Scientific Development in Africa

Judging from the responses I have received, my article "A scientific safari to Africa" (7 Aug. 1970, p. 554) did what it was supposed to do. It succeeded in arousing interest in the need for increased action in scientific development in Africa and encouraging more direct contact between African and American organizations and individuals in our respective scientific communities.

The article also brought to light what various U.S. universities are already accomplishing in the way of a wide range of cooperative activities with counterpart African institutions and African scientists. Some of the universities which have informed me of their involvement in such cooperation are Columbia, the University of Kansas, the University of California at Los Angeles, Oklahoma State University, California Institute of Technology, Cornell, Syracuse, New York State College of Agriculture, the University of Illinois, the University of Pittsburgh, the University of Miami, and New York University. In addition, many other universities have written to explain their plans for or interest in pursuing cooperative activities. I have also read a very interesting report to the Ford Foundation prepared by John Ross of M.I.T., covering his and John Hunt's visits to Ghana, Kenya, and Ethiopia. In these countries they visited universities, technical institutes, and Ford Foundation programs where they gave lectures and discussed problems with staff and students.

I have received a heartening number of inquiries from individuals and organizations pertaining to such matters as working or teaching in Africa, the feasibility of establishing a technical purchasing service to obtain spare parts for scientific instruments at institutions in developing countries, and ways of cooperating in the establishment of documentation centers. I have supplied to each correspondent whatever pertinent information was available and suggested individuals and organizations, both in Africa and the United States, that are likely sources of further information.

Several national societies, including the American Medical Association, the American Institute of Physics, the American Association of Physics Teachers, the American Institute of Chemical Engineers, and the American Physical Society, have generously provided subscriptions to scientific, technical and medical journals to African institutions.

Many individual scientists have also made meaningful contributions. For example, William R. Atkinson of Boulder, Colorado, has purchased, at his own expense, a subscription to *Science* for an African university. Also the efforts of William T. Golden were instrumental in securing private foundation funding for subscriptions to *Science* for nine African institutions.

As I indicated in the article, U.S. government agencies are operating under very stringent budgetary limitations; however, it is encouraging to note that Glenn E. Schweitzer, of the U.S. Agency for International Development (AID), recently carried out a 3-week visit to Ethiopia and East Africa which included the exploration of suggestions contained in my article. In addition, AID is, in concert with the National Academy of Sciences, investigating the possibility of sponsoring workshops in several African countries on the problems of science and technology. This is being undertaken in addition to other scientific development programs which AID is presently carrying out in Africa and which hopefully may be expanded.

With respect to my own agency, I am pleased to note that the Atomic Energy Commission's Brookhaven and Oak Ridge National Laboratories are providing, under a loan arrangement, a neutron pulse generator, a scintillation spectrometer, two rate meters, and two decade scalers to Ethiopia's Haile Selassie I University.

Henry J. Gomberg, Director of the AEC's Puerto Rico Nuclear Center (PRNC), recently visited the United Kingdom's Tropical Products Institute in London, which is carrying out research and development in support of developing countries. The institute is keenly interested in PRNC's experience in applying nuclear energy to the solution of problems in the tropics, one of which is the control of parasitic diseases. In this context, Jorge Chiriboga, of PRNC, has visited Ethiopia and Tanzania to study schistosomiasis. PRNC has had much experience and success in developing programs for countries in Latin America, and we believe that this experience can be readily transferred to the African situation.

I was especially pleased to receive distinguished visitors from some of the countries we toured on our scientific safari. Among them, Alexander Kwapong, Vice Chancellor of the University of Ghana, told me about a series of five lectures that Clark Kerr gave at the University of Ghana during March 1970 and how well received they were. I also had a very interesting discussion with a Tunisian delegation headed by Ali El Hili, Director of Higher Education and Science Research. Also included in the party, all from the University of Tunis, were Mohammed Skouri, Dean of the College of Agriculture; Mongi Chemli, Dean of the College of Education; and Mokhtar Latiri, Dean of the College of Engineering.

Taken together, the responses that I have received to my article have strongly reinforced my belief in the need for a focal point in the United States for promoting and coordinating cooperative activities designed to further scientific advancement in the developing nations. One of the functions of such an organization would be to serve as a clearinghouse for requests for assistance and information regarding available sources of all types of aid, whether governmental or private.

Finally, it is clear that one visit and one article are only a small contribution toward bringing to bear the full weight of modern science and technology on scientific development in Africa. We need more knowledge and, most importantly, more cooperative effort. I hope that my experience will be reviewed as an encouragement for further action by those who read my article.

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La Porte Anomaly

Through use of a rather tenuous reference to the recent article by Landsberg (*1*), Holzman (Letters, 5 Mar.) has reissued his previously published views on the La Porte precipitation anomaly (*2*). A reply rebutting these same points was published in the *Bulletin of the American Meteorological Society* (*3*). It appears wasteful to re-

peat these specific rebuttals. However, it is somewhat surprising that the Holzman letter contains no attempt to answer any of the questions or points raised in the published reply (*3*), and which are so pertinent to assessment of the credibility of his findings and conclusions. For example, how many synoptic weather situations were investigated by Holzman and Thom, and how were they able to determine reliably air trajectories into convective storms with the relatively sparse synoptic data in Illinois and Indiana?

I also recommend that interested readers examine the recent article by Hidore (*4*) which deals with a thorough study of the streamflow data from river basins encompassing the La Porte area. This independent study verifies the existence of the La Porte rainfall increase through increases in runoff that are highly correlated with the La Porte rainfall. Whether this streamflow anomaly can be shown to be "spurious, statistically invalid, and physically unacceptable" (Holzman's terms for the rainfall anomaly) is an interesting question. Data on crop hail insurance loss in the La Porte area also corroborated the increase in hail-day frequencies shown at the La Porte weather station (*3*). Any reader interested in the subject of inadvertent urban modification of precipitation is encouraged to review the longer article by Holzman (*2*), my reply (*3*), and other pertinent publications (*5–8*).

Several major research proposals have been funded as a result of the recognition engendered by the La Porte results and the subsequent interest in inadvertent precipitation modification. For instance, the Illinois State Water Survey was awarded a 2-year grant to make climatological-statistical studies of precipitation conditions at eight major American cities. Furthermore, four atmospheric science groups (Argonne National Laboratory, University of Chicago, Illinois State Water Survey, and University of Wyoming) have joined together to plan a comprehensive 5-year field project to study urban effects on precipitation in the St. Louis area where downwind precipitation increases also exist. This funded project begins operations in 1971. Thus, several sizable funded proposals have been examined and approved by a wide variety of atmospheric scientists and funding agencies. Their judgment as to the validity of the results and the desirability of our studies of this phenomena is most gratifying and indicative of the fact that the La Porte precipitation anomaly is not a fallacy in the minds of most knowledgeable scientists.

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. . . It is possible that the La Porte anomaly is not real, but there has been considerable work done by some competent researchers that suggests that it is real. The fact that researchers have supported both sides of the issue suggests that the problem has not been resolved. A very important environmental problem is under investigation. If the anomaly is real, there may be far wider implications than is apparent in this individual case. A major problem in investigating this particular phenomenon is the difficulty in isolating the relevant variables and a lack of data with which to work. Unfortunately, however, analysis is limited to the data available.

Since the station data are suspect, perhaps the question can be resolved by using other environmental variables. A change of the magnitude suggested in the data should be exhibited in other aspects of the environment. If other avenues of testing the anomaly can be pursued, such as growth rates of trees or other ecological variables, they should be followed, whether aided by federal funds or not. It is through continued investigation from a variety of approaches that the question of the validity of the La Porte anomaly will be resolved. . . . A study is being carried on by William C. Ashby of Southern Illinois University involving a tree-ring analysis of white oak in the area of La Porte. It must be remembered, however, that in view of the complexity of interrelationships between environmental variables, changes in other variables may not be nearly so great as those in the precipitation.

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