

Letters

Glamorous Road to Space

Recently I received a memo from the National Aeronautics and Space Administration which was addressed to life scientists to solicit proposals for experiments to be conducted on upcoming space shots. I wish to protest against a system of research funding which permits one agency, NASA, to solicit extremely expensive, risky, and low-yield research at a time when other agencies, such as NIH, are having difficulty funding any new research projects in the basic sciences.

I am personally involved in two ways. First, for 10 years I have had a series of small grants to support my research and the research of about 30 students. Now, because of the critical shortage of funds, I foresee the possibility of this work being cut short, also the possibility that many young men, my students among them, will have little chance these days of being able to start productive research careers. Secondly, I have some personal knowledge of the type of project NASA is seeking to support in the projected series of Biosatellite missions since I had NASA support at one time and came to know something of the projects and the men involved. Each of the Biosatellite projects is enormously expensive, primarily because of the problems in developing life-support and data-telemetering systems. The engineering of these necessary but scientifically tangential systems can cost \$1 million or more. Even when the scientific aspects of a study can be financed on a quite modest scale, the total cost can be quite immodest. I know also that there is an inevitable gimmicky aspect to these projects. The biological studies that are conducted in space can be simulated in a normal earth-bound laboratory; at least the same experimental variables are available for manipulation. Radiation in space can be readily simulated. Weightlessness cannot be sustained except in space, of course, but *increased* weight can be easily achieved in a centrifuge. Yet the scientists who would spend \$1

million to determine the effects of decreased weight do not usually bother to install a simple centrifuge in their labs to determine whether increased weight has any effect upon the phenomena they study.

A space shot has glamour. The space scientist can have a "first" almost regardless of what he undertakes. His data are almost guaranteed publication because journals, too, play the glamour game. For myself, I have no intention of submitting a proposal for the Biosatellite program, even though my research could be easily extended to the program. There are more productive things to do with my limited funds and time. I shall miss out on the glamour, and have to risk papers being published on their merit, rather than finding automatic publication because they have the aura of the space age. I shall content myself with traditional research in one of the traditional basic sciences. Perhaps 10 or 20 or 50 young scientists could do likewise if it were possible to reallocate the funds that will probably serve primarily to give some scientist a little glamour.

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Amazonian Fauna in Danger

At a wildlife conference in Colombia some months ago biologists were greatly concerned over the rapid decimation of a number of Amazonian species. Many are involved: jungle cats, caiman crocodiles, big turtles, the unique New World monkeys, otters, peccaries, amphibians, and many tropical fishes. The native Indians who hunt the animals were reported to be penetrating deeper and deeper into the forest to secure their specimens which they sold daily to the honorary U.S. Consul at Leticia, Colombia, and he, in turn, shipped out great quantities of animals without any regard for their increasing scarcity.

A 1-percent tax on the very low local value of each shipment is collected on those exports which are declared at customs. The Colombian Ministry of Agriculture figures show that about 200,000 "skins" of vertebrate species are shipped from Leticia to Bogota and Barranquilla each year. Tiny monkeys are crowded into cages. One Colombian biologist states that even on the first leg of the journey to Bogota, a high percentage die *before* shipment to Miami. It was also reported that over 400 monkeys, mostly howlers, were killed in order that a medical research team from a U.S. university could study the aortas, and that this was apparently the only use made of their carcasses. These stories may have grown in the telling, but the conferees did point out that the fauna of Colombia was being decimated by the U.S., in spite of our own well-recognized principles of fish and game management. Why, they asked, should the U.S. encourage exploitation of South American fauna when it does not tolerate such careless harvest of its own? They viewed this as another case of "imperialism," of our taking advantage of their less industrialized society.

Several Colombian biologists suggested that hunting be completely stopped around Leticia until an inventory of numbers and careful ecological studies can be made by the fish and game personnel. In reply to this suggestion, a reporter for *El Tiempo* of Bogota stated that illegal traffic would then simply be diverted to competitive trading posts such as those at Manaus, Brazil, and Iquitos, Peru, where the trade is, if anything, worse than at Leticia. It would seem that the drain of fauna might be stopped if the countries of the Amazon basin were to act as a unit in sealing off the trade while the endangered species can still make a comeback.

In summary, my colleagues in Colombia suggested (i) adequate study of each of the endangered species and their ecology such as was given to the guanay cormorants on the bird islands off Peru; (ii) action by the republics of the Amazon basin, perhaps through the Organization of American States or the United Nations, to enforce a ban on the capture and sale of endangered species; and (iii) U.S. congressional legislation to forbid importation of endangered species similar to the Migratory Bird Treaty Act.

It is to be hoped that the plight, not only of the Colombian, but the entire Amazonian fauna will merit a large