The Sub-Committee appointed "to review the existing Draft Request for U.N.Special Fund" was composed of the following.

1. Dr. K.R. Ramanathan, India (Chairman)
2. Mr. K.Parthasarathy, WMO Special Fund
3. Mr. A.N. Shabaz, UN Special Fund
4. Mr. C.S. Ramage, U.S.A.
5. Mr. Soeroto, Indonesia
6. Mr. S.N. Naqui, Pakistan
7. Mr. A.F. Sundberg, Mauritius
8. Mr. Ramanisarivo, Malagasy Republic

After considerable discussion, it was decided that India should sponsor a request for financial assistance from the U.N. Special Fund for the establishment of an I.M.C. at Bombay, and that other interested Governments be requested to advise the U.N.Special Fund of their support of the I.M.C. This was submitted in the form of a resolution which was adopted by the COMMITTEE (cf Resolution 1).

A "Memorandum of a request to the U.N.Special Fund for assistance towards the Meteorological Research Programme for the Indian Ocean area" was also prepared by the Sub-Committee. It was agreed that the working out of the details of the Memorandum should be left to the Government of India who are to sponsor the request.

A summary of the Memorandum is enclosed.

/S/ K.R. RAMANATHAN

Chairman.
SUMMARY OF MEMORANDUM OF REQUEST TO THE U.N. SPECIAL FUND FOR ASSISTANCE TOWARDS THE METEOROLOGICAL RESEARCH PROGRAMME FOR THE INDIAN OCEAN AREA.

1. PURPOSE

1.1 The purpose of the project is to collect extensive meteorological data including those of a type hitherto unavailable over the Indian Ocean area and adjoining lands. With the help of these data, the large-scale atmospheric circulation and weather processes over this region will be studied in relation to the general circulation of the whole world. These studies are expected to yield improved weather forecasting methods and techniques.

2. BACKGROUND

2.1 Inadequate knowledge of the large-scale influences on weather have always hampered weather forecasting in the countries in this area. Limited observations and limited international exchange of observations make difficult even short range forecasting in the countries surrounding this large body of water which covers one seventh of the earth's surface. The need for the development of improved forecasting techniques and for the training of meteorological personnel of the countries concerned in the application of the best methods of analysis and forecasting has been keenly felt. This need has become even greater and more urgent in recent years in view of the large-scale development plans of many of the countries in the field of agriculture, exploitation of water resources, flood control programmes and programmes for ameliorating the consequences of weather calamities such as tropical cyclones, torrential rains, etc.

2.2 The economy of many of the Indian Ocean countries such as India, Pakistan, Burma, Malagasy, East Africa, etc. is mainly agricultural. As agriculture is affected directly by the variations of the summer monsoon which brings the bulk of the rain to these countries, planned programmes for the improvement of agriculture require accurate advance information of the onset of the rains, its variations from day-to-day, the occurrence of spells of heavy rain and breaks in the rains in the middle of the growing season. The present knowledge of the character of the circulation over the oceans in the monsoon area is to inadequate to allow development of forecasting methods which can be used by the meteorological services of the countries for providing the different types of forecasts and warnings needed for agricultural development.
2.3 Many of the countries in this area suffer from periodical visitations of severe tropical storms which cause considerable damage to property and food crops, dislocation of transport and communication and untold human suffering including loss of human lives. Every such severe cyclone causes a set-back in the economic development of the country. There is a very great need, therefore, for developing forecasting methods to provide adequate and timely warnings for tropical cyclones. These cyclones originate and develop over the ocean areas and move over to land where they cause disaster. In order to develop appropriate forecasting techniques, it is necessary to collect more data from the ocean areas and study them with the help of classical as well as modern methods involving the use of electronic computers if we are to develop appropriate forecasting techniques. Considering the vast expanse of the Indian Ocean, the inherent difficulties of making observations over a large ocean area and the limited resources, both financial and of trained man-power of the countries concerned, it is much beyond the resources and capacity of any single country to plan and carry out a programme of observations and investigations described above without assistance on a large scale from international organizations as well as from developed countries which have the resources and the technical know-how.

2.4 The International Indian Ocean Expedition which is being organized by the Special Committee for Oceanic Research in which a number of countries in the Indian Ocean Area and other countries such as the U.S.A., U.K., U.S.S.R., Japan are participating has now afforded the opportunity of carrying out an extensive and co-ordinated meteorological programme for the Indian Ocean Area as a whole. As a number of ships of different countries will be operating in the Indian Ocean area for oceanographic observations, these can be used for making specialized meteorological observations which would otherwise be impossible. The participating nations and the International Association of Meteorology and Atmospheric Physics have established working groups to design meteorological programmes to be integrated with the oceanographic Expeditions. An essentially international programme for Meteorology was drawn up by the U.S. Working Group for Meteorology after a meeting in October last. This as well as the programmes and suggestions from other countries were discussed at a meeting of the Meteorological Representatives of the Expedition countries held in Bombay from 18th - 20th July, 1961 and a co-ordinated meteorological programme was drawn up. Essentially the programme consists of :-

2.4.1 Increased efforts by the countries concerned to collect better and more extensive meteorological data for the ocean areas as well as adjoining land areas by establishing more land observatories, specially equipped ships for observations over the sea, use of improved instruments and methods and techniques of observation.
2.4.2 The establishment of an International Meteorological Centre in the Indian Ocean, to make immediate and practical use of the vast amount of data flowing from the Expedition ships, island and shore stations for issue of appropriate forecasts for expedition operations, to analyze and process them, to conduct research on them and to evolve forecasting techniques, and to train selected meteorological personnel of the countries of the region in these techniques.

2.5 The observational programme will be carried out with the resources of the countries in the Indian Ocean area, supplemented by assistance in the form of observational equipment etc., by interested Scientific Organizations in the developed countries.

2.6 The assistance of the Special Fund is required for the establishment of an International Meteorological Centre.

3. PROJECT

3.1 Description

3.1.1 The I.M.C. to be set up with the assistance of the Special Fund will have the following functions:

3.1.1.1 Provide special training for expedition meteorological observers and technicians and maintain strict quality control over the observations during the expedition period.

3.1.1.2 Forecast weather and sea conditions for all expedition ships for these operations.

3.1.1.3 Be a base for the Expedition's meteorological research; collect and process with electronic computer (wherever necessary) all meteorological observations made in the Indian Ocean region from July '62 through June '64.

3.1.1.4 Train students in modern operational and research techniques in Meteorology.

3.1.1.5 Maintain effective liaison with representatives of the other disciplines in the International Indian Ocean Expedition and with the various meteorological agencies.

3.1.2 These will be expanded in the final request to be submitted by the Indian Government.
3.2 Duration of the Project

3.2.1 The International Meteorological Centre will be established in the Spring of 1962, begin full operation on 1 July 1962, cease full operation on 30 June 1964 and after completing data processing, finally close down in December 1964.

3.3 Location of the Project

3.3.1 It is understood that the Government of India and Pakistan have plans of establishing Institutes of Tropical Meteorology at Poona and Karachi and are deeply interested in the development of programmes akin to those envisaged in the I.M.C.

3.3.2 The Indian National Committee for Oceanographic Research have welcomed the idea of co-operative international study and research in Meteorology and have suggested that the proposed centre might be established at Bombay. In the Regional Meteorological Office, Bombay, there already exist good facilities for forecasting, communication and office accommodation. In view of these and many other facilities which exist in Bombay, the meeting of the Meteorological Representatives held at Bombay accepted the suggestion to locate the International Meteorological Centre at the Meteorological Office, Colaba, Bombay.

3.4 Requirements of the I.M.C.

3.4.1 Staff

<table>
<thead>
<tr>
<th></th>
<th>Director</th>
<th>Division Chiefs</th>
<th>Senior Technicians</th>
<th>Research Meteorologist cum Forecasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td></td>
<td></td>
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<td>(c)</td>
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<td></td>
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<tr>
<td>(d)</td>
<td></td>
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</table>

(Total (a) to (d) International staff 19)

<table>
<thead>
<tr>
<th></th>
<th>Administrative Staff</th>
<th>Scientific and Technical Assistants</th>
<th>Messenger staff</th>
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</thead>
<tbody>
<tr>
<td>(e)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Total number of Local staff (e) to (g) 51)

Total (a) to (g) 70

3.4.2 Accommodation:

To accommodate the staff, communication equipment, the laboratories, the dark room, the seminar room, the computer and the card storage room etc., a floor area of 7000 sq. ft. is required. The India Meteorological Department proposes to make available the required space.
(a) by rearranging and economising existing accommodation in the Colaba Observatory and the Regional Met. Centre (both located in the same compound),

(b) by putting up prefabricated temporary structures on the roof of the Regional Centre building

and

(c) by transferring some of the space needed by the I.M.C. for training and material storage purposes to Santracruz and Poona Met. Offices respectively.

**Furniture:** Approximate cost 22,000 U.S. dollars.

Modifications of the existing accommodation like Air conditioning of some of the rooms including the Electronic Computer room, etc.

Approximate cost: 35,000 U.S. dollars.

### 3.4.3 Equipment:

(a) Electronic computer, auxiliary equipment and maintenance.
   Approximate cost: 262,000 U.S. dollars.

(b) Communication, office and other equipment.
   Approximate cost: 1,371,250 U.S. dollars.

(c) Stationery, punch card and Photo supplies.
   Approximate cost: 15,000 U.S. dollars.

### 3.4.4 Fellowships: 12

Approximate cost: 90,000 U.S. dollars.
3.5 Financing

3.5.1

<table>
<thead>
<tr>
<th></th>
<th>Amounts in U.S. Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equivalent Local</td>
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<tr>
<td>Staff (cf. 3.4.1)</td>
<td>160,000</td>
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<tr>
<td>Travel cost including shipping</td>
<td></td>
</tr>
<tr>
<td>Accommodation (cf. 3.4.2)</td>
<td>45,000</td>
</tr>
<tr>
<td>Furniture (cf. 3.4.2)</td>
<td>22,000</td>
</tr>
<tr>
<td>Modifications like Air Conditioning etc. (cf. 3.4.2)</td>
<td>5,000</td>
</tr>
<tr>
<td>Equipment (cf. 3.4.3 (a &amp; b))</td>
<td>1,633,000</td>
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<tr>
<td>Supplies (cf. 3.4.3(c))</td>
<td>3,000</td>
</tr>
<tr>
<td>Fellowships (cf. 3.4.4)</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>235,000</td>
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<tr>
<td>Leave sickness and other contingencies 20%</td>
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<tr>
<td><strong>Grand Total</strong></td>
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</tbody>
</table>

3.5.2 The contribution India is likely to make for the establishment of the I.M.C. at Bombay is indicated above. The remainder has to be met either from the Special Fund or contributed by other agencies. If this aid is not forthcoming, India will have to reconsider the set up for the proposed I.M.C. at Bombay.

4. CONCLUSION

The Government of India requests the Special Fund to support the Meteorological Research Programme as described in the preceding paragraphs and to sanction for this purpose the assistance in the form of experts and equipment, details of which have been given in para 3.5.1 above. The total cost of the assistance required from the Special Fund is 2,787,600 U.S. dollars.