

INSTITUTE OF CURRENT WORLD AFFAIRS

DRP - 1

4284 Hemlock Road
Branchport, NY 14418

January 18, 1986

Flight Without Wings

Peter Martin
INSTITUTE OF CURRENT WORLD AFFAIRS
4 West Wheelock Street
Hanover, NH. 03755

Dear Peter:

I open my first report with a quote from "Forest and the Sea", by Marston Bates, 1960.

"Man is a land animal; it seems probable that much of this evolution took place in the tropical forest, or in regions where the forest was giving way to open grasslands. Yet it seems to me that in some ways modern, scientific man has learned to cope with the sea better than with the forest....In my [tropical rain] forest I was always confined to the trunks of the trees, I had no way of getting out into "interarboreal space"--I could be a poor sort of a monkey, but I had no way of being a bird."

I just returned from Los Angeles where besides celebrating the holidays with friends and relatives, I met with John Williams who is designing the Automated Web for Canopy Exploration. We spent several hours going over details such as how much weight is going to be lifted (details about of my previous biological work as well as AWCE can be found in the November 1984 SCIENTIFIC AMERICAN) and the length of the stainless steel cable spans and etc.

I plan on going to Costa Rica in February to start AWCE but have been tempted to delay. However, GEO television of the U.S. called, one of their subjects was canceled, and asked in near panic, "Could I squeeze into my busy schedule a quick, early February trip to Costa Rica?" (the program will air this March on commercial television.)

AWCE will be located in beautiful, virgin jungle adjacent to Costa Rica's Braulio Carrillo National Park. The forest has waterfalls, exotic birds, colorful flowers, and a wealth of treetop life. The property, called Rara Avis, is owned by Amos Bien who has just agreed to lease a portion of it to the Institute for constructing my canopy research station. I will

Donald Perry is an Institute Fellow who is developing a new system of access for conducting research in the tops of jungle trees.

make arrangements to have a small house built when I'm there in February.

Rara Avis rests in the misty foothills of the volcanic spine of Central America on Costa Rica's northern Caribbean slope. The site is quite isolated since it is at the end of a several kilometer long unimproved trail that becomes knee deep in mud during the rainy season (June-December). Isolation has kept the foothills blanketed in virgin jungle and nearly untouched by civilization. The pristine nature of the area is attested to by crystal clear streams -- now a rarity in Central America where logging and agriculture give way to heavy erosion.

With all the attention that is given to tropical forests these days, one would expect that they are being effectively studied, especially since it is widely predicted that most tropical forests will disappear before the year 2000 as a direct result of expanding human populations. Yet over the eleven years that I have been inventing and refining ways to climb into the jungle canopy, little has changed in the way tropical research is conducted. Nearly all tropical biologists work with field glasses from the ground, where they are virtual prisoners of the dark, humid, forest floor -- multiple layers of leaves effectively conceal the canopy from view. It is the most important forest region that is also the home of about two thirds of all jungle life.

Even biologists who have mastered tree climbing methods find it very difficult and hazardous to study the aerial jungle. Tree tops conceal a battery of potentially lethal obstacles. Trunks and limbs house a collection of poisonous and noxious animals such as scorpions, centipedes, ants, wasps, spiders, and snakes. Many of these blend into surrounding flora and their presence is discovered too late. A climber's nerves are tested further by weak limbs and powerful storms that often uproot trees, and lightning can also be cause for concern. It is no wonder the canopy is the least studied habitat of life on earth.

Though the canopy has played an integral part in the evolution of terrestrial life, it has been virtually ignored by the academic world, and in turn few people know of its existence. In *LIFE AT THE TOP*, my canopy exploration book (to be published in August 1986 by Simon and Schuster of New York), I explain how jungle tree tops have been a source of new biological inventions such as flight in birds, pterodactyls, insects, and bats; the evolution of "warm bloodedness"; and the fundamental blue print of human intelligence. This dynamic evolutionary factory is still at work, forging animals into unique and intelligent forms -- jungle tree tops have accumulated more living species of life than any other habitat.

Over the next few years at Rara Avis I plan to raise the veil of ignorance enshrouding canopy life. John Williams, an engineer, and I have designed an exciting radio controlled chair-lift that will transform scientists into "arboreal astronauts." The new system uses the precipitous terrain of Rara Avis to its best advantage -- trees on ridges will support a network of stainless steel cables spanning a small valley. Eventually

researchers will be able to soar over twenty acres of forest roof and down into dense layers of vegetation to investigate the jewels of canopy life. Hand-held controls will determine position and speed of the chairlift giving riders a freedom of movement comparable to flying animals. The system will make it possible for all scientists to share in the exploration of tree top life. Complementing this canopy vehicle will be a specially designed aerial laboratory, housing up to three researchers, for day and night studies of canopy communities.

My aerial jungle research began in 1974 while I was a graduate student of biology at California State University at Northridge. There I developed the first simple and inexpensive method for climbing jungle trees. The method has since been adopted by a handful of intrepid biologists worldwide who are actively exploring the planet's "last biotic frontier." In 1978, while working on my Ph.D. at the University of California at Los Angeles, I came to realize that my tree climbing method had a major limitation -- over fifty percent of tropical forest trees are too weak to climb. Yet a large percentage of all forest animals spend much of their time in these weak trees foraging for food. I decided that unless these weak trees were made fully accessible for investigation, the biology of tropical forests could never be understood.

The first system, called "the web," for exploring this realm was designed by John Williams and myself in 1979. It was an adjustable, horizontal system of 1200 feet of rope suspended between the tops of giant trees. The web, however, was frightening to use and this deterred its widespread use. A biologist could move on the web by pulling himself hand over hand along the rope, while hanging a hundred feet above the ground from a small pulley. Descent was accomplished by dangling a rope into the underlying forest and then climbing down. This was a revolutionary method for studying forest, but biologists are not highwire acrobats and only a few have used the web for research. Furthermore, the web gave access to only about an acre's volume of forest -- tropical forests are so complex that it is necessary to study many acres in order to understand their ecology. However impractical the web may have been, as a prototype it was a crucial step in designing an automated chairlift.

There were three site choices for AWCE: the finca of Arnold Newman, a naturalist, was located near Corcovado National Park on the Peninsula de Osa. This site is relatively isolated and no longer serviced by Sansa, an airline that once had numerous bush planes. Sansa's planes are now grounded because of Costa Rica's poor economic conditions. Worse, a gold rush at Corcovado has brought a flood of 2,000 miners who are rapidly destroying the park's wildlife. The government was initially adamant about the presence of a few miners but now it wants the miners out. A leader of the miners, who was forcibly kicked out of the park once by the government and has since returned, says this about the possibility of being ejected again: "The government must understand that we need to make a living and feed our families.

We are all armed. If they try to move us again, we will fight, shooting anyone who tries."

This I think will send chills through the international effort to save Costa Rican forest. A large number of institutions have been supporting Costa Rican parks hoping to help save jungles. These include the National Science Foundation and the MacArthur Foundation. The latter recently donated \$1,000,000 to turn the Zona Protectora into a park.

The lure of foreign exchange as well as social unrest can be expected to place increasing and tremendous pressure on the government. It has been estimated that by 1992 Costa Rica will have to start importing wood since its once ample primordial forests will have been mostly burned for pasture. During the ten year period following 1992 it will become increasingly expensive for Costa Ricans to build homes as the demand for wood products will outstrip supply to the tune of about 1.9 billion of today's dollars. Costa Ricans in general may know that there is a looming wood shortage, but what they cannot know is exactly how it will affect their society. By 1990 logs will look like gold nuggets. What is happening at Corcovado is perhaps a look into Costa Rica's future. Out of the way forests will disappear.

The other site was Braulio Carillo National Park located only a half hour from San Jose by way of a brand new super highway. With considerable foresight, the forest surrounding the highway has been made a park. My trip to Costa Rica last summer was remarkable in that thousands of people used the road to see the park, picnic, and enjoy the out of doors. Costa Ricans are showing how much they like the park and its future seems solid. Braulio may make the difference in whether the future crunch for wood will spoil the whole park system.

Nature Conservancy is actively involved in saving large tracts of forest, specifically the Zona Protectora, an extension of Braulio. Interestingly, this is being purchased at perhaps twice the going rate per acre and there are rumors that the effort to buy the land was poorly considered. It is said that there was other similar land that would have been easier to patrol and had fewer farms to be purchased. The Zona, however, is a statement of strong American influence in the designation of land to be saved. Not coincidentally the Zona was conceived by the Organization for Tropical Studies, a consortium of largely United States Universities, to ensure that their research station at finca La Selva would not become an island surrounded by a sea of pasture.

La Selva's troubles seem to have mounted with each passing year. First, pasture encroached from three sides. This brought poaching, because the only hunting was within the reserve. And now the military has an encampment across, and down river. Occasionally the sound of howlers monkeys is punctuated by a burst of automatic weapon fire.

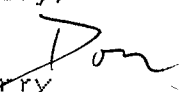
In choosing to work with Amos, I scratched the idea of working closely with the Costa Rican government within Braulio Carillo Park. It would have been a difficult relationship to define. Amos, a colleague whom I met while conducting long term

research at La Selva a number of years ago, wishes to have my affiliation. He believes it will be good publicity for the bird watching facility he is preparing to build. We have made certain agreements to keep the science station and bird watching facilities separate.

The canopy research station at Rara Avis will undoubtedly open exciting new avenues of biology, while becoming the most advanced means for conducting tropical research. I will begin construction of a ground station with funds given by Heinz to the Institute of Current World Affairs. Then I travel to Los Angeles, California to test the system being assembled by John Williams. If all goes well, the chairlift will be installed and in full use by the end of summer, 1986.

During these reports I plan to keep you abreast of the developments with AWCE and to take the opportunity to tell about my biological work. The next installment will cover my February trip to Costa Rica.

Sincerely,


Don Perry

* the South North News Service may use some of this material

Received in Hanover 1/28/86