Principal Immigration Officer, Victoria, Mahe, Seychelles, or at the nearest British Consulate.
B. Participation in seminar programs.

Because of its international aspects and its special significance to India, the International Indian Ocean Expedition has created widespread interest among the Indian scientific community. Accordingly, the U. S. Information Service has expressed a desire to sponsor a number of seminars on oceanographic research to highlight U. S. participation in the Expedition. These seminars would be planned to coincide with the port visits of U. S. research vessels and would be held at or near the scheduled ports.

Although no details for the arrangements of these seminars are available as yet, it is hoped that visiting scientists will participate actively in the programs by presenting brief talks on their particular research interests and experiences.

At Cochin where the U.S.I.S. sponsored an oceanographic research seminar when the U. S. vessels ARGO and HORIZON were in port, about 125 Indians attended the program. This included 30 senior professors and 15 graduate students; many of them also participated in the program which apparently met with unqualified approval. The seminar provided an excellent opportunity for local scientists to visit the ships, look over the research equipment and gear, and meet informally with the visiting scientists.

Dr. S. Jones, Director of the Central Marine Fisheries Research Institute at Mandapam Camp, India, has also extended a cordial invitation to participants scheduled at that Institute to join in their seminar program. Dr. Jones has expressed the desire for visiting scientists to bring along slides and other illustrative material as well as copies of their research papers.
ADDENDA TO NEWS BULLETIN FOR PARTICIPANTS, U. S. PROGRAM IN BIOLOGY, INTERNATIONAL INDIAN OCEAN EXPEDITION (cont.)

C. Additional remarks on the handling and disposition of biological samples on ANTON BRUUN.

Since a vital aspect of the U. S. Program in Biology is concerned with systematics, some further remarks on the handling and disposition of the biological samples that will be collected on the ANTON BRUUN are in order. These remarks should be considered within the framework of the recommendations set forth by the Advisory Committee on Systematics, and are presented here to help prevent any misunderstanding as well as duplication of effort.

1. The plankton samples obtained by a 200 meter vertical haul with the Standard Indian Ocean Net will be deposited intact at the International Taxonomic Center at Cochin, India as part of our obligation to the International Indian Ocean Expedition.

2. The multiple oblique plankton samples obtained with Be' nets and the vertical plankton samples obtained with fine-mesh (No. 25) nets will be preserved intact, with the exception noted below, and shipped directly to the National Sorting Center at the U. S. National Museum in Washington, D. C. At the National Sorting Center, the various groups will be sorted out and distributed, or otherwise made available, to the systematists and other specialists to whom they have been assigned. If a person who has been assigned a particular group, such as the salps, for example, is on board the ship, he is free to sort out that group from the plankton samples as they are obtained, either for purposes of shipboard study or for shipping them directly to his home institution at the end of the cruise. Any person removing his assigned group or groups of organisms from a given plankton sample for shipment to his home institution should see that the proper notation is made in the scientific log.

3. The bottom trawl and dredge samples will be handled very similar to the multiple oblique and fine-mesh vertical plankton samples. That is, a participant on board the ship may sort out the group or groups assigned to him and have them shipped directly to his home institution. Otherwise, the permanent scientific staff on board will preserve for direct shipment to the National Sorting Center adequate numbers of each species from each haul. The bottom samples, especially those obtained with the otter trawl, should be sufficiently large so that other participants on board interested in having specimens for personal reference collections or for studies other than from a taxonomic viewpoint, such as parasites, stomach contents, etc. can take as many of the excess specimens as desired. The only point that should be stressed is that specimens taken by participants other than the person to whom they have been assigned should not be worked up from a taxonomic aspect because of the obvious likelihood of duplication of effort.

4. Night-light and individual collections (hand lining, rod & reel fishing, dip netting, beach seining, skin diving, etc.). The night light collections made by the permanent scientific staff will be shipped directly to the National Sorting Center, but as with the bottom trawl samples, participants on board may sort out the group or groups that have been assigned to them. Other participants are free to use the night light collecting
facilities to make personal collections. These additional personal collections as well as any such collections made either on board or during temporary shore stops may be shipped intact to the home institution of the collector. Final disposition of these personal collections is treated in the section on Special Collections in the recommendations of the Advisory Committee on Systematics.

5. Special collections (e.g., surface plankton tows) which do not interfere with other scientific operations may be made simultaneously with other activities by any individual but must have approval of the Chief Scientist. These may be considered as personal collections and will be handled as in (4).

6. Special collections (e.g., deep plankton tows) which require separate ship time may be made by any individual if time permits at the discretion of the Chief Scientist. There can be no guarantee that time will be available for making such collections unless special provision for them has been made in the original cruise plans. These collections also may be treated as personal collections and handled as in (4).

7. Mid-water trawl samples will be preserved intact for shipment to the U.S. National Sorting Center or, by pre-arrangement, to the home institution of the individuals making the collections.

8. Specimens caught on long-line gear will usually be so large that it is unlikely many specimens will be preserved for shipment. Participants on board may take whatever counts and measurements are needed, and can dissect out whatever parts they need (stomach contents, parasites, gills, etc.) for direct shipment to their home institutions.

9. The grab and core samples will necessitate special arrangements that will be made with the individuals involved.
ADDENDA TO NEWS BULLETIN FOR PARTICIPANTS; U. S. PROGRAM IN BIOLOGY;
INTERNATIONAL INDIAN OCEAN EXPEDITION  (cont.)

D. Scientific Responsibility and Authority aboard R/V ANTON BRUUN

1.) The Captain shall have full authority and responsibility in all matters concerning
the safety of the ship and its operation under U. S. Coast Guard regulations and Marine
law. His authority in this area shall at all times over-ride that of the Chief Scientist.

2.) Each cruise shall be planned and scheduled well in advance by the Scientific Director,
the Chief Scientist, and as many of the participating scientists as possible. These plans
shall include:
   a) departure date
   b) ship's course
   c) duration of cruise
   d) ports of call
   e) duration in port
   f) number and location of oceanographic stations
   g) scientific work carried out on station and underway.

3.) The Chief Scientist shall follow the pre-arranged cruise plans where possible. How­
ever he shall have full authority to modify these plans as necessary due to weather, mech­
anical difficulties, or other unforeseen or unpredictable events. The Chief Scientist may
also take advantage of unusual situations or phenomena of scientific interest which are
unexpectedly encountered in the field, taking additional time on stations or diverting the
ship's course at his discretion, but not to such an extent as to jeopardize the successful
completion of the cruise as planned.

4.) No major modification of the cruise plans shall be made without notification of and
approval by the Scientific Director by radiogram.

5.) Prior to the departure of each cruise, the Chief Scientist shall discuss the cruise
plans with the Captain, and the Captain shall be kept fully informed at all times during
the cruise of the status of the scientific program and any modifications or changes thereof.

6.) At each station, a basic oceanographic program will be carried out consisting of the
following:
   a) A hydrographic cast to 1000 meters for determination of temperature,
      salinity, oxygen, phosphate, nitrate, nitrite, ammonia, silicate.
   b) A Van Dorn bottle cast for water samples for primary productivity,
      phytoplankton pigments, and phytoplankton organisms.
   c) Measurement of light penetration with a submarine photometer.
   d) A standard vertical IIoE plankton haul from 200 meters to the surface.
   e) A micro-plankton tow with a fine-mesh net from 200 meters to the surface.
   f) Oblique plankton tows with a series of Bé plankton samplers at depth
      intervals of 2000-1000, 1000-500, 500-250, 250-100, 100-0, 100-25 and 25-0
      meters (or those depth intervals possible in shallow water).
   g) A bathy-thermograph observation at each station and once each hour while
      underway between stations.

7.) The basic oceanographic program shall be the responsibility of the Permanent Scientific
Staff. The Chief Scientist shall have no authority to require these individuals to delete
or modify this program or the techniques or procedures used in carrying it out. The Chief
Scientist shall allow sufficient time at every station for the completion of the basic
program. The decision of when the basic program has been completed will be made by the
Chief of the Permanent Scientific Staff.
8.) All scientific work other than the basic scientific program shall be under the responsibility of the Chief Scientist. Requests for special projects by participating scientists or members of the Permanent Scientific Staff shall be made to and approved by the Chief Scientist, except where previous arrangements have been made directly with the Scientific Director and discussed with the Chief Scientist prior to the cruise. Requests involving ship time shall be made to and granted by the Chief Scientist at his discretion. Such requests must be granted sparingly since all available time will be fully scheduled for each cruise. All such activities should normally be included in the original cruise plans, and the Chief Scientist is under no obligation to make exceptions in the field.

9.) Quarters and laboratory space for the Permanent Scientific Staff have been assigned. Quarters and laboratory and deck working space for participating and guest scientists shall be assigned by the Chief Scientist.

10.) Conflicts involving the use of ship-time, space, facilities, equipment, and supplies shall be resolved by the Chief Scientist with the following exceptions:
   a) Priority in the use of scientific equipment required for the basic oceanographic program shall be given to the Permanent Scientific Staff.
   b) Photographic equipment and supplies shall be issued and its use supervised by the Staff Scientists in charge of photography. This shall include the issuing of film, which may be used for scientific purposes only.
   c) Scuba diving equipment shall be issued by and its use supervised by the Chief of the Permanent Scientific Staff under conditions specified by the Scientific Director.

11.) Full, complete records of all activities will be made on the forms provided. These will be maintained by the Staff Scientist in charge of records. All original data sheets will be sent to the Scientific Director. A copy of all data sheets will be maintained permanently aboard the ship. Any participating or visiting scientist may make his own copies of all data.

12.) Equipment and supplies required by participating scientists shall be approved by the Chief Scientist and issued by the Staff Scientist in charge of supplies. All supplies and small equipment items shall normally be kept in a locked storeroom and shall be issued only in the prescribed manner.