U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
ROCKVILLE, MD. 20852

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IN REPLY REFER TO: AE

Dr. Jule G. Charney
Chairman, US Committee for
Global Atmospheric Research Program
National Academy of Sciences
2101 Constitution Avenue, NW
Washington, D.C. 20418

Dear Jule:

Following up our conversations on November 17, I thought it would be appropriate to provide you with the substance of my remarks. At the Federal Committee for Meteorological Services and Supporting Research meeting on November 12, 1969, extensive discussions took place on GARP. The Committee established some broad guidelines for the scope of GARP that would be considered by the U.S. government. In addition, the Federal Committee authorized me, along with the invited participants from other agencies who are included in the GARP Committee activities, to discuss U.S. participation in GARP with a view towards reaching an agreement with the Academy. The guidelines that were provided by the Federal Committee are quite general in order to expedite these discussions.

The Federal Committee also discussed the time frame for the work ahead of us. The critical factor in this regard is the GARP International meeting now scheduled for the middle of March 1970. Taking into account the normal requirements for decision within the government, the Federal Committee felt that they should meet again approximately in the middle of January, to make decisions based upon the recommendations of the Federal Committee sub-group in conjunction with the Academy which in turn would be forwarded to the Secretary of Commerce. This means that we should have recommendations completed before Christmas.

The Federal Committee considered GARP in three parts: (1) mathematical modeling and observing simulation studies; (2) global observations; and (3) field experiments. The mathematical modeling

and observing simulation studies were considered vital elements by the Federal Committee. The Committee agreed that there was a need for more scientists and supporting personnel and that the requirement for ultra high speed computational capability here in the U.S. is valid in order to meet the objectives of the overall World Weather Program. Because of large cost of the ultra high speed computer, the Committee felt that there was a need for additional study concerning how to arrange for this computational capability at more than one location. Certain configurations were discussed based upon principles of time-sharing or independent computer complexes. Consequently, the Committee set up a study group (members from DOC, NSF, DOD, and probably NASA) which is to provide a preliminary view on this matter in the first part of January and a more complete view in the spring.

With regard to global observations, the Committee focused primarily on the systems test proposed by the Academy and gave only very limited consideration to the global experiment that has been proposed by the Joint Organizing Committee. The Committee took note of the outstanding success of the NIMBUS III satellite which occurred since the issuance of the Blue Book and further noted the fact that a vertical sounding capability is now scheduled to be incorporated into the operational satellite system as part of the World Weather Watch in late 1971 or early 1972. All of us who have been close to GARP have recognized that when we discussed a global experiment we were talking about what needed to be added to the existing WWW at the time of the experiment to acquire the global observations needed for the research on the large-scale circulation of the atmosphere. The basic difference between now and a few years ago is that the WWW has moved forward quite rapidly and that the add-on as a result of the NIMBUS III and ATS successes may turn out to be much less than we had thought some time ago.

A review of the planned activities indicates that a systems test can be carried out as the Blue Book proposed at a very modest cost. The test would utilize an ITOS satellite with a sounder, NIMBUS F (NCAR has proposed a thousand balloon experiment for NIMBUS F), SMS satellite (prototype GOES - one of which could conceivably have a vertical sounder on it), and drifting or small moored buoys (although the FY-71 budgeting process might have an impact on the schedule of these elements, they have been planned

to be in existence by 1973). As I see it, the systems test with the above elements would be the same as you propose except (a) there would be no larger buoys, (b) location of the test would have to be moved to the Eastern Pacific or the Atlantic to take advantage of the prototype SMS satellite and (c) the availability of a vertical sounder on the SMS would not be guaranteed.

I believe on global observations we must come to grips with the following points:

1. Whether the above systems test would meet the specifications adequately as outlined in the Blue Book?

2. Whether we should attempt to internationalize the systems test?

3. A precise recommendation should be made on the balloon experiment proposed by NCAR on NIMBUS F and

4. The exact role we see the systems test playing in the decision process on the global experiment.

Of the three areas in GARP, the Federal Committee had their greatest difficulty in coming to grips with guidelines for the field experiments. As you know, the entire array of experiments proposed have relatively high costs associated with them and at the present time they are not defined in great detail. The Blue Book makes it clear that the highest priority experiments are those associated with the tropics. The Committee felt that the national program on Clear Air Turbulence could take into account the requirements of GARP as we have discussed for some time. The tropical experiment you proposed in the Central Pacific is quite high in cost partly due to the fact that no geostationary satellite is planned for the area and partly because the logistical cost for operating in that area is high. Therefore, the Committee wondered whether it might not be possible to carry out a tropical experiment in the Eastern Pacific or the Atlantic where geostationary satellites are presently planned and where logistical costs could be reduced. There was also a strong feeling that in order to maintain the momentum on GARP there was a need for a reasonably early experiment, say in the 1973 or 1974 time frame, and that the experiment needed to be further defined than at the present time. This latter point is, of course, re-inforced by the views of the Joint Organizing Committee at its Third Meeting in October. Hopefully, as a result of the forthcoming meeting at

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Miami, we can get a better specification of the experiment. It seems to me that if we could agree on a number of principles before the Miami meeting, we could arrive at an experiment which is scientifically viable and operationally feasible in the international arena. The principles I would suggest as a starting point are:

1. An early international experiment is required to maintain momentum.

2. The experiment should focus on a few scientific questions concerning the tropics but equally important provide the information required to formulate a more comprehensive experiment in the future.

3. Should take advantage of the type of facilities available or planned (planned geostationary satellites and more emphasis on ships which, in my view, are available internationally more than island locations).

4. The equipment specifications (sensors through data recording and processing) should not be so stringent to eliminate nations from participating and

5. The degree of centralized control should be acceptable in the international arena (greater than in the past international experiments but not to the degree that we have sometimes considered as necessary.)

Finally we should consider the desirability of carrying out the tropical experiment in conjunction with the systems test so that the data from the systems test provides us with synoptic data from a broader area.

I should like to propose that you name one or two people from the Academy to work with Dick Hallgren on the government side in preparing a program document on GARP. I believe this document must be completed by about December 20.

I hope that the above is helpful as we move forward under a difficult time schedule.

Best regards,

Robert M. White