INSTITUTE OF CURRENT WORLD AFFAIRS

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Testing AWCE

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Dear Peter,

Following the Spring meeting of the Institute, I traveled to Costa Rica to plan the importation of the Automated Web for Canopy Exploration (AWCE). AWCE, as you know, is an elevator-like vehicle that I have been developing for studying the tops of jungle trees. To date, there is still little work being done in treetops, even though several tree-climbing techniques have been developed. These methods have a serious limitation -- scientists are not interested in taking risks akin to those of a high-wire acrobat. The result is that the canopy remains a virtually unexplored habitat.

The difficulty of studying tropical treetops was described almost thirty years ago by Marston Bates, in his book The Forest and the Sea:

> "Man's point of view is curiously different in the forest and the sea. In the forest he is a bottom animal, in the sea a surface animal. To study the forest man must climb; to study the sea, dive....it seems to me that in some ways modern, scientific man has learned to cope with the sea better than with the forest.
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> "With the invention of the aqualung and similar devices man has gained a freedom in the seas (at least in the top hundred feet or so) that has no counterpart in the forest....And scientists have been more ingenious in developing methods of sending recording apparatus and traps down into the sea than they have in studying conditions up in the forest. In my 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."

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

Scientists need a specialized vehicle in order to effectively study treetops. I am confident that, after a little upgrading, the AWCE elevator system will be that vehicle.

My first demonstration of this vehicle will be done in Costa Rica at finca Rara Avis. The site is about sixty miles due north of San Jose, the capital.

AWCE's main support cable will have a span of up to 1000 feet, and it will cross a narrow valley. In my first reports I had mentioned that this cable would be connected to trees, but now I have decided to anchor the cable to solid rock with long steel pins. This greatly simplifies construction and increases safety.

According to John Williams, there will be no danger from lightning since the system is grounded at both ends. That remains to be demonstrated, although in principal I agree with him.

The elevator cage rides along the main cable; its horizontal motion is driven by a single hydraulic winch and its vertical motion (up to 300 feet) is driven by another winch. The radio-control box will stop the engine and switch the operation of the winches. Using a radio transmitter, researchers who are riding in the cage will determine where they want to travel within the forest below the main cable.

I flew to San Jose on June 23rd hoping to receive governmental permission to bring AWCE into Costa Rica duty-free. I stayed in Costa Rica about ten days and met a number of officials. All were interested in the project, including the Minister of Tourism and the Minister of Science and Technology. I was offered duty-free entry, but most people agree that the fastest and simplest solution is to pay duty, which would be about $1200. The important thing is that I have made contact with the Costa Rican government, and most officials like positive publicity about the country's natural beauties. It appears likely that the equipment will move through customs with a minimum of delays.

I have also made an agreement with INTREPID, a documentary-film production company, to document the construction of AWCE. They, in turn, have made a contract with NATIONAL GEOGRAPHIC EXPLORER to show the film this coming spring. Anyone who has followed the progress of AWCE would question the sensibility of guaranteeing the project for a spring schedule. This time, all I will say is that I am committed to finishing the construction of AWCE by the end of November. A nice side benefit is that I can show the program, which will be twenty minutes long, at the spring 1988 meeting of the Institute.

I traveled to Los Angeles on July 3rd. John had done a considerable amount of work, but his commitments to a large museum contract had brought our project to near a standstill. I helped to make the radio-control box (that has since been upgraded) and finished the steel cage. I left Los Angeles on July 19th expecting to return in early September, when we would complete a full-scale test of the system.

On September third, I flew back to Los Angeles to finish

constructing AWCE. John estimated that about forty hours remained to complete the system. Three of us spent a week machining parts in John's garage/machine shop. This was a pleasant, but grueling, experience. I enjoyed learning a new skill, but we were rushing to finish so INTREPID could film the test run of the system. Final touches were added to the pulley system that would suspend the cage, the electronic-control box was redesigned to use mechanical switches (instead of some misbehaving mercury switches), pulleys were machined with John's lathe, holes were drilled, and final parts were purchased. We started the motor of AWCE in the shop and immediately discovered that we had been supplied with a faulty hydraulic valve. (It has taken more than a month to get the valve replaced.) But by week's end, the system was ready to be assembled.

We selected a site about five minutes away from John's garage/workshop, at the top of a ridge in Topanga Canyon, California. The main cable would be anchored to a huge, sandstone rock and a many-ton tractor. The distance between these two points was about 300 feet and the highest point above the ground was about one hundred feet. The 1/2 inch-36,000 pound-test cable was chained to the tractor and anchored at the rock with a steel pin that was inserted into a hole. I made the hole with a power drill, which took about ten minutes. That was what convinced us to use rock, instead of trees, to support the cable.

When the system was completed, I went for a ride. The elevator occasionally dropped quickly when operated in the down position, which was much too thrilling and could potentially cause a serious accident. The system needed an equalization valve, as well as the new control valve mentioned earlier. Yet the test in Topanga proved to be very useful. In general, the system operated extremely well, and all was captured on film. I returned to New York on September 18th.

At the time of this writing, all the kinks have been straightened out, and the system is being disassembled and sent to be zinc-plated, which will keep it from rusting. It will then be crated and, on November 9th, air-freighted to Costa Rica. I will be waiting to receive it.

Best wishes,

Received in Hanover 11/16/87