
Enrichment and Occupational Devices for Orangutans and Chimpanzees

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In the wild, foraging for food occupies much of a primate's day. Considerable energy is expended as the animal travels its range in its search for food. Primates have evolved special abilities which enable them to deal with food-gathering in a unique way.

Field studies are providing an unprecedented wealth of information on the behaviour of free-ranging primates. In their natural environment, primates engage in a variety of complex activities, including intricate feeding behaviours. Chimpanzees have been observed to fashion and use tools. Orang utans may travel a considerable distance in their search for food and have been observed at mineral deposits.

Great apes are able to solve complex problems readily. Chimpanzees appear to have insights and to develop hypotheses about new problems when food is a reward. Laboratory studies also indicate that orang utans and gorillas have well-developed learning and memory capacities (Rumbaugh, 1973).

The captive environment bears little resemblance to the wild. In contrast to foraging in the wild, the zoo animal is presented with food at regular time, and little or no effort or activity is required of the animal. Hediger (1968) states that the restriction of a captive environment produce peculiar behaviour patterns, which can be counteracted to some extent by activities suitable to the animal's biological needs.

In a well designed captive environment, animal would obtain food by means natural to it and at times determined by its own needs. This hypothesis is supported by behavioural engineering projects at Portland Zoological Gardens in Oregon (Markowitz, 1973), where animal-operated feeders have been used with a number of primate and non-primate species. In addition to enriching the animals' environment, feeders provide an opportunity for the collection of new information on animal behaviour.

Recently two projects were undertaken at the San Francisco zoo. The goal of these projects was to arrange a more natural feeding regimen, and to simulate foraging behaviour by providing food reward for activity. A feeding system was designed to provide features of stimulation and activity in a natural environment and a feeding regimen spanning the animal's waking hours.

Prior to the installation of the feeding device, the zoo's two young orang utans were more frequently found indoors or on the concrete floor of their enclosure.

Hairless patches resulted from contact with the concrete. Activity level was low. The female was often seen pacing circles. This type of problem is particularly disturbing when one considers that the captive orang is a naturally arboreal animal compelled to live primarily on the ground. Inactivity resulting from inappropriate environmental design may be the major cause of unnatural behaviour.

In the first project, a feeding device was installed on a platform among tree limbs in the orang utan enclosure. The mechanism in a large wooden box consisted of a food magazine, an auger, a drive motor, timing circuits and a food bin. The food bin was constructed to allow food to drop into it but prevent the orang from reaching into the mechanism. Placement of a feeding device above the ground rewarded the animals for climbing activity similar to that found in the wild.

The feeding device dispensed small amounts of fruit and Purina monkey chow when activated. The orang utans quickly learned to operate the device by climbing up to the box and pressing the activator button. The feeder received considerable attention and was frequently emptied of food. The orang utans would at times activate the system simply to watch the food drop out, and seemed more interested in that activity than in eating. The device was altered so that it could be operated once every six minutes. This resulted in less wasteful food use. The orangs were provided with their normal evening meal in their inside quarters. Total food intake remained about the same.

On days when the device could be operated by the orang utans, they were observed climbing in the structure about thirty per cent more often than when the device was not operating. There was an apparent increase in general activity. The most encouraging result was a reduction in the female's stereotyped pacing.

The orang feeder, an experimental prototype, relied on surplus electric circuitry and motors. Maintenance difficulties resulted in its removal after about six months.

In the second project, a simpler feeding device was introduced to the chimpanzee exhibit. A heavy metal cylinder, 60 cm long and 45 cm in diameter, was capped on each end and bolted to a platform. Three 8 cm holes in the cylinder allowed access to the inside. Each morning before the chimps were released, the keeper placed chopped fruits, vegetables and sunflower seeds in the cylinder. A short section of a rubber hose was chained near one hole in the cylinder. The chimps were able to use the hose as a tool in a manner similar to fishing for termites or opening a beehive in the wild.

The chimpanzees rapidly emptied the container of their morning meal with ingenious manipulation and intense interest. Hole size is important. Too large a hole will allow chimps to reach food too easily. A salt lick with trace minerals was also added to the chimp enclosure and was frequently used. A series of platforms, a network of poles, hanging ropes, branches and cargo nets were combined to provide a more varied enclosure. The increased complexity of the enclosure creates more climbing surfaces. The chimps can seek different areas or platforms.

A simple mechanical food delivery system is currently being designed for the chimp exhibit. This device will deliver monkey chow when a series of levers are pushed. The system relies on gravity. When a lever is pushed, food will fall to the next stage. Then a second lever must be pushed, and finally food drops out of the feeder to the chimp. The final design will

allow for changes in the sequence in which the levers must be pushed in order to deliver food. The sequence could be changed on a regular basis to provide variety and additional opportunity for problem solving. This feeder may offer a simple solution where more complex devices cannot be applied for technical or economic reasons.

The environmental enrichment of the chimp exhibit has resulted in a decrease in observable coprophagy, a diversification of the activities, and a probable improvement in the physical and psychological condition of the animals.

Chimps and oranges manipulated their feeders even though ample food was available. These feeding devices have not resulted in undesirable effects such as obesity , stereotyped behaviour directed toward the device, or serious competitive aggression. The introduction of feeders provides an occupational aid for zoo animals.

When an animal-operated device is added zoo visitors are able to watch a more active animal engaged in food-seeking and consuming behaviour. An educational advantage emerges, since the observer sees a more active animal. Such a display helps to demonstrate the behaviour and intelligence of the great apes. as well as providing them with rewarding activities.

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Information on the design of the feeders may be obtained from D. E. Murphy. San Francisco State University, Psychology Department, 1600 Holloway, San Francisco, California 94132, U.S.A.

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