



Creating the Nation's first BioPark

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Letter from the Desk of David Challinor
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In my October letter I discussed the evidence scientists have accumulated on how animals think and communicate with each other. The more we observe, the more we recognize that the range of human sensory organs (eyes, ears, and nose) is very limited compared to the distance many other mammals can communicate. Elephants, for example, can hear each other on the open plains three or four miles away by making rumbling noises at very low frequencies (15 to 35 hertz), well below sounds audible to human ears, which can only begin to hear at about 30 hertz. Such ability to stay in contact when widely dispersed allows elephant and whales, whose songs can be heard from scores to even 100's of miles away in water, to assemble for breeding or other purposes such as to exploit a new unexpected food source. Much of the research on animal communication started in the zoos where the subjects can most conveniently be observed.

The National Zoo has started an exciting new project in reconstructing the old monkey house (built in 1906) into a new facility we are calling Think Tank. Exhibits there are being designed to demonstrate how two groups of primates, Lion-tailed macaques and Orangutans compare in communicating within their groups. To test their respective abilities, zoo scientists have planned a series of devices to challenge mentally these primates. For example, to expand the horizons of the orangutans, the zoo is constructing a line of eight 15 m high towers, the first of which is within their outside exhibit area and the last one being 300m away in an open-to-the-sky enclosure in Think Tank. The towers support a cross arm bearing two parallel plastic coated steel cables about 1.5' apart, a distance we believe adequate to keep one Orangutan from blocking the passage of others. A square platform at the top of each tower will allow them to rest or enjoy the view, but they will be prevented from descending any tower, except the ones at each end, by a collar of electrically charged wires. We have previously noted that once one animal in the group touched and was shocked by the hot wire surrounding the walls of their present enclosure, no other orangutan has ever tried to touch it, even those juveniles born after the initial contact occurred. How did these young animals get this message? We do not yet know, but we hope to learn in the next few decades by sensitive observation and gentle manipulation of their surroundings.



We expect the orangutangs to use the skyway, but can only speculate which individual will be the first up the tower. Are they all in good enough condition to brachiate (use their arms) between the full distance of the towers? The resting platforms are one way we think might help them but is their curiosity an adequate stimulus or will we have to use food as an additional lure? Will the first one to climb the tower be the first one to go onto the next one? All these questions will have to wait, but we do know from past experience that even small primates such as the squirrel-sized tamarins are very adaptable. In fact the skyway construction project is an outgrowth of the training regimen the Zoo has had for the last seven summers here for the Golden lion tamarin families being prepared for release in Brazil's Atlantic coastal forest every October (springtime there). The tamarin family group of about six individuals roam the canopy in the upper reaches of the zoo's Beaver Valley. Instead of the natural lianas of the Brazilian forest, the Zoo has stretched 3 cm diameter hemp rope between the local hardwoods. The small monkeys adapted rapidly and returned to their large nesting box high in a tree very night. Zoo visitors are often puzzled why they "don't run away" and we explain there is no incentive for them when they already have security and all they need to enjoy life. Their food is raised to their level by pulleys in containers that require some imaginative manipulation for food extraction. Certain individuals learned to do this faster than others but all acquired the necessary skill. The more adventurous ones traveled well over 300 m to the Small Mammal House to visit other tamarins there, but all returned to their nest box in the woods.

Inspired by the success of these small primates in learning how to retrieve food, we will test the orangutangs by having some of their favorite food at the Think Tank end of their skyway just out of their reach. It can only be gained by using a hooked stick, but such a stick will be stored back in the enclosure at the other end of the skyway. Which one will go back to retrieve it? How will he/she carry it if they must use both hands for brachiating? Will the one which goes back to get the stick have first choice of the food pulled out?

While these tests are going on, the orangutangs will also be instructed in a simple language system using symbols. The orangutangs will be able to type sentences on an electronic keyboard, arranging the symbols in proper order, i.e. they will use syntax. By using symbolic objects on the keyboard to correlate with articles of interest to the orangutangs such as food items, the first ones to master the system will be the first to enjoy their rewards. Our assumption is that they will teach each other, just as they have on avoiding the hot wire.

The colony of about six Lion-tailed macaques will have quite different challenges, which the visitors may watch them trying to meet. For example, to test their ability to share tasks and communicate with each other, we propose installing a see-saw on the floor of their yard. Above the seesaw will be a banana or other favored food. To reach it, one or more macaques will have to sit at one end of the plank so that a lighter weight monkey can be elevated to reach the fruit. Assuming they are successful, and we think they will be, how will the banana be consumed? By the light-weight one who got it? By the biggest and strongest? Or will it be shared? I welcome your ideas of other simple devices we can make to keep our primates challenged, and if you suggest one we use, we will videotape the action for you to try to learn yourself which animal is in charge and how it gives its message to the others.

As humans we are understandably anthropocentric, but when trying to understand communication between other mammals, we have to drop our human baggage -- particularly our dependence on speech. Perhaps only those people who cannot talk for various physical reasons are best qualified to unlock the key to primate communication. By being dependent on alternate ways to gain attention and transmit messages such a person might recognize how these intelligent primates are trading information. Even humans do not have to talk to give a message such as by using body language, facial expression, perfume, clothing, etc. which are all forms of silently transmitting information. The methods being used by primates may be staring us in the face, but we are so vocally biased we do not recognize it. Keep watching with an open mind and you may make the discovery yourself.

David Challinor
(202) 673-4705