the Caribbean Meteorological Institute a UNDP/WMO project for the improvement of Caribbean Meteorological Services

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For more than two years the Commonwealth countries in the Caribbean, the World Meteorological Organization and the United Nations Development Programme worked together in the formulation of a project proposal which would be aimed at obtaining United Nations Development Programme financing and support for a project that would provide for the improvement of the meteorological services available to the Commonwealth Caribbean countries.

The dissolution of the West Indies Federation in 1962 led almost inevitably to the separation of what was once a unified Federal Meteorological Service, into fragments of national services. As a result, many of the various facilities that the participating countries had formerly been able to call upon now no longer existed. Central acquisition of meteorological instruments was no longer practicable. A central service for the collection and dissemination of climatological information no longer existed. Training facilities, especially for the smaller participants with no existing meteorological service, simply did not exist except insofar as they were able to make bilateral arrangements with another of the countries that was in a position to assist. In a similar manner, many of the other centralized meteorological facilities that had existed became somewhat less effective.

As a result, the status of meteorology except as applied to aviation and hurricanes in the area began to decline, and even though it was recognized that this was undesirable there appeared that little could be done without outside assistance. At this point, discussions between the Director General of the Caribbean Meteorological Service, acting on behalf of the governments which made up the loosely organized service, the World Meteorological Organization and the United Nations Development Programme, paved the way for the eventual drafting of a project proposal for a Special Fund project which would help to remedy the situation. Over a few years' time there were evaluations of the proposal, suggestions for modifications followed by further discussion until a final draft was prepared and submitted to the United Nations in June 1965. One year later, in June 1966, the United Nations gave its approval to the proposal and work was begun on the implementation of the project.

The World Meteorological Organization staff for the project was to consist of a Project Manager and five Technical Experts. The Project Manager assumed duties in February 1967 and the project was officially declared operational on 23 August 1967. The Technical Experts arrived in Barbados between September 1967 and January 1968.

The overall aims of the project may best be described by summarizing from the purpose and description section from the Plan of Operation which was signed by all the participants.

1. Purpose and description

The purpose of the project is to assist the Governments in strengthening and improving the meteorological services to meet the particular needs of the region. The project specifically calls for:

- (a) the establishment of a Regional Meteorological Institute in Barbados with the following units:
 - (I) a training unit which during the period of the project will train approximately 160 meteorological personnel at different levels and in different specialized fields;
 - (II) an equipment calibration, repair and maintenance unit;
 - (III) a research unit intended to develop a capability for undertaking independent basic and applied research on hurricane tracking and warning, hydrometeorology, agrometeorology and related studies of direct practical value to the participating Governments; and to co-operate in investigations carried out by universities and other research organizations;
 - (IV) a data processing unit which will receive, process and publish meteorological data, maps and other relevant information based upon the data collected in the participating countries;
- (b) the establishment of a weather radar network consisting of five units located strategically in Antigua, Barbados, Guyana, Jamaica and Trinidad and Tobago. These units will form, in co-ordination with existing installations, a continuous radar fence and provide an essential facility for the

study of hurricanes and for development of effective warning techniques;

- (c) the establishment of seventeen agrometeorological stations distributed over the participating countries.

Five areas of meteorology: aerology, climatology, agrometeorology, hydrometeorology and instrumentation, are represented by five experts from the United Kingdom, the United States and the Philippines. The Director-General of the Caribbean Meteorological Service serves as Project Co-Manager.

A fine building, the main entrance shown in Fig. 1, was specially designed and built for the Caribbean Meteorological Institute which is located in the parish of St. James on the western coast of Barbados. Situated within a mile of the new campus of the University of the West Indies at Cave Hill, the Institute is in a splendid position to share facilities with the University.

2. Implementation of the program

The initial task of each expert has been to determine the status of his specialty in the territories being served by the Institute. This has also included the determination and acquisition of the necessary instrumentation and equipment.

3. The training program

Training at the Institute covers each branch of meteorology for which there appears to be a requirement in the area. Initially, emphasis has been placed upon the training courses for forecasters (Class II Van Mieghem) and for meteorological assistants (Class IV). Classes for both categories began on 25 March. Training courses in the other areas of meteorology will be formulated as these needs are crystalized. The Aerologist is in charge of the training program.

4. Equipment calibration, repair and maintenance unit

The Equipment Calibration, Repair and Maintenance Unit is under the supervision of the Electronics Equipment Expert. This section will be responsible for all conventional meteorological instrumentation as well as for five S-Band radars, an APT system, radio facsimile receivers and other ancillary electronic equipment. Spares of more common instruments will be available at the Institute so as to cut to a minimum the time when any of the stations in the area will be without instruments in the case of repairs or replacement becoming necessary.

5. Research unit

The research program at the Institute must initially consist of co-operation with other organizations conducting research in the Caribbean. Ultimately appropriate in-house research will be generated. Such research must be strongly orientated towards the area of applied meteorology. Recognizable and tangible returns

FIG. 1. The main entrance of the Caribbean Meteorological Institute located in the parish of St. James on the west coast of Barbados.

should be forthcoming from such research if financial support of the Institute is to be assured in the future.

Basic research will be encouraged through the co-operation with other interested groups. Several Universities and organizations have well-established meteorological research programs on Barbados (see the other articles in this issue of the BULLETIN). It is planned that the Institute will function as a base of operation for projects of this type, and, in addition, will serve as a base for siting instrumentation. The Institute staff will be free, as time permits, to participate actively in these projects. Wherever applicable the results of such research will be actively incorporated into the Institute training program and applied in the field.

6. Data processing unit

There is provision in the project for a small data processing unit. The funds provided are sufficient only to permit the acquisition of punch card facilities. Even this modest addition will, however, greatly increase the broad scale climatological program in the area, which, as was indicated above, has all but disappeared. Data from all of the participating nations will be processed and published in a form that will be designed to meet the needs of the area.

The Data Processing Unit is under supervision of the Institute climatologist but will serve the requirements of all of the staff members as well as helping in providing service to all of the participating governments.

It will be late 1968 before the equipment will be installed and the unit can begin to function. In the meantime, plans and programs for the data processing unit are being formulated so as to be ready for the equipment when it arrives.

7. The library

It is planned that the Institute library will, in due course, become one of the leading libraries in me-

teology and related fields in the Caribbean area. It will have a modest beginning, with a number of books and various serial publications being provided by the Headquarters of the Caribbean Meteorological Service in Trinidad. In addition, several of the experts made arrangements, before reporting for duty, to have various items relating to their specialty provided for the library. As work gets underway, additional volumes and periodicals, which are considered necessary, will be obtained.

The library will be required to serve the various units of the Institute, training, research, and instrumentation and, in addition, the fields of meteorology, climatology, hydrometeorology, agricultural meteorology and any other specialty for which the need may arise.

8. Agrometeorology

In addition to the specific units of the Institute which have been described above, there is responsibility in several specialized fields of meteorology.

Agriculture is the foremost source of income in the Caribbean and adjacent territories and significant research in tropical agriculture has been accomplished in this region (e.g., by Imperial College of Tropical Agriculture now the Department of Agriculture of the University of the West Indies, the Sugar Growers Association, the Government Departments of Agriculture of the various countries, etc.). Much must be done on the part of the meteorologist to acquaint himself with this work. In turn, the meteorologist has methodology and techniques to offer the agriculturist. The aim of the Institute will be to encourage such mutual exchange of knowledge.

9. Climatology

Since 1960, resources available to the Caribbean Meteorological Service were inadequate to support comprehensive climatological summaries. The Institute is in a position to remedy this and to direct attention to the many areas in which applied climatology is of potential use.

It is planned that the Institute will publish climatological data. The format has not yet been decided. This will evolve from the experts' surveys and their evaluation of data requirements in the area.

10. Hydrometeorology

As in the case of agrometeorology, significant work has been done in hydrology (e.g., in Guyana and Surinam). However, a wide diversity of problems exist, ranging from water excess to acute water deficiency. Specific studies and tools (e.g., radar) will be brought to bear on these problems.

11. Equipment supplied to the project

Equipment and instrumentation provided by the United Nations Development Programme will be installed both at the Institute and in the various participating coun-

tries. The five meteorological radars will be installed in Guyana, Trinidad, at the Institute in Barbados, Antigua and Jamaica. These radars will be used for the following depending upon the needs of the respective areas: as an aid in weather prediction, hurricane tracking, as an additional tool for providing meteorological service for air navigation, delineation and tracking of precipitation areas, quantitative estimates of rainfall amounts, relative intensities and eventually flood forecasting.

Nearly 20 agrometeorological stations, including the one which will be installed at the Institute, will be provided to the participating governments. All of the basic agrometeorological equipment will be installed to make measurements of temperature, humidity, rainfall intensity, duration of sunshine, solar radiation, soil temperature, evaporation and wind direction and speed, and possibly soil moisture. Installation of these stations will take place over the next years or so.

At the Institute, there has been provision for radar, radio facsimile and APT equipment. A complete principal agrometeorological station will include all equipment at the other agrometeorological stations together with additional instruments.

It is planned that the Institute will act as a central instrument repair and calibration depot and it will maintain spares of the various types of equipment in the field so that in case of an emergency these can be dispatched rapidly and there need not be long delays while equipment is replaced or repaired.

12. Fellowships

The United Nations Development Programme is providing funds in the project for a 9 man-years of fellowships which are to be awarded to West Indians. At the completion of their training it is intended that these fellows will join the staff at the Institute. The scientists and technicians so trained will replace the World Meteorological Organization experts and continue the work of the Institute under the overall direction of the Caribbean Meteorological Council.

13. Conclusion

As may be seen from the foregoing, the plans for the Caribbean Meteorological Institute are forward-looking and when implemented, should provide a great surge forward in the status of meteorology throughout the Caribbean.

During the initial stages of development of the project considerable emphasis will be placed upon the areas of applied meteorology. Such applications must extend beyond those areas, such as aviation forecasting, which are the traditional preserve of the meteorologist to include all aspects of human endeavor which might benefit from the application of meteorological principles. Such an endeavor depends critically upon the contributions and co-operation of not only the Institute staff but all those areas where there is the potential use of meteorological knowledge.

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