Creating the Nation's first BioPark

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Letter from the Desk of David Challinor
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From 26 February to 1 March, twelve members of the Zoo's National Council visited Panama where they viewed many of the facilities of the Smithsonian Tropical Research Institute (STRI). Mike Robinson, who worked at STRI for 20 years before coming to the Zoo, and I were the joint leaders, and we and the Council members observed many fascinating aspects of the research underway at STRI.

Following an evening arrival on Wednesday 26 February, we left in a STRI bus about 6:30 the next morning to drive north to Gamboa, a road-head town on the Panama Canal about 17 miles from the Pacific entrance. At Gamboa we boarded STRI's passenger boat for the ten mile trip north to the well-known Barro Colorado Island (BCI) in Gatun Lake. BCI and the adjacent mainland peninsulas make up the 12,000 acre Barro Colorado Nature Monument administered by STRI for the Republic of Panama.

The Zoo group split into two sections; Mike led one and I the other into the forest where both parties saw a multitude of fauna and flora. Mike's group visited the huge Kapok tree (Ceiba pentandra), the largest tree on the island, and saw the only troop of tamarins on BCI. These small monkeys are rare on this island because they prefer secondary growth and BCI is now virtually all primary growth. Mike's tour group glimpsed the small forest-dwelling Red brocket deer, which is secretive, solitary and seldom seen. My group was rewarded with clear views of a troop of black howler monkeys, agoutis and coatis, plus scores of birds, many of which were "lifers" for George Didden and myself.

The next morning, Friday, we drove to the edge of a forest on the outskirts of Panama City where Alan Smith, a STRI botanist, demonstrated how he studies the forest canopy from a 4-person gondola attached to an 80-foot high T-crane, a building construction device adapted for research by STRI. Those who chose to ascend to the top of the forest in the gondola with Alan were able to see how trees and woody vines compete for sunlight. Both need sunlight to grow, but trees have to support themselves structurally. Vines do not, and thus they concentrate their energy on longitudinal growth using the host tree for support. The vine cannot be too successful and kill its host by completely blocking access to light, because if the tree dies and falls, the vine is lost, too.

Some tree species were conspicuously devoid of vines, and using the gondola as an observation platform, Alan and his colleagues analyze the mechanisms by which some trees are able to keep vines from growing on them. Trees have several strategies to compete with vines. For example, in certain species the tree itself is a host for arboreal ant colonies. Whenever vines start encroaching on the tree's crown, the ants nip off the vine tendrils, thus preventing the invader from gaining a foothold. Other tree species seem to produce chemical compounds that discourage vines from coming into contact with their leaves or bark.

From the forest canopy we went to STRI's new research facility where we met with scientists who patiently described their research. One colleague, Stan Rand, has been studying frogs for most of his career. He described how on a given local pond, shortly after the start of the rainy season, there could be as many as 15 different frog species whose males would each call females in their own distinctive way. To human ears the mixed chorus sounds cacaphonic, but to the frogs the sounds are orderly. By recording the calls of each species and displaying them on a sonagraph, Stan found very little overlap in the intensity and frequency of the different species' calls. Thus a female frog could easily isolate the courtship call of her conspecific male.

Stan also described one frog species that has a standard monosyllabic call when a single male calls from a pond edge. However, if more than one male of this species calls, then each adds to its regular call an extra syllable that sounds like "chuck." The more "chucks" added up to a maximum of six, the more likely the frog is to lure a female. But at what a cost! The more chucks, the greater the likelihood that the extravagantly serenading male will be caught by a frog-eating bat, which echolocates with particular accuracy on the "chuck" sound. As most of us know, every success has its price.

After a delightful lunch with some of the STRI scientists, we visited the breeding facility for pacas established by Nick Smythe. Pacas are the size of a very large rabbit and are nocturnal, solitary, forest-dwelling rodents. Their coats are dark red with parallel rows of white spots on their flanks. Unlike its diurnal equivalent, the agouti, the nocturnal paca lacks a strong scent and therefore makes for declicious eating. Hunting pressure has made pacas rare locally. Until recently attempts to breed them for domestic consumption have failed because pacas normally live only in pairs and are aggressively territorial. When placed together, pacas often fight to the death. After more than a decade of work, Nick Smythe has overcome this aggressive action of the pacas, and we saw pens full of these rodents lying together like rabbits or guinea pigs.

Nick's project is part of a long-term STRI effort to find ways of exploiting the tropical forest for useful local products without at the same time destroying it.

We spent the afternoon at STRI's marine laboratories on Naos and its adjacent islands, which are connected by causeways to the mainland. There we met John Christy, who told us about his studies on fiddler crab courtship and mating. The male's large claw is used for courtship and for fighting other males for burrows ("nests") to which females come for mating and breeding. Fiddler crabs see tall objects on the horizon very well. They rapidly detect predators and, if they are away from a burrow, run to grass or roots that provide cover. They see objects on the ground very poorly. Crabs find their way back to their own holes by memorizing the steps they took in each direction. This memory map is of little use to females when they wander in search of mates. In Panama's tidal flats, courting males of some species build little towers of mud next to their holes. These towers are very attractive to females both when they are searching for mates and when they are escaping predators. Even females of other species that do not build towers will run to them for protection. Courting males benefit from building towers because females are attracted to them as they are to grass and roots when females run from predators. I wish that I could include in this letter all the other fascinating research accounts we heard, but space precludes this option.

On Saturday, our last full day, we cruised in the Bay of Panama on STRI's R/V Benjamin. We circled Taboga Island about six miles offshore where we hoped to visit the pelican rookery. The birds had not yet started to nest, however, because the southwest trade winds had not blown hard enough to push the Bay's nutrient-rich deep water to the surface. The rich water in turn triggers an explosion of the fish population which provides the pelicans plentiful food to enable them to start nesting. Instead of hiking to the empty rookery, we swam at the beach below the small fishing village on Taboga.

This trip to Panama was such a success that I am planning one for interested members of the Zoo's Council next year. At the end of March I go to Mt. Hopkins in Arizona, a 9,000' mountain in the Coronado National Forest, about 40 miles south of Tucson. The Smithsonian operates the United States' second largest optical telescope on the summit of this peak. We could visit the telescope as well as the surrounding 4,000 acres which the Smithsonian manages; it is full of wild turkeys, javalinas, coatis, and a host of birds including trogons. If arrangements

can be made for a trip in March 1993, I will notify all members of the National Council and the Director's Circle well in advance.

Before closing this letter, I must clarify a clause in my March letter: "chimpanzees share 98% of our [human] genetic material...." Those portions of the human and chimpanzee genes that have been studied so far have shown a surprisingly similar identity (about 98%). However, only a very small part of the total human genome (maybe 5%) has been mapped, and work on the chimpanzee genetic code is even less complete. Thus, if these very preliminary mapping results of human and chimpanzee genes are sustained by further analysis over the next few decades, my statement about the closeness of the genetic relationship between these two primate genera will be more supportable.

The Spring meeting of the National Council will be at 9:30 a.m. on Friday, April 24, 1992 in the Board Room of the Zoo's Education and Administration Building. Please note the agenda attached. I look forward to seeing many of you then.

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