

I am not kidding when I ask you: do your animals prefer eating popcorn or watching TV?

- I'm not sure. I think they enjoy the sounds sometimes more than the pictures on the TV, but many animals will watch at least part of the TV session. They certainly love the popcorn, and it doesn't last long!

Why are you switching from cartoons to primate videos? Did you find evidence that the animals respond in a more appropriate/interested way to primate videos than to cartoons?

- We are making the transition to nature videos based on an in-house study documenting that the animals paid more attention to other monkeys compared to cartoons.
- We used to show our indoor rhesus macaques nature films or even cartoons like *The Little Mermaid*. The monkeys couldn't care less most of the time.



- Our enrichment team took several videos of the outdoor monkeys. The indoor monkeys are now fascinated when they can view this material. They watch intently, sometimes lip smacking, grunting or threatening. These videos are much more engaging and elicit sustained interest in the macaques.
- Our rhesus macaques also love videos of other macaques, but show no interest in watching cartoons.
- We occasionally show videos of outdoor macaques to our indoor macaques. Some, but not all, of the animals orient themselves in their cages so they can get a good view, and they are quiet and attentive during the viewing. I observed a similar response when I worked with baboons, who gave the impression they enjoyed watching the movie *Babe*.



- Videos are regularly played for our rhesus macaques who also seem to have a preference for movies with animals.
- One of my concerns here is that when nonhuman animals view movies, they might not be perceiving what we think they are; therefore it is difficult to know whether TVs and videos are really enriching.
- People have for many years studied object recognition in birds. It appears that birds are unable to recognize images shown on conventional TV screens. It has now been demonstrated that the likely reason is a basic physiological difference: their higher critical flicker fusion frequency makes birds perceive a film on the screen as images flashing on and off, whereas we humans see a continuous flow of images. I accept that the difference between humans and other primates is likely to be less dramatic than the difference between humans and birds, but before saying that we entertain our animals by showing them particular films on TV screens, we must ask ourselves, do we actually know what the animals are perceiving?
- I studied the preference for movie contents in caged male Japanese macaques; these movies had no sound tracks, so the animals could only see but not hear the contents. A touch-sensitive monitor was attached at the animals' cages and the monkeys could select movies by touching the monitor.

In this setting, the monkeys showed a clear preference for human and animation movies, although they could chose movies with Japanese macaques, rhesus macaques, and chimpanzees [Ogura & Tanaka, 2008].

Were the animals familiar with the people in the human movies, and in what kind of activities did the people and the animals shown in the movies engage?

- In human movies, the monkeys had a preference for strange people rather than familiar people such as caretakers and me. Yes, this finding was a bit surprising for us. Interestingly, one of the male monkeys had a clear preference for movies with women.

People in the movies were just walking, cleaning a room, reading a book, using a computer, or talking (no sound track!) with another person. No movies included people eating something. Chimps and macaques were resting, feeding, walking or interacting with other animals. Animations included a moving human or a moving object such as a cube or a ball. The monkeys showed a preference for human animations.

- Your findings are particularly important because they provide data-supported evidence that monkeys not only can perceive the contents of movies, but also can identify different species and, as shown by one of your males, distinguish the gender of the human shown on the screen. I guess your findings are a good example of how easily we humans underestimate the cognitive capabilities of animals, in this case, monkeys.



We will be purchasing televisions for our NHP (nonhuman primate) rooms, and I am wondering if anyone can share their experience of which types of televisions have or have not worked for you. While we have a number of older TVs on carts that we can bring into the rooms for short periods, this is the first time we will be purchasing new TVs and permanently mounting them in the rooms. With the advent of flat screen TVs, does anyone have any advice for us?

- At this time we still have our TVs in enclosed carts. We had a flat panel TV mounted in one room. The screen was installed in a box that was closed when the TV was not in use. This allowed us to protect the television from water, especially when the room was sanitized. It fortunately never happened that a monkey got loose while the TV box was open.
- Our TVs are on carts inside plastic boxes; they are removed when the room is cleaned.

behavioral problems



poo-painting

Has anyone encountered monkeys who repeatedly smear feces on the side of their cages?

- Oh yes, we have a lot of macaques who do that. We call them Picassos!
- We have quite a few rhesus Picassos—or poop-painters—as well. Some of our original painters have inspired others in the room, so now we have a room of juveniles who paint their cage walls with feces almost daily—unfortunately. We have tried various enrichments in an attempt to stop them from making such a mess; it works for a while, however, once they are done with whatever foraging-type of enrichment we give them that day, they

resume the painting. Oddly enough, all these animals are pair-housed. It is very difficult to deal with this strange behavioral habit. Our cages are hosed daily—twice during the week, once during weekends and holidays—and I sometimes wonder if this circumstance might encourage them to repaint their walls over and over again after they have been washed and the familiar odor removed from their cages.

- For many of our capuchins poo-painting seems to be a favorite past time.

- Poo-painting is perhaps a kind of creative behavior that helps the subject cope with abnormal living quarters. Extreme boredom and frustration resulting from enforced confinement can trigger an array of behavioral coping strategies, feces smearing is probably one of them, just like hair-pulling and self-biting.

Choi (1993) noticed in single-caged baboons that feces smearing was dramatically reduced once the animals received more attention from the attending personnel.

hair-pulling

Can you cure single-housed nonhuman primates from hair-pulling through environmental modifications such as foraging enrichment, inanimate enrichment, or social enrichment?

- This is one of the most frustrating behaviors to deal with, in my opinion. Despite having little success in treating it, we do spend a lot of time enriching the cages of our rhesus macaques who persistently engage in hair-pulling. It seems hopeless but we keep trying anyway. Even pairing them with compatible companions does not stop the compulsive hair-pulling, which is now often redirected toward the cagemate.
- It is my personal experience with caged macaques that alopecia resulting from hair-pulling-and-eating is impossible to treat effectively with inanimate environmental modifications. It is true, you can temporarily distract a subject from hair-pulling, for example with enrichment devices, but this is not a cure. Once the distraction gets weak or stops, the hair-pulling appears again just as before.

- I have the impression that hair-pulling in rhesus macaques and marmosets is often triggered by watching another monk showing this behavior in the cage across the aisle. Once an animal gets the hang of it, the compulsive hair-pulling is very difficult, if not impossible, to eradicate.
- Social facilitation probably explains the overall progressive increase of hair-pulling behavior in primate research facilities. After all, nobody will argue that it must be extremely boring to sit alone in a cage every day all year round; so why not imitate the behavior of the neighbor across from you? This is probably true not only for hair-pulling but also for all other compulsive behavior patterns and stereotypical movement patterns.
- Our cynos stop pulling their hair within two weeks when they are moved from individual housing to social housing. I have had quite a few single-caged bald girls who grew back beautiful coats in the company of another cagemate.
- At a previous institution we had a cyno—Grandpa—who suffered from severe hair-pulling. He had removed practically

all hair from his body. Grandpa was not shy about his idiosyncratic behavior and would contort into strange positions to remove the hair from his body; all that was left was a patch in the middle of his back! He was not an active animal and gave the impression of being a bit depressed. The veterinarians tried various treatments to alleviate the problem to no avail. We gave him various enrichment devices; they would only keep him occupied for a day or so. We pulled all the dividers from his quad cage to give him more space; no luck. We were reluctant to pair him as he was an older male who had been singly housed for so long; he didn't seem to be a promising candidate, but we saw no other option to address his behavioral problem.

The first two pairing attempts with two other adult males were not successful. We finally settled on a newly acquired juvenile who was very rowdy and active. This was the little guy's second pairing attempt; during the first attempt with a young male, all he did was start a fight. We were a bit surprised and so relieved, when his pairing with Grandpa turned out to be a success. This truly odd couple got along great right from the start. Grandpa responded correctly, brought the little guy

in line, and he actually perked up. The most surprising part, however, was that Grandpa stopped hair-pulling—completely! He didn't even over-groom the little guy; we were monitoring them closely, just in case.

- A few years ago, a bachelor trio of gorillas was transferred into the zoo where I was working. One of the males pulled the hair from his forearms and legs to baldness. The new exhibit was twice the size and far more complex than the previous exhibit. The male's hair-pulling decreased in the new, more species-appropriate environment by approximately 90 percent, and most of the hair grew back in a few weeks. We did notice that the hair-pulling did not stop completely, and when this male gorilla was disturbed by personnel or by surrounding changes, he always started pulling his hair again.
- I find it very surprising that hair-pulling in single-caged monkeys and apes has been largely overlooked in

the published literature. In humans this behavior [trichotillomania] is classified as a mental disorder, causing clinically significant distress (American Psychiatric Association, 1987), and occurring in the context of depression, frustration, boredom, or other emotional turmoil (Christenson and Mansueto, 1999). If hair-pulling is associated with similar mind states in nonhuman primates, it seems reasonable to conclude that the cause of this behavior deserves more attention and potential cures explored.

- Hair-pulling, or obsessive grooming, just screams mental distress arising from being denied full contact with a compatible companion. Plenty of things can be done to help curb this behavioral pathology, but unless the animals' social needs are addressed it is probably impossible to effectively deal with this problem. I have seen hair-pulling very often in rhesus and cynos and in marmosets who have lived alone in single cages, but never in animals living in pairs or groups.

- Being imprisoned in a small, barren cage, without the possibility to touch and interact with another companion may well constitute a stressor significant enough to trigger and promote behavioral pathologies such as hair-pulling in any social animal, including monkeys.
- Trichotillomania in people is generally thought to occur during stressful situations. From personal experience, I know this was true for my sister, who struggled with trichotillomania in high school. She was diagnosed with obsessive-compulsive disorder and the hair-pulling was a symptom of the mental problem, not the problem itself. So my understanding is that she had an underlying mental disorder, which made her more sensitive to stressful situations, and when faced with stress, resulted in compulsive hair-pulling almost to the point of baldness.



stereotypical locomotion and self-injurious behaviors

It seems that nobody can share a success story on ways to stop—I mean stop for good—hair-pulling in nonhuman primates. How do you deal with other behavioral problems such as stereotypical movement patterns and self-injurious behaviors?

- I can think of two cases where pacing and rocking were nearly extinguished in two single-caged adult female rhesus by pairing them with compatible isosexual partners. The stereotypies disappeared, but popped up again when the pairs were separated for research-related reasons. The separation stress was probably too much to cope with for these animals.
- I had a similar case where a locomotor stereotypy was almost extinguished. We had a back flipping, backward pacing adult rhesus female who pretty much stopped this idiosyncratic behavior once she was group-housed with juvenile males in a kind of kindergarten situation. The stereotypy only reoccurred whenever the vet staff showed up for TB testing twice a year.
- It is my experience that alarming situations, such as a white-gowned vet with heavy gloves entering the room, very often triggers unusual behavioral reactions in any behaviorally healthy macaque.

- Animals who have been cured of behavioral pathologies typically have an acute relapse and resort to pacing, self-biting, ear-pulling or whatever their behavioral pathology was. I take this as an exception for an animal who exhibits normal, species-typical behavior patterns under undisturbed conditions.
- Isn't that true also for humans, at least some of us? Our little habits pop up during stressful times. I know mine do: USDA is here and I have chewed my lips all week and picked off most of my nail polish.
- I had two male rhesus here at our facility who lived in the same room together, but each one alone in a separate cage. Since Big Guy suffered from self-injurious biting I decided to try pairing him with Theo, hoping that this would stop Big Guy's behavioral pathology.

The two turned out to be a compatible pair. Once Big Guy lived with a social companion he stopped the self-biting. Unfortunately, the two were separated

many months later. Not surprisingly, Big Guy resumed his old habit of self-biting after he was kind of condemned to live alone again.

- When dealing with behavioral problems, I am primarily interested in finding the cause so that I can prevent their development in other animals and, perhaps, cure the already affected subjects.

For example, I had to deal with seven rhesus macaques who engaged in self-biting. The animals were all housed alone in barren cages. In an attempt to treat them, I first provisioned their cages, each with a perch so that the monkey could at least access the arboreal dimension of the enclosure. The perch did not change the self-biting behavior in any way. I then gave each monkey a food puzzle to allow for more foraging related activities. While the monkey was engaged with these gadgets he or she did not self-bite, but the self-biting was resumed once all the food was retrieved and eaten. Environmental

enrichment, obviously, was not what the animals needed to stop the self-biting. After some hesitation, because of the potential consequences, I decided to try pairing each of the seven monkeys with another behaviorally healthy partner of the same sex. To my great relief all new pairs turned out compatible with no incident of injurious aggression. The new social housing arrangement cured all seven subjects from self-injurious behavior within the first four months after the transfer to pair housing (Reinhardt, 1999).

I concluded from this intervention that lack of social companionship is a cause of self-biting and, therefore, committed myself to transfer as many as possible—several hundred—single-caged rhesus macaques to compatible pair housing arrangements in order to prevent the development of this serious behavioral pathology in any other animals. During the remaining four years I worked with this rhesus colony, no new case of self-biting was recorded.

- I would hope that our primary goal, when dealing with behavioral problems, is to reverse the underlying cause, not just distract the animal. That may be difficult to do but it has to be the goal.

- That goal is very noble, but it seems difficult to achieve at the same time. Do we not know the underlying causes for most behavioral pathologies, but keep treating the symptoms rather than preventing the development of behavioral problems in the first place?

For example, if we would allow infant macaques to stay with their mothers until the biologically normal age of weaning and house them then, either in the maternal group or in other compatible social settings, the animals would have no reason to resort to self-injurious biting. Well, do we reverse the underlying cause of self-injurious biting? Presently the majority of macaques—who make up the bulk of nonhuman primates in research labs—continue living in single cages [Baker et al., 2007], and self-injurious biting continues to be a common behavioral problem [Dellinger-Ness & Handel, 2006; Lutz et al., 2007; Davenport et al., 2008; Novak et al., 2008; Major et al., 2009].

Rather than trying to reduce the incidence of certain behavioral pathologies, we should perhaps take these conspicuous activities as silent but clear messages from the animals that our design of their living quarters is inadequate, and act accordingly, for example by making it a standard practice to house all social primates in compatible social settings. This would probably be the best preventive against self-injurious biting and there would no longer be a need to deal with it as a problem.

husbandry-related stressors



double-tier caging

When primates are housed in a double-tier caging system, are they affected by the level of their cage's position?

- If I had to guess, I would imagine that monkeys on lower tiers feel safer because they are out of direct view.
- Given the fact that these guys are arboreal animals who avoid ground predators—such as humans—by spending all night and most of the day at elevated sites, and who flee from ground predators by climbing up into trees, it is unlikely that they feel particularly safe in bottom-tier cages. Based on my own experience, I would even argue that the majority of bottom-tier caged monkeys feel cornered when a person

whom they do not trust approaches their cage. Some rhesus males get so frustrated in such a situation—they can neither flee nor can they attack—that they bite themselves to the point of self-laceration.

- When I managed a colony of macaques, I hung my hat on the generalization that the animals are arboreal, and I still feel that most prefer high places. However, I would imagine that there are a few out there who break the mold. If they don't have the possibility to flee upward, a relatively dark area farther away from human eye level is perhaps the lesser of two evils. I imagine it would be like covering a rabbit's eyes during a fear-provoking handling procedure.
- Working in primate facilities for quite a number of years and visiting numerous primate facilities in different countries, I got the impression that personnel tend to give more attention to animals in the top rows than to animals in the bottom rows of the cage racks.

If this is correct, the two-tier caging system—the prevailing caging arrangement in the United States [Bentson et al., 2004]—would be an important variable that could affect not only the health status of the animals and the hygienic conditions of their living quarters, but also their stress response to being handled by personnel.

- I would agree with your observation. Unless there is an animal in the lower tier who is particularly outgoing, the same amount of attention is not given.
- Underlining the inadequacy of the two-tiered caging system, the International Primatological Society (2007) also points out that “animals in the lower cages tend to receive less attention from attending personnel.”
- I have witnessed more than once that bottom-caged primates with health problems did much better when we transferred them up to a top-row cage.

Cages in the top row do provide much more light; this gives the occupants a better chance to be checked and monitored more thoroughly by the attending technicians.

The only reason I might purposely place an animal into a bottom cage would be if it were a very dominant, feisty one who is scheduled to be pair-housed with another partner. I think living in a bottom cage would mellow such a potentially difficult animal.
- Unlike the cages in the upper tier those in the lower tier have very little direct light. This makes health observations more of a challenge. I agree that bottom-caged animals do have a disadvantage when it comes to the daily health checks by the attending staff or vet.

- Being permanently confined in shady, crepuscular lower-tier cages is probably also not conducive to the monkeys' general well-being.
- Personally I feel that the outdated two-tier turkey caging system—dating back to the time when very large numbers of monkeys had to be quickly accommodated in laboratories for polio vaccine research [Kelley & Hall, 1995]—is counterproductive both in terms of animal welfare and scientific methodology. It's time to get this caging system phased out not only in Europe [Council of Europe, 2002] but also in other countries, especially the United States.
- It is my experience that males and heavy females tend to end up in lower-row cages for obvious reasons: it is not so hard on your back when you remove a heavy animal from a bottom row, plus it is easier to force a big animal to exit the cage into a transfer box when the animal is housed in the bottom row. Animals in the upper tier tend to flee from you upwards—not into the transfer box—while animals in the lower tier tend to escape from you right into the transfer box; that's their only route of escape.
- It may be difficult to completely phase this caging system out, as space is at a premium, especially in a country like the U.S. that keeps large numbers of monkeys in research labs. Researchers defend the prevailing two-tier caging system not for scientific but for economic reasons; it certainly is cheaper to keep 100 monkeys in a two-tier system than in a single-tier system.

As a compromise solution, we rotate the animals from top to bottom during cage transfers. There are times when a dominant male, moved into a top location, agitates everyone in the room, so he stays on the bottom tier, but for the most part it works well. When we first implemented the rotation schedule, there was a lot of push back from the techs, so we had our facility department fashion a mobile tunnel connection between lower and upper cages to make the rotation process less strenuous for the personnel.
- Rotating the animals does not solve the problem; it literally “rotates” it. Even if you take the trouble to rotate your 100 animals on a regular basis, there will always be 50 of them who have to live in dark bottom-row cages. This is not a satisfactory solution.

In the traditional double-tier caging system, illumination in the shaded lower-tier cages is often very poor. It is difficult to observe animals in the bottom cages due to insufficient lighting (Reinhardt & Reinhardt, 1999; Reisinger and Rogers, 2001). How do you properly identify individual animals in lower-tier cages?

- When I worked at a preclinical toxicology facility, flashlights were a necessary component to daily health checks for the cynomolgus macaques. Those lower-row cages were very dark. I am not sure what is more stressful for a monkey, being pulled forward with the squeeze-back to have the ID tattoo read by a person at very close quarters, or having a light shine in your face by a human once a day. I think this circumstance provides evidence against the use of double-tier caging.
- It is not uncommon that attending care personnel make use of squeeze-backs to push monkeys in dark bottom rows to the front of the cage to facilitate routine health checks and correct reading of the tattoos. With flashlights the animals can be monitored easily, making it unnecessary to forcibly restrain them with the squeeze-backs [Savane, 2008].
- We use flashlights but have a policy in place, and strongly enforced, to create a positive relationship with our animals.



Most of them are calm and come to the front of the cage to receive a treat while you can check the tattoo.

- We don't use flashlights in our facilities; most rooms have sufficient light at the floor level so that we can read tattoos and identify individual monkeys correctly.

changing housing arrangement

How important is it to keep a particular housing arrangement of caged macaques?

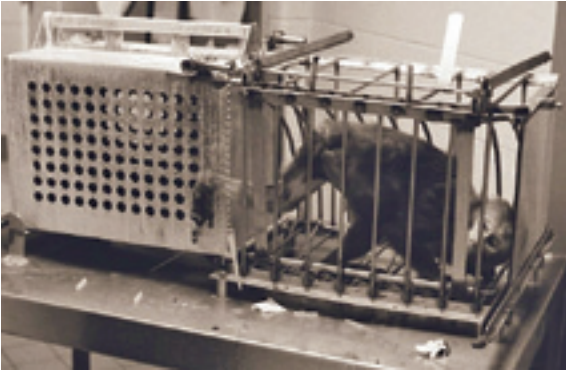
- At my current institution, our rhesus macaques get shifted quite frequently, and, much to my chagrin, folks tend to never think twice about where to put them. Animals sometimes end up in different positions during the cage-jump process, or are shifted by the research group for ease in handling. Additionally, we move animals in and out of the rooms frequently due to new animals entering or leaving the colony. The monks go through a short period of adjustment, but amazingly, things always seem to work out fine.
- I have no data to back this, but I feel that keeping the room arrangements consistent helps to minimize stress in the primates. We do our best to keep things the same in our monkey rooms. If animals need to be moved around, we closely monitor the events.
- Based on my own experience, I don't think it is critical for the well-being of primates

to keep a particular room arrangement. In fact, changing the arrangement may even be a kind of enrichment under the condition that the animals are properly monitored. If new neighbors don't settle down peacefully—this happens occasionally—it would not be fair to force the issue.

I remember several instances where the residents of a rhesus room staged quite a havoc after a new animal was transferred into *their* room. This can cause distress if the animals don't settle down within the day of the transfer. When I noticed that a particular transfer gives rise to conspicuous displays of aggression and threats, I always found a way to move the newcomer to another room where he or she was accepted without much ado.

Moving macaques around is usually not a welfare issue, but you have to take some time to carefully check that the animals do get along well with the new neighbors.

training to obtain cooperation during procedures



working with macaques

Injection and venipuncture can be a rather distressing event for caged macaques. The distress results not so much from the needle prick but from anxiety (not knowing how it will work out this time) and fear (knowing that it will be disturbing or painful). Based on your own experience, what technique is the least distressing for caged macaques?

- We had several groups of adult male rhesus who had been donated to us for plasma production. The males were bled once a month. This entailed first catching them with a net, then physically restraining them with gloved hands for ketamine injection; blood was drawn when the animals were sedated. After only two or three months, we had several boys in each group present their rears when our vet entered their enclosure, so they didn't have to be restrained for the ketamine injection; obviously, they did not like this part of the procedure at all and figured out by themselves how they can avoid it.
- I have experienced with single-caged female and male rhesus macaques, who have been squeeze-back restrained in their home for routine blood collection, or have been transferred to a squeeze apparatus for this procedure, that some animals learn over time that they do not need to resist and finally cooperate. These animals will come to the front of the cage, when you talk to them and partially open the cage door, and present for saphenous or femoral blood collection without the need for being physically restrained. I reinforce this kind of *spontaneous cooperation* always with a little food reward at the end of the procedure.

The response of an animal during a common procedure, such as blood collection, injection and nasogastric intubation, is predetermined by his or her relationship with the handling person. If the relationship is based on fear, enforced restraint or a formal training program will be necessary. If the relationship is based on mutual trust, the disturbing element of fear is absent, and there is a good chance that the animal gradually learns through positive experience to cooperate rather than resist during the procedure; restraint then becomes unnecessary.

The problem in the lab setting is often that we do not find the time to allow the animals to learn through experience that simple procedures such as venipuncture or injection are not a big deal, and that it is not our intention to do them any harm.

- It seems to me that we are coming into a new age of training options that are based on truly voluntary cooperation by the trainee rather than forced acclimation. Positive reinforcement training gives us that opportunity, and I do believe that mutual trust—the cornerstone of successful training—can be built even faster and stronger with positive reinforcement training than with forced acclimation.

- I would like to respectfully state that I am uncomfortable with the term “forced acclimation.” I worked with a group of rhesus macaques and used strictly positive reinforcement for the chair training process. It took quite a bit of time before the animals started coming to the front of the cage and allowing me to touch them with the pole. Then, after the first time you actually catch them, there is a tremendous regression, and they no longer want to come to the front.

I found that a combination of acclimation, desensitization and PRT [Positive Reinforcement Training] works best:

- (a) *Acclimation* is a step-by-step process where animals are gradually exposed to something, and reinforced with a reward for appropriate responses. The goal is to progress without fear.
- (b) *Desensitization* is placing animals repeatedly in a situation and expecting them to become used to it—like buying a house next to a highway; eventually you don’t even hear the cars.

I acclimated macaques to being pushed forward by a squeeze-back to make it easier to catch them on the pole. It’s true that by pushing the animal even a tiny bit, you are forcing him/her to move forward,

but when this process is done patiently with *gentle firmness*, it will develop a trusting relationship between you and the animal who, although the squeeze-back is carefully employed, will come to the front of the cage without any ado, allow you to attach the pole to the collar, come out of the cage readily and accept a reward for being cooperative.

- In a research setting, there are so many reasons for squeezing up a monkey, so most animals are used to the squeeze-back; it’s nothing new to them.

I have trained animals to cooperate with injections without using a squeeze-back. In the biomedical laboratory, there just isn’t the time to do this on a larger scale. And what I mean by that is, there isn’t time to take an entirely positive approach to training. If you use the squeeze-back to move your animal to the front of the cage, you are no longer using positive reinforcement to train the animal. My intent is not to debate terminology, but rather to say, desensitizing an animal to a procedure, using equipment that speeds the process, can get you the results faster, and without detriment to the animal.

- It is fair and realistic to point out here that, unless you are working with a completely naïve animal, chances are that a macaque has experience with being restrained with a squeeze-back *before* you start your training program. Therefore, you will not be making use of a new technique that will scare the animal up front. When you then allow the animal to gradually learn that being gently coaxed with the squeeze-back and subsequently rewarded [either with a treat or by you gently touching/grooming the animal] is not at all a fear- or anxiety-inducing exercise, you desensitize the monkey in just a few sessions to a formerly distressing apparatus. Personally, I feel that this initial desensitization has nothing to do with forced acclimation or negative reinforcement training, but some of you may have a different opinion. I should perhaps add that a harsh person can nullify all your desensitizing effort by subjecting the animal to a traditional, brutal squeeze-back experience. When you train your animals, everybody who works with them will have to collaborate with you; it's teamwork that benefits everybody involved in it.



- It is my experience with more than 50 adult rhesus macaques of both sexes that gently desensitizing a monkey to the squeeze-back will strengthen the animal's trust in you and shorten the cumulative time needed to achieve the final goal of the training. A well-acclimated monkey will come to the front of the cage *without* being pushed by the squeeze-back when you approach his/her cage and ask him or her to come forward. The subsequent training for injection or venipuncture is no big deal because the animal trusts you and is willing to work *with* rather than against you. These training sessions were one of the most uplifting experiences for me when working with macaques.
- The situation is totally different when you work with a naïve animal who has never been exposed to being pushed against his/her will with a squeeze-back. In this case it is more than fair to first target-train the animal so that he/she comes voluntarily to the front of the cage and, only then, continue with a formal training program to achieve cooperation during blood collection or injection.
- We also use the squeeze-back during pole-and-collar training sessions. Even after the animals are trained, we still will pull the squeeze-back up about halfway—the animal is in control of the situation and has the ability to present his collar or not. We do this for safety reasons; the squeeze-back is released completely and pushed back into place only after the second person has clipped onto the collar. The monkey is then rewarded with a food treat, removed from the cage and walked to the chair where another reward is in store.
- I work with both single- and pair-housed rhesus macaques who are fully pole-and-collar and chair trained prior to going on PK [pharmacokinetics] studies where multiple blood samples are collected. Successfully trained animals get an IV [intravenous] catheter placed. We then take blood samples using needleless syringes, so the only needle the animals feel is the initial one for the catheter placement.

The monkeys are quiet and calm when we take the samples, and I have the impression that they are not at all disturbed, let alone distressed.

It has traditionally been claimed that adult rhesus males are very aggressive, intractable animals who must be physically restrained during procedures to protect the handling person from scratches and bites (Gisler et al., 1960; Ackerley & Stones, 1969; Valerio et al., 1969; Altman, 1970; Henrickson, 1976; Wickings & Nieschlag, 1980; Wolfensohn & Lloyd, 1994; Johns Hopkins University and Health System, 2001; Panneton et al., 2001; IACUC Certification Coordinator, 2008).

Is it your experience that adult rhesus males are less tractable, more difficult to train to cooperate during procedures than adult females?

- It seems to me that adult male rhesus are very often big bluffers. They have learned over time that they can get our attention whenever they want by acting up like little devils; children sometimes do the same when they are desperate to get their parents' attention. It's just bluff, nothing to be taken seriously.
- I have only done training as enrichment, not for actual husbandry procedures, but it hasn't been my experience that the males are more aggressive. I've had just as many sweet males as I had sweet females, if not more.
- Some of our adult males are amazingly cooperative; they will present a leg even before I ask them to do so and will allow me to draw a blood sample without showing any sign of resistance, let alone aggression.
- Adult males always gave me fewer problems than adult females or juveniles, provided I had a very good relationship with them. Granted, I have met very calm and submissive females, but my males have always been very willing to work with me and learn how to cooperate during various procedures. I've found that most males have a keen interest in food treats and in



me being around; I use this as positive reinforcement when training them but also afterwards when they have cooperated during a procedure.

I've worked with large, over 18-kg-heavy males who could have overpowered me during chairing activities, or while I was prepping them for training, but as long as they had a very clear understanding of what I was asking of them, they never gave me any trouble.

Are there circumstances that justify using aversive stimuli when you want an animal to learn something, for example to cooperate during a procedure?

- When one of our cyno girls won't come and sit next to the cage door to allow poling for the chair, we just pretend to pull the squeeze-back. This kind of warning gesture is always enough to get her butt in motion to come sit by the door. We very rarely need to actually squeeze such an animal.

- Given the fact that the animals we are working with are confined, it seems important to make sure that they trust me. They should feel at ease when I am present; only then will I have a chance that they will understand what I want them to do. Yelling at them or threatening them with a broom, when they do not respond properly to my training cues, would not only scare them and make them confused, but they would also lose trust in me and resist my attempts to train them any further. A losing battle!

On the other hand, however, I do believe that while gentle coaxing with the squeeze-back is not essential, it shortens the time necessary to achieve the goal of the training *without losing the subject's trust*. The point is that the coaxing is not used as a kind of punishment to enforce a certain response, for example extending a leg through an opening in the cage.



Is it safe to train macaques to cooperate during blood collection in their home cages?

- I've been met with opposition about training the monkeys for blood draws in the cage for safety reasons; instead, our monkeys are sedated in the restraint chair to facilitate blood collection. I would love to get them to cooperate in their home cage rather than sedating them so often.
- Any hands-on interaction with a monkey bears a potential risk regardless of the environment in which the interaction takes place. What I have learned over the years is that the risk of being scratched or bitten by a monkey can practically be eliminated when you have first allowed the animal to establish a relationship with you that is absolutely based on trust, mutual trust. The animal knows through direct experience that you do not intend to harm him or her in any way, and you know through direct experience that there is no reason to be afraid of the animal. In order to establish such a safe relationship that is free of any traces of fear, some extra time is required in which you offer the animal your undivided attention and affection during encounters that are pleasant for the animal and enjoyable for you.

- I personally feel that we should make attempts, whenever this is possible, to train our animals for cooperation during procedures in their familiar home cages. You don't really have to make a study to demonstrate that animals, just like humans, are less stressed by a potentially distressing procedure, such as injection or venipuncture, when the procedure is done *at home* [Phoenix & Chambers, 1984; Reinhardt et al., 1991c; Schapiro et al., 1997].

Sedating animals for blood collection introduces stress as an extraneous variable [Aidara et al., 1981; Line et al., 1991; Crockett et al., 2000; Mori et al., 2006], unless the animal has been trained to cooperate during drug injection. Again, why not train the animals to cooperate during such a simple but common procedure in their familiar home environment?

When people argue that training monkeys for blood draws in the cage is dangerous, they cannot have much first-hand experience with monkeys. When you train a monkey, you are creating a predictable, safe environment for the animal; so there is no need for aggression. Many people ignore the fact that personal safety is markedly increased when the handling person works *with* an animal who feels no need to defend himself or herself.

I am observing increased self-directed aggression in a few individually housed rhesus—mostly males—after positive reinforcement training sessions and wonder why they do this.

- I've also seen this in some of our single-housed males. For every training session, the males come out of their cages on a pole-and-collar system to sit in a primate chair. They then perform various tasks at a computer with either touchscreens or joysticks. Correct responses earn reinforcements, usually water or juice, and occasionally other treats.

The training sessions are probably so much liked—the subjects get generous doses of positive reinforcement during those sessions—that a return to the home cage is perceived in a negative manner. We've found that making the return to the home cage a more pleasurable experience helps to decrease self-directed aggression upon returning. We carefully avoid forcing the males to stop their training, and return them only when they show indications that they are finished. We consistently reinforce instances when returning to the cage is done in a calm and willing manner. Having a surprise novel toy or foraging task waiting for them when they come home has also helped to make the return more enjoyable and hence give the animals less reason to engage in self-injurious behavior.

Do you find it more effective to schedule training sessions at short intervals (e.g. two sessions per day) or at relatively long intervals (e.g. one session per week)?

- Based on my experience with rhesus macaques and baboons, I definitely find frequent but short training sessions most effective. The more training you can get in, the faster the trainees learn, but you can't do it all at once, otherwise the animals get frustrated or bored.
- I have found with rhesus and stump-tailed macaques that frequent, short training sessions—two or three approximately 5-minute sessions per day—are very helpful in the beginning to develop a good work relationship with the individual animal. Once this relationship has been established and the animal has gained full trust in me, I space longer, up to 30-minute sessions according to my work schedule; two sessions per week can be just enough with a monkey who has settled into the training program. These sessions are now a form of environmental enrichment for the animal, who seems to look forward to them. When you approach the cage, the animal will now attentively come to the front of the cage, ready to interact with you and eager to get raisins after accomplishing the first training step of the day.

By the way, the training sessions are a kind of environmental enrichment not only for the trainee but also for me; they break the monotony of my routine husbandry work and challenge me to make a creative, and at the same time useful, contribution to scientific methodology.
- Two brief, 5 to 10-minute sessions per day seem to work best with the monkeys I have worked with, namely rhesus, cynos, bonnets, marms, owls, galagos and squirrel monkeys.
- It is my experience with male rhesus that the animals work best with me when I keep the training sessions short; the males are more attentive and learn better during two 5-minute or shorter sessions per day than during one 10-minute session per day.

working with marmosets

Marmosets often give the impression of being distressed when they are caught with heavy gloves for oral dosing. Has anyone of you come up with a refinement technique that makes this common procedure less traumatic for these little guys?

- I have worked almost exclusively with common marmosets for the past four years and have developed a refinement technique for oral dosing.

First, I interact with the animals individually to establish very close bonds with them. Mutual trust is the key for successful training. Some marmosets feel so much at ease when I am with them that they allow me to pick them up without gloves, pet their backs and bellies—wouldn't recommend this unless you *really* know that animal very well and know that the animal trusts you without reservation.

I have been able to successfully train 42 marmosets to accept dosing via 3 cc blunt-tip syringes through the bars of their home cage. We generally mask the flavor of the drug, depending on the individual animals' likes and dislikes, with maple syrup, blueberry or raspberry syrup; none of the marmosets I have worked with cared

for the flavor of cherry syrup. Occasionally I have to reach my arm into the cage to coax an animal. Once they taste the flavored dose, they usually ingest it without being hand-caught.

Oral dosing of trained marmosets has become incredibly faster—about three animals per minute—and so much less stressful than the traditional procedure where you first have to chase the animals in their cage, catch them and position them for involuntary oral drug application.

With trained marmosets we are able to conduct studies requiring one or two acute doses, one dose for pharmacokinetics, and up to 28 daily doses. The only problem we encounter is that with repeated doses, the marmosets seem to get tired of the flavor mask after about a week; when this happens we have to switch flavors. We have tested several flavors, so we know in advance which flavors each of the marms

would accept; we actually charted each individual's likes and dislikes, so we are always prepared if a study requires daily dosing over an extended period of time.

- I have used this syringe technique with rhesus, cynos and baboons with great success.

It is my experience that marmosets are scared when they are caught by the dreaded human gloved hand(s) in order to be subjected to an uncomfortable or life-threatening procedure. What can we do to make the capture procedure less stressful or distressing for these little animals?

- I use deer skin gloves; they are fairly thin, allowing me to firmly but gently feel the animal's body. They are bite resistant yet soft enough so that the animals cannot break off teeth if they do bite the glove. Marmosets do become upset when you start training them, but they adjust quickly and accept the catch procedure if the training is broken into small steps [Donnelly, 2008]:
 - (a) Before handling marmosets, I habituate them first to the sight of these catch gloves. For this purpose, I place the

gloves on a cart in the middle of the room and move it to the front of each cage several times in the course of one week, so each animal can see the gloves on different occasions at close quarters.

- (b) After this week of habituation, I offer the animals favorite treats from the glove from the outside of the cage, then reach inside and allow the marmoset to take more treats from the gloved hand if they choose.
- (c) Next, I catch the animals with the gloved hand but do not remove them from their cage; usually I grab them around their waist while they hang on the bars of the cage.
- (d) I then progress to catching the marmosets, briefly remove them from their cage and promptly release them back home; this is followed by offering them a reward from the gloved hand.
- (e) Finally, I will catch the trained animal for a procedure. Upon returning to the home cage, the animal always receives a food reward.

This training program requires some time investment in the beginning, but it pays off quickly in the long run because you don't have to spend time chasing monkeys around; it is also so much better for the animals' welfare! The hard part is convincing people who have done it the conventional way for so long that this refined approach is so much better!

- In our facility, we don't use gloves anymore. Our marmosets are pair-housed, each pair in two single cages on top of each other with removable bottom between both cages. When catching the animals, we insert the bottom. Inevitably, the marmosets will retreat into the upper half of the cage. We then insert a small Perspex cylinder, catch one marmoset at a time, and put a lid on it.

This exercise is initially a bit frightening for the animals, and you have to slowly drive them into a corner to trap them, but since we use this method routinely each time we need to move the animals, and most procedures are actually quite nice—behavioral tests with marshmallow rewards—our marmosets quickly get used to it. Many of them walk into the cylinder without any coaxing.

- We also capture our marmosets in a Perspex box. The animals are very used to us and come to the front of the cage when we approach them. This means we do not actually need to catch them because they are not running away from us.

There are small openings, with sliding doors, at the front of our cages; we hold the carrying box up to those. In the beginning, we just encourage the marmosets to come into the box where we reward them with treats that we pass through little holes. Then we close the box for a short while, still giving treats, before letting the marmoset return back into the

home cage. The animals learn that entering into the box is not a frightening experience, so eventually they cooperate and we can carry them to another area. The problem is always to get only one partner exiting into the box at a time.

- We have several marmosets who will spontaneously jump in their nest boxes, which then allows for easy transfer to a clean cage or on the scale for body weights.
- Our marmosets were all trained to enter a jump box for cage change. We were lucky and had a great grad student working with them and really caring for his animals. He would come in and jump the animals on cage change days for the animal care staff. We found that the socially housed animals shift much quicker when allowed to shift together instead of one at a time, which is





understandable. The training itself really didn't take all that long, and once the grad student's behavioral portion of the study was over, the training was transferred to the animal care staff. I am pretty sure they all preferred the jump box to hand-catching, as marms can be quick and feisty, but they are pretty delicate and easily hurt by a gloved hand that is not careful enough.

- I had a colony of marmosets for over seven years and never once had to use gloves. In that time I was only bitten once and that was from an unruly male who got loose in the room. Even then, I feel, the bite was accidental. He almost looked at me apologetically after he did it and immediately calmed down. I think the biggest key is trust between the caretaker and the animals.

For cage transfer we had a caging system that used industrial tubing attached to the cage doors so that the marmosets could run into the next cage. I had tried to get them to go into the nest box and transfer them that way but there was always one who would stay out to keep watch over the others, or they were all just so curious to see what I was doing that they wouldn't go in. I should also state that my colony had extensive interaction with people and the families were almost exclusively made up from hand-reared infants over a long period of time. While hand-rearing can have its own drawbacks, I feel it really created a colony of very cooperative animals with very low stress. The time and effort that was invested in the program rewarded us very well.

What are the options of bringing procedures such as weighing, injection or blood collection into the marmosets' home cages?



- I haven't done blood collection in the cage, and I am not sure I would. I place the animals in restraint tubes in a separate quiet room and take femoral blood samples. They are never alone. There are always three or four buddies present who provide psychological support. After taking a sample, you need to hold the vessel off very well, as marmosets are prone to hematomas—even days after the bleed; we had two animals who needed surgical removal of a clot resulting from venipuncture. Bleeding in the cage would scare me, because the animals could struggle before you are certain that the bleeding has stopped completely. We have tried to acquire blood samples from other veins, but it hasn't worked well; so we only bleed via femoral vein.
- McKinley et al. (2003) successfully trained marmosets to step one at a time on a platform for weighing in their familiar home cages.
- Cross et al. (2004) describe a training method that allows saliva collection from unrestrained marmosets in their familiar home cages.

How do you feel about the restraint tube? Do the animals get so desensitized to blood collection that being restrained in the tube is no longer a source of stress/distress for them?

- We condition and train each and every animal for the restraint tube by first catching and then placing them in the tube. The time being restrained in the tube is gradually increased and the individual animal returned back to the home cage after each session and rewarded with a food treat. This training exercise is done with each marmoset over and over again. I spent many, many hours working with these guys and have finally trained them



enough that I don't have to constantly give them refresher sessions for the restraint tube. They now have no problem being placed into restraint tubes, and they do not seem to be stressed in the tube, as long as nothing is done with them.

When blood collection starts, many marmosets are still somewhat stressed; they have never gotten completely over the blood collection part; many seem to tolerate it, maybe because a marshmallow is waiting for them as soon as they are done.

We always do the blood collection procedure on all four animals of a group at the same time, assuming that the presence of friends exerts a stress buffering effect.

I'm not sure if you can ever have these rather flighty animals really *accept* being restrained and subjected to blood collection. It seems to me that in general, marmosets do get stressed to some extent when it comes to blood collection in the tube.

institutional support of training program

When you train your animals, how do you find the time for this? Does your institution support your efforts to achieve cooperation of the animals during procedures?

- At our facility, training animals to cooperate during procedures is an integral part of our daily work.
- I have to sell a cost benefit analysis of training animals in my charge to the management of our laboratory. This brings out the salesman in me.
- In order to implement a training program, I first had to train my staff to re-think their routine. No real time difference, just a change in the way everyday tasks are performed. For example, to train macaques for transfer or injections, we teach the animals what the clicker is by using it during regular morning feedings. Click means biscuit as a reward. Any animal who naturally presents during that time will receive a click along with a biscuit and raisins as a reward. Whatever desirable

behaviors we can catch will be rewarded throughout the day. Once the clicker has a meaning for the animals, the tech starts using a simple target—this can be the mirror already on the cage, or the plastic cage tag—to reward animals during regular feedings when they touch the target. Now we can begin targeting individual animals where we need them to move and station.

This training program does not require an extra time investment, so it is endorsed by our facility.

- My institution is very supportive of training our macaques to cooperate during routine husbandry procedures such as shifting animals. Unfortunately, however, our animals are not trained to cooperate during specific procedures such as injection and blood collection.

- I work at a facility where we have to do certain chores and must complete them in the allotted time. If we have a slow day—which is rare—we can spend as much time as we want training the animals or simply visiting them; this inconsistency is of no real value. If necessary, I spend lunchtime training animals in my charge so that they overcome their apprehension and fear during handling procedures.
- It will be great when all investigators understand the importance of training. Research does show that working with animals who have been taught to cooperate during procedures is very beneficial, but it's odd how that research gets often dismissed so easily with the presumption that there is no extra time for conducting training sessions with the animals.
- Not only that, but also many investigators are kind of stuck in the inertia of tradition. They interpret any attempt to change their traditional practices as a personal critique, so they have the tendency to stubbornly defend the *status quo* even if it implies a resistance to well-documented progress.
- All involved, the researchers as well as management of facilities, have to look more closely and give more attention to efforts to train animals in order to minimize or avoid stress reactions. It is not only a welfare issue but it is also a scientific issue.

No animal should fear his or her caretaker or any procedure if there are training techniques available that can avoid this.

- My staff has the training/conditioning of animals built into the care schedule and, if things take longer than planned, someone else will pick up some of their chores so that the animals don't lose out.

All research benefits if animals are trained to some extent, even if it's only to prevent them from stressing out when someone approaches them. Investigators and administrators at our facility understand that training helps produce better science, so I get very little opposition from the research team. Occasionally there are investigators who, used to working overseas, dismiss our ideas in the beginning. However they don't have a choice and in the long run will actually admit that our "quaint British ways" are progressive and provide a better research methodology.



spontaneous cooperation

Does it occasionally happen that a monkey, or any other animal, spontaneously cooperates during a procedure that used to entail enforced restraint, for example injection, venipuncture or replacing a bandage?



- Because I am a Vet Tech, I often see animals who are in distress. I find it amazing how cooperative many of these animals become. It is almost as if they want to help you take care of them. I have worked with animals who had the reputation of being very aggressive, especially some of my male cynos; but when they get a little finger injury, they would just turn into big babies. They often say that a hurt animal is more dangerous and more likely to act out, but I have found quite the opposite in most cases.
- I would argue that animals, even potentially dangerous ones, cooperate and allow you to help them only if they know, kind of intuitively, that you have good intentions and that they can trust you fully. If they don't trust you, then the situation can become extremely dangerous, because the injured/hurt/distressed animal will feel cornered and resort to self defense.

- It is my experience that macaques who are being pushed forward with a squeeze-back for routine injection sometimes start cooperating without any formal training, making the squeeze-back unnecessary in the future. I think such animals learn from the repeated experience that being squeezed is very unpleasant, but that the injection itself is not really painful, and that they can avoid the squeeze-back by voluntarily coming to the front of the cage and presenting a specific body part for injection. I have encountered quite a number of such animals, especially, but not exclusively, animals assigned to diabetes studies.
- I work with 12 rhesus who behaved just as you describe: being approached by me, the monkey comes forward without me even touching the bars of the squeeze-back; I encouragingly say “come” and then “hold” and give the injection without triggering any fear or aversive reaction. These animals have not received any formal training other than receiving a food treat reward after the injection. They have learned on their own to avoid being squeezed by voluntarily coming to the front of the cage and accepting the injection.



- I cannot think of an example from the laboratory at the moment, but I remember several incidents of spontaneous cooperation during my time working as a humane society officer, in particular dealing with wildlife. A common call to attend to was skunks getting themselves tangled in hockey nets—as I live in Canada, a frequent encounter for skunks. Skunks are fairly gentle creatures, but of course have their secret weapon, and can still spray even in compromised positions. Yet, on the calls that I attended, after approaching the animals slowly, and gently restraining them, they were quiet as could be while they were cut free from the net. Then, once free, they would waddle off.

Though shock is obviously a factor when dealing with wildlife, I have memories of skunks who truly seemed to connect with me during that moment, and surrendered themselves to the task at hand, allowing me to free them quickly; these were always rewarding experiences.

- I had a similar experience with a wild animal. We share our property with a large family of mule deer, and over the years cared for a number of leg-injured animals. It happened last year that we noticed a yearling limping, but we could not see any signs of injury. Observing this kid for a few days, I finally saw that she had a kind of bandage around her right front leg right above the hooves. It took me a few days to get close enough to realize that the bandage was not a bandage but a 3.5-cm-long section of white PVC pipe. Obviously, the animal hadn't managed to get the pipe pushed back over the toes after she had got trapped in it. In the meantime the skin had started to react and was slightly swollen, making the scenario pretty hopeless for this young deer. After much pondering I decided not to ask for help from the Wildlife Service but work with this little creature myself.

Next morning, I was sitting at a nice spot with a gorgeous view of the rising sun behind a bank of clouds when out of the blue Elli, the yearling's mother, and the patient turned up right in front of me. This was a big surprise! I gave Elli some raisins and groomed her while attentively getting a very close look of the yearling's leg. Having no other choice, I finally moved my right hand in the direction of the leg—the kid did not seem to take any notice of my endeavor—and then very, very gently but

at the same time with great resolution got hold of the leg, held it very firmly, while carefully turning the PVC section with my left hand and pushing it slowly to the rims of the hooves—and off the leg. To my utter amazement, neither the kid (who got the name Lilly) nor the mother budged during the whole procedure, which took about two minutes. The two gave the impression that they didn't even notice what had been going on. Somehow, we three communicated on a non-verbal level to make this happen to save Lilly from painful and serious consequences. Not surprisingly, Lilly got very affectionate and she is now just like her mother, one of those deer who gets kind of blissed-out when you groom her just at the right spots.



touching monkeys



Working with the monkeys in your charge on a daily basis, it is almost unavoidable that you develop affectionate relationships with them and that some of the animals get to like you and trust you so much that they want to be groomed by you. Does it sometimes happen that you groom some of your monkeys?

- We have a few female and male rhesus macaques who give the impression that they really enjoy it when I groom them through the bars. They approach the front of their cage and present themselves in such a way that I can easily reach all the body parts that they would like to have scratched. While I groom them, they relax completely and get this typical glazed, blissed-out look—eyes at half mast. Some of the animals like to be scratched on their heads/necks while they are sitting in their chairs, and again they show blissed-out faces while they are groomed.

- I am working with several female and male macaques who regularly extend their arms out of their cages, while others press their chests or hips against the cage bars and then let me groom them for several minutes. I have no doubts that these animals really like it when I follow their invitations and groom them.
- Some monkeys don't like people for legitimate reasons; they will use the grooming invitation to tease you. Our Holly is such a brat. She's clever and will lure her victim by deception to get close enough to accomplish her mission. Once you are in her reach, she will perform that lightening fast turn, pinch you and give you some attitude. I am sure Holly enjoys these little attacks and the victims' surprise reactions.

But we also have a few monkeys who genuinely beg to be groomed. Some of these individuals arrived with serious behavioral disorders. They had been singly housed for years. The touch they routinely received from our seasoned staff made a tremendous difference in their emotional well-being and many neurotic behaviors all but disappeared in a short time. These animals pose in different positions to receive their *therapy* in just the right spot and they will fall asleep while we groom them.

- I have worked with cynos, rhesus, pigtailed and boons of all ages and both genders who presented themselves regularly for a good butt scratch. For instance, currently there

are two aged rhesus males who tend to “fight” for my attention when I am in their room. First, the more dominant partner will put his rear end up against the cage bars and, when I approach, will settle down so I can groom his entire back. The other partner will then saddle up to the front of the cage and present his body so that I can scratch his chest/belly/face and other parts of his body—he's even presented his tongue to me. When either of them is really happy, they'll go into that trance-like state and have a glazed look; the less dominant guy has even sighed a couple of times while I groomed him. There are days that, once I get done with these two, the rest of the room—all aged rhesus males—start presenting body parts for grooming.

- I remember a female pigtail on a viral tox study who wouldn't show friendly behavior towards people and would lash out from time to time, but for some reason she really liked me. I never figured out why, but whenever I entered the room, she would stand, hoot, and duckbill in my direction until she got my attention. Then, when I would walk to her cage, she would calmly settle and present her hips to me for grooming. We got to a point where she would reach out of her cage and attempt to groom me. I really don't know why she has only taken a “shine” to me and not to other staff members.

primates in labs versus primates in homes

It was recently written in an article published in the Journal of the American Veterinary Medical Association that pet primates are better off than primates in labs. Is this a valid comparison?

- It would probably be more realistic to assess each case separately rather than making a categorical statement.
- My own impression is that pet owners are more variable in their adequacy as caretakers with most being worse than a typical lab and a few being better. Unfortunately, as primate-owning is not illegal in the United States, we seem to have decided to let people own primates without any oversight, sell them online, and generally continue unregulated in any aspect other than interstate transport.
- I really worry about the primates in the care of individuals who may have bought them on impulse, lack understanding of the species-typical behavioral and psychological



needs of their new pets, and are not ready to make a long-term commitment. What happens if the monkey bites a child? That poor monk could end up being shoved from one home to the other. I lean on the side of the labs as generally offering more suitable housing and better care for these animals.

I'm sure that there are a few people who go out of their way to learn all they can about the species-specific needs of the monkey they intend to adopt and are committed to providing the best possible care for their pet. The majority of monkey pet owners, however, are probably getting tired of trying to diaper and keep a cage clean



with a monk; or the monkey is going to get frustrated and then aggressive towards people who treat the animal like a human kid—monkeys aren't meant to be dressed up and carried around like dolls. Just look at how many adorable puppies go home only to end up abandoned in a shelter! Monkeys are also cute and adorable when they are young, but it's their nature to grow into adults who have their own personalities and the means to defend themselves if needed.

- The following comment doesn't really fit, but I still have the urge to post it, given the fact that we are all so particularly concerned about nonhuman primates as pets:

In the United States there are approximately 1,000,000 pets—mainly dogs and cats—abandoned by their owners for convenience reasons, for example pets dumped in rest areas of highways.

Now talking of *human* primates:

In the United States there are approximately 750,000 homeless children, most of them too scared to go home for good reasons of which we are all aware.

- That's terribly sad.
- We have a long way to go to make this world a more compassionate place.