ACTIVE ENVIRONMENTS

# TRAINING TO ENHANCE SOCIALIZATION AND REPRODUCTION IN DRILLS

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Over a period of seven months a pilot behavioral project was conducted at the Los Angeles Zoo with a resident group of drills (Papio leucophaeus). The project had two purposes: to demonstrate that training techniques used primarily in animal "shows" could be used in zoo exhibits with existing social groups to effectively deal with husbandry, handling, and veterinary care situations; and to demonstrate the feasibility of training zoo staff with minimal animal training experience to achieve these goals. In addition, we wanted to demonstrate that these goals could be achieved while working within existing zoo conventions and safety guidelines for handling of the animals. In this case, that meant we could not remove the animals from the exhibit nor could we enter the exhibit, but had to work with the animals through the fence.

The drill exhibit was chosen because of several concerns. First, despite the presence of sexually mature animals, no breeding had occurred for over seven years. This was of particular concern since this species is extremely endangered and breeding of captive drills has been successful in only a small number of groups. Second, Sam the dominant male was overweight and control of his food intake, as well as that of the rest of the group, was very difficult. Third, Rocky the sub-adult male, who had been introduced to the group six months, previously, was shunned by the rest of the group. He appeared stressed a good deal of the time and on the verge of developing neurotic behavior. Finally, the subdominant animals were inaccessible to the keepers for any handling or husbandry purposes because of the social dynamics within the group.

Interviews were conducted with curators, management personnel, veterinarians, and keepers who were involved with the drill exhibit. Based on this information and on experience with marine mammals, a fundamental assessment and subsequent assumption was formulated. This assumption was that a long term moderate state of sensory deprivation had existed in the exhibit. This shortage of stimulation had resulted in subtle competition among group members which, in turn, inhibited breeding, other positive social interactions, and interest in interacting with the environment. After further discussions the following goals were developed for the behavioral project:

1. increase overall sensory stimulation of the group and thus reduce the potential of hostile competition for the available stimulation

2. establish feeding stations and targets to control food intake, the movement of animals, and allow one-on-one access to all animals

3. attempt to actively enhance positive social interaction by creating controlled situations that reward animals for letting other animals receive food or attention from the keeper

4. give personal attention to Rocky

5. achieve voluntary separation of animals when needed

6. train voluntary cooperation with artificial insemination procedures

METHOD

The drill behavioral project was conducted over a period of seven months. The effort was a blend of two sets of skills and experience. Tim Desmond and Gail Laule, both experienced marine mammal trainers, brought behavioral skills to the project and provided supervision. Drill keepers, Jennie McNary and Diane Gilchrist, provided the knowledge of the animals and their behavior critical to training judgments.

The training personnel consisted of several volunteer keepers and the three authors. An optimum diet was established by the curators and veterinarians for each of the five animals within the display, and every morning that allotment of fruit, vegetables, and monkey chow was cut into bite-size pieces and placed in separate containers labeled for each animal. The animals were fed two times per day. If a training set was not done at a feed, then the animals were simply free fed; no food was withheld. A small hand-held clicker was used as a conditioned reinforcer. The training sessions were conducted on Monday through Friday, and trained volunteers from the Los Angeles Zoo Research Department recorded observations on the drill group at times when trainers were not present.

There were five animals in the display - Sam the dominant male; Rocky a sub-adult male; Nadine the dominant female; Melisa a sub-dominant female; and Leona a sub-adult female. Because of dominance interactions and the inability to separate animals, multiple trainers were necessary to conduct effective training sessions. Within these sessions, different activities were occurring with different animals around the display simultaneously.

Prior to each session, a discussion was held to determine which trainer would be working with which animal or animals and what specific goals were to be pursued. The goals varied from session to session to keep the training activity a source of interest and stimulation for the animals.

Initial work focused on establishing feeding stations for each animal to control food intake. Feeding pairs were established where animals were fed side-by-side, with the dominant animal being reinforced heavily for allowing the subdominant animal to eat. We also introduced a round piece of wood as a target that they were to touch through the fence with their finger when it was presented. By moving it to different spots in their work area, their gross movements could be controlled and more physical activity encouraged. Stationing and target work remained a part of training activity throughout the project.

Next, we attempted training of separation or gating behaviors. There were two holding areas off of the main display that could be used to separate animals. Four of the five animals were worked on gating in one or both of the areas. Since Rocky, the sub-dominant male, was least accessible for gating work, we chose instead to concentrate on increasing his positive social interaction with group members and with his trainers. We rewarded group members for allowing him to eat and we offered him extra human contact by allowing him to gently touch the trainer's hand and arm in a simplified form of grooming behavior.

The third phase of the project involved reproduction goals. We concentrated on Sam and Nadine because they had previously produced offspring (in 1979 and 1980). Sam had not previously been fed in any pairing with other animals, and past observations had shown that Nadine's aggressiveness toward Sam often ended any mating attempts. Training consisted of stationing Sam and his trainer and Nadine with her trainer within close proximity of each other and just feeding them. Next, Sam's behavior of touching the wood target was shaped into him touching Nadine, and each was reinforced simultaneously.

The second reproduction task was to train voluntary cooperation with artificial insemination procedures in the event that normal breeding did not occur. The females were trained to present to us by positioning their hindquarters right up to the fence. We then desensitized them to a smooth plastic syringe casing being inserted into the vagina. This behavior would allow frequent artificial insemination of the females without restraint or anesthesia.

The other part of the artificial insemination procedure was semen collection. Sam was selected as our potential donor. Our strategy was to train Sam to masturbate on command in a specific location where the semen could be easily collected. This was to be accomplished either by observing and reinforcing spontaneously occurring masturbation or by formal approximation of the behavior.

In order to assure collection of a clean, fresh sample for insemination, we introduced a Plexiglas plate that could slide under the fence in one of the holding areas. The goal was to have Sam sit on the plate, masturbate onto it, and then slide the plate out.

## RESULTS

In novel training settings, where there is no previous body of experience to draw from, there is almost always an initial period of utter chaos and confusion. This project was no exception. With both keepers and animals, all learning the training game together, initial progress was slow. Training is an empirical process and it is through trial and error that we learn what will work and what won't. Each lesson is learned at the cost of breakdowns in progress.

Gradually the trainers became better at consistently rewarding desired behavior and progressively better game plans were developed. In the latter half of the project, progress came more quickly and easily. The following are the results achieved by the project's end.

### Feeding Stations

All five animals stationed at least one location and handfed. Most worked wherever they were asked to by their handler, and responded to "sit" and "stay".

### Food Intake

All five animals received the exact amount of food budgeted them in virtually all of the sessions.

### Targets

Four out of five animals touched a target and followed it to various locations, allowing effective control of the movements of animals inside the facility.

Shared Feeding Stations

Feeding stations where two animals were fed by one trainer were established for three pairs: Melisa-Rocky; Nadine-Leona; and Sam-Nadine. A fourth Sam-Leona was nearly established. In all of these cases the animals shared their access to food and the trainer's attention.

In the Sam-Nadine dyad, Sam was trained to touch Nadine on signal. Both tolerated the situation well, and by the end of the project, Nadine would present to him while he placed his hands on her back closely approximating the mating position. Similar work with Sam and Leona was in the early stages of training.

Attention for Rocky

In most of the sessions, Rocky was paired with Melisa. Melisa was reinforced for "staying" while Rocky was given food and personal attention. He learned to gently touch the trainer's hand and arm and this developed into a behavior closely approximating grooming. Throughout the project he became much less nervous and agitated when eating with Melisa and in many sessions he was quite relaxed. Prior to this project, Rocky had been observed biting his leg in a manner and frequency that indicated the potential onset of neurotic behavior. Keepers familiar with the exhibit felt that there was a significant reduction in the observance of the behavior throughout the duration of the project.

Voluntary Separation

The results of this goal were mixed. Before the project, Sam and Leona would gate together in the upper cage area. After the project began, a new wood floor was installed over the existing wire mesh. This new floor allowed us to work below the cage, but unfortunately, it also allowed Sam better mobility to chase Leona. Consequently, Leona refused to be locked in with Sam, although she would enter and work with him if the door remained open. We then concentrated on training Sam to gate in the lower holding area. We were successful. When Sam was locked in below, we could work Leona and Nadine in the upper cage, and Leona could be locked in the upper cage by herself. At the conclusion of the project, it was clear that separation of the animals would be possible. However, a great deal more work remained to be done.

Artificial Insemination Procedures

All three females positioned their hindquarters against the fence on signal. They tolerated touching of this area with our finger or a plastic syringe tube for 5-15 seconds. Leona and Nadine allowed insertion of the plastic tube of up to 1/2 inch on several occasions.

Sam was observed masturbating on exhibit in the morning hours and reinforced. After four such incidents, he began masturbating occasionally during training sessions. However, clear stimulus control was not established. In addition, Sam was successfully desensitized to the Plexiglas semen collection plate and taught to sit on it.

Increase Overall Sensory Stimulation and Social Interaction

Observational studies of the drill exhibit had been conducted for one and a half years prior to the onset of this behavioral project by the Los Angeles Zoo Research Department. These observations

continued outside of training sessions, for the duration of the project. The results relating to interactions between the drills were charted for the period of March/April 1986, which was prior to and at the onset of the pilot project, and then again in September/October 1986. The results discussed in detail in Dr Cathleen Cox's paper (Cox 1987) showed dramatic increases in every category of social interaction by the end of the project while non-social behavior decreased. In addition, although aggressive behavior increased on an absolute level, it dropped from 34% to 25% of total social interaction.

## COMMENTS

There were two factors which directly influenced the results of the project. First, the involvement of volunteer keepers, and the limited time each had available outside of their regular work schedule, restricted the number of sessions we were able to conduct and the availability of personnel. The optimum number of trainers for a session was three, however, the majority of the sessions were carried out with less than that number. Over the course of the 7 month project we achieved about the same number of sessions as would have been conducted in three months of a formal training regimen. Time and personnel availability also forced us to make changes in personnel during the project. As a result, communication between individuals was complicated and consistency from one training set to another was more difficult to maintain.

Second, supervision is crucial when developing new trainers or beginning new training projects. In this case, the supervisors were only available on the average of two days per week, which limited the extent to which goals were achieved.

## CONCLUSIONS

This project was a very basic attempt to use active behavior intervention (training) to manipulate social interaction and stimulate sensory deprived environments. The assumptions upon which we based our training strategies could no doubt be stated in a much more precise fashion. The point is that training techniques are not only useful in manipulating behavior, but they also provide a means of better understanding the social and environmental factors which influence behavior in captivity. Training can provide a classic exercise in the scientific method that allows us to formulate hypotheses about the behavioral habitats of captive animals, test those hypotheses, adjust the habitats, formulate new hypotheses, test them, and so on. When this process integrates information on the ethnology of wild specimens, it can provide a key element in construction a behavioral "simulator" - a captive habitat capable of sustaining the animal's natural behavioral repertoire.

This process is not without risk. Care must be taken to monitor training activities closely. Veterinarians, curators, and research personnel should be kept aware of what's happening throughout the training process. The vast majority of situations will be ones for which there are no precedents. The "If it ain't broke, don't fix it" rule will definitely apply, meaning that most initial work should occur where problems exist or the risks of upsetting a breeding situation or other delicate social balances are minimal. However, despite the risks, we believe that the innovative use of animal training techniques represents a significant and virtually untapped resource for the modern zoo.

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## REFERENCES

Cox, Cathleen, Social Behavior and Reproductive Status of Drills (Mandrillus leucophaeus), Proceedings of the 1987 A.A.Z.P.A. Western Regional Conference.