

Karen Pryor On Behavior

Including

• The Creative Porpoise: Training for Novel Behavior • The Wicked Winds of New York • Why Punishment Doesn't Work • A Dolphin-Human Fishing Cooperative in Brazil • When the President Appointed Me • Phil Wylie, Dancin' Man • If I could Talk to the Animals • The Dreadful Dowager Dolphin • My Favorite Joke • Reinforcement Training as Interspecies Communication • The Llama Post • and a dozen more essays and research reports by the author of *Nursing Your Baby* and *Don't Shoot the Dog!*

Together with digressions, personal remarks, anecdotes, opinions, and reflections by the author, and numerous comments on why each article was written, how it came to be published, and what, if anything, happened as a result.

From the Foreword by Prof. Ellen P. Reese

"Animal trainers will adopt it as their bible, and students will rip off copies from the library . . . Required reading for all of us who think we know something about shaping . . . Pryor at her wittest and most perceptive."



Karen Pryor is a scientist, a writer, and a pioneering animal trainer. She is a mother and grandmother, and is married to Jon M. Lindbergh. They live in the Cascade Mountains near Seattle.



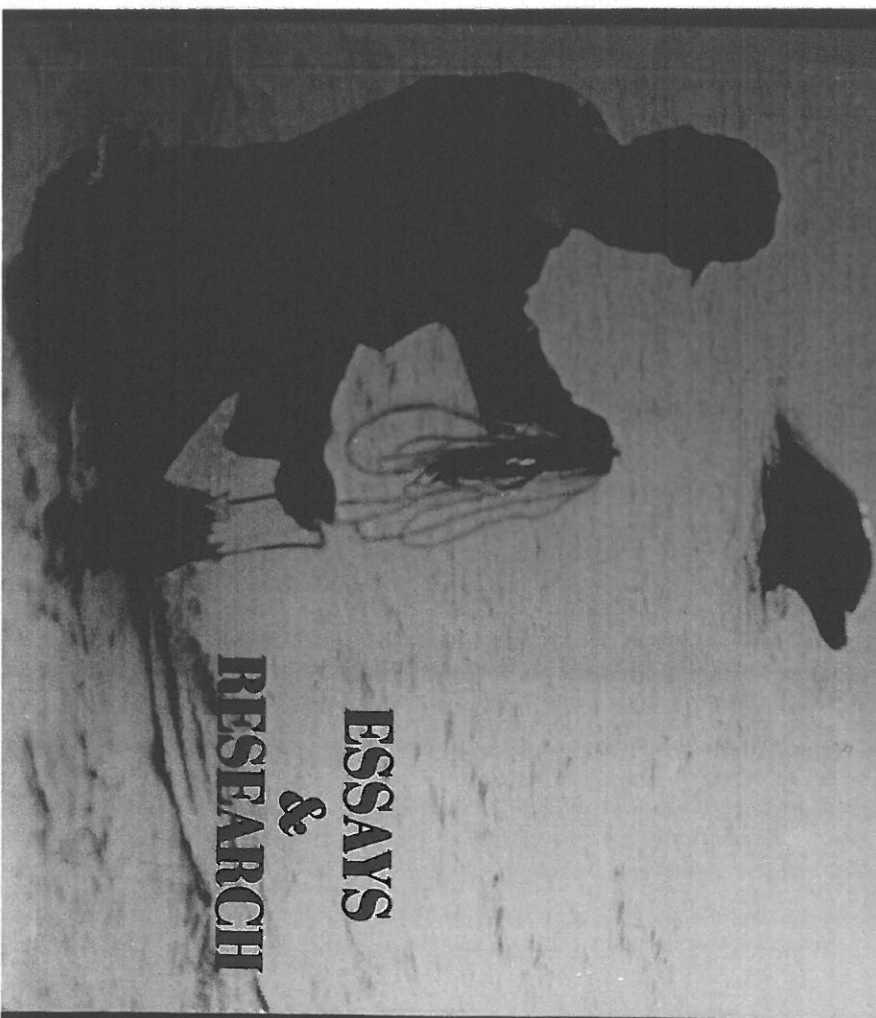
Front cover: "Are you ready? I am." A wild Brazilian dolphin, Bate-Cabega, inspects his selected fisherman before herding a school of mullet to be netted.

Photo by Jon Lindbergh.

Karen Pryor

On Behavior

ESSAYS
&
RESEARCH



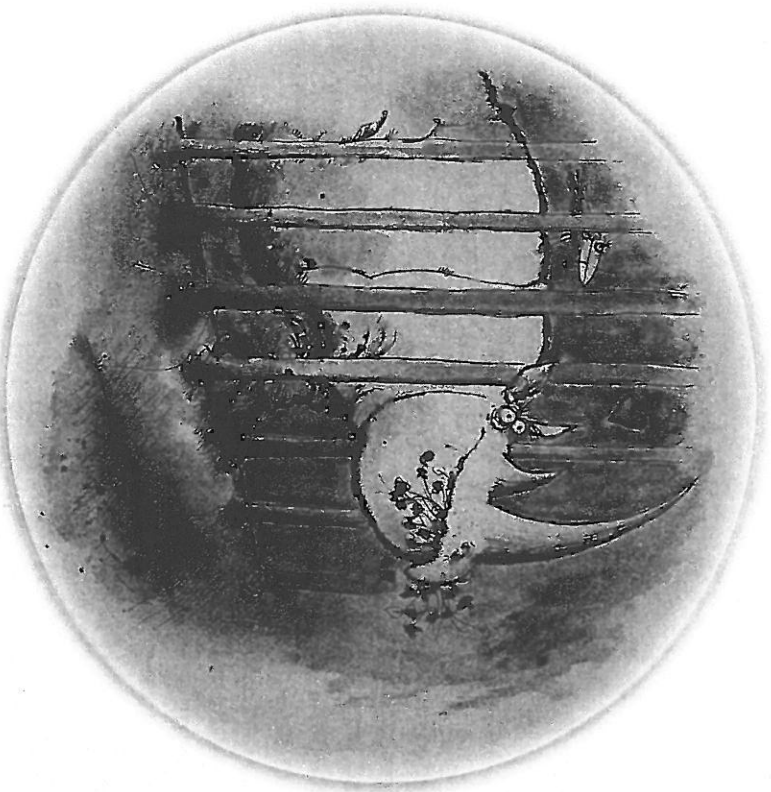


Illustration by British artist Ronald Searle for "The Rhino Likes Violets."

CHAPTER SIX

The Rhino Likes Violets

By Karen Pryor¹

We sat on the ground just outside the rhinoceros enclosure. Mary, an adult rhino, put her very large head through the fence, resting it on the bottom railing so that her chin overhung my lap. Since I was sitting in a patch of violets, I picked some violet leaves and fed them into her huge jaws. She took them with apparent pleasure. She seemed, too, to enjoy having me stroke her mouth and face. The heavy skin that looked like armor plating felt like suede; it seemed to be very sensitive. Mary could not see which way to turn for more leaves, even if I held them up to her eyes, but if I touched her face with the greenery she oriented easily and folded in the leaves adroitly.

Mary's ears tilted calmly and pleasantly to keep track of the whereabouts of her baby and to follow the conversation between Melanie Bond, a keeper at the National Zoological Park in Washington, D.C., and me, a visiting consultant. We had just finished a training session with the great apes, part of an experimental program at the zoo, to see if modern, nonforce behavioral modification techniques could be of use in handling zoo animals. Now, while we took a break in the spring sunshine, Melanie was playing with Mary's baby. Using violets and petting

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as rewards, she had just taught the baby to pick up one of its front feet on command, as horses and elephants are trained to do. The baby was quite excited at discovering such an easy way to earn Melanie's attentions, and between bouts of foot raising it gamboled clumsily about, now and then bumping heftily into its mother.

The half-hour of play reinforced for me a concept I'd long been aware of. If you have something an animal wants, you can train virtually any animal. People often don't realize how easy it is to train even difficult, dangerous animals without knocking them around. I wouldn't have dreamed of going into the rhinoceros enclosure and trying to train either animal by force, like an old-fashioned circus trainer. But obviously one could shape rhino behavior with positive reinforcements: in this case, greens and, I think, attention and diversion.

Shaping behavior with positive reinforcement is a technique described in the laws of learning first defined by B. F. Skinner and generally called operant conditioning. In the last 20 years or so, the technique has revolutionized animal training. All dolphin shows are based entirely on positive reinforcement, not aversive control. Bird shows involving free-flying birds of many species have proliferated; birds, too, cannot be trained by force (they just panic) but will work hard and learn well for food rewards. In Hollywood, shaping with positive reinforcement is called "affection training," and it has produced results that in the past would have been considered impossible: the Hartford Insurance stag is one example.

I gained my background in the applied uses of operant conditioning as the head trainer and curator of Sea Life Park, an oceanarium in Hawaii, where we trained dozens of dolphins, small whales, birds, and other creatures for both public performances and research. Positive reinforcement, properly used, could produce spectacular shows. Sometimes, though, I was even more impressed with its practical value in the everyday maintenance of our animals. For example, some whales are too large to restrain by force, so when our whales needed veterinary attention, we trained them to present their tails and allow blood samples to be taken and shots to be administered, for a reward

of food and petting. (The amount and kind of reward is not important; what is important is that the animal know exactly what it has to do to get the reward.) All of our animals were trained to move from tank to tank on command; they did not have to be chased or forced. Also we used training to relieve the boredom of dolphins that were being kept in solitude; for dolphins, boredom can literally be fatal.

I had then been asked to see if the same techniques could be applied to wild animals in a zoo; thus I found myself feeding violets to the rhino. Theodore Reed, director of the National Zoo, had read a book I'd written about my porpoise-training experiences and had decided that these techniques might be useful to his keepers. He mentioned specific behavioral problems to me: the polar bears that banged on their steel doors hour after hour; the giraffes that sometimes refused to go indoors before a cold snap and had to be chased about by 10 men with sticks in a slipping, kicking, cursing, and risky rodeo; the chimp that sat in a corner all day plucking the hair out of its arms from boredom.

Reed, a veterinarian, was also worried about boredom among the keepers. He prided himself, and justifiably, I was to discover, on a staff of intelligent, capable men and women who took serious interest in the animals they cared for. But a lot of the work of animal care is grueling drudgery: feeding and cleaning, cleaning and feeding. Reed thought that, for those who took to it, ongoing training interactions might add interest to the keepers' lives as well as the animals'.

I agreed to go to work for the zoo as a consultant, teaching a group of keepers as much as I could about training techniques. Twenty-five people came to the first class: young, old, male, female, black, white. I was intrigued not only by the variety of lively faces but also by the variety of animals they had to work with: birds, reptiles, apes, elephants, mammals I'd never even heard of, such as grisons and binturongs. I explained that it would not be my job to train animals nor to solve specific problems, necessarily, but to give the keepers methods by which they could do those things. I outlined a basic technique: you let the animal discover that every time you blow a whistle, it gets a piece of food. Then you let it discover that it can make you blow the whistle by, say,

moving toward its den. Presto. You are training the animal to move into its den. Or it is training *you* to be reliable about whistle blowing and food giving, depending on the point of view.

Everyone had to pick an animal to practice on and a behavior to shape. I recommended choosing a lively, greedy animal. Melanie Bond, in the great ape house, had dandy subjects to start with—two juvenile orangutans. Keepers had been forbidden to play or interact with the apes, on the ground that it was dangerous, but now that rule would be relaxed so that Melanie could participate in the training class. Bela Demeter, in the reptile house, was dubious about training snakes or lizards, but I knew reptiles could be conditioned; the late reptile collector Grace Wylie had had a number of trained alligators years ago. Birds, reindeer, elephants—everyone picked good subjects. However, Art Cooper in the lion/tiger complex had fixed his heart on training his best tiger, Peela. [Actually Art and the other keepers called the tiger Ajax, but the Zoo insisted I use his official name in this article. KP]

"No, Art," the others protested. "That tiger never does anything! He just lies on the top of his hill all day. What are you going to reinforce?"

"Well, he's cool," Art explained. "He's saving his strength." Art intended to persuade this cool cat 1) to come down to the front of the exhibit, to the edge of the moat; 2) to get into the water in the moat; 3) to retrieve a floating beer keg that was sometimes put in the moat as a tiger toy (tigers like to swim, and like all other cats, they will play with moving objects); 4) to put the beer keg on the beach; and 5) to get back up on shore himself. A five-step behavior chain, and quite difficult even for a seasoned trainer, especially with a disinterested animal. I suggested doing something simpler, but Art's mind was made up.

Training is time-consuming, and some people found that they could not fit it into an already overcrowded day's work. Curators, too, sometimes objected to the keepers' frittering away valuable minutes on apparently trivial tasks. "I do not see the value," one curator huffed at me, "in training the panda to stand on its head to impress the other keepers." The value, of course, was in the process, not the product: the trainer was learning to train. What

he or she chose as a practice behavior was irrelevant to me; I have found that first-time trainers make much better progress if they choose their own task rather than have one assigned to them, so I let them do what they like. But I could empathize with the practical zoo people who not only saw no point in the particular behavior (who needs a retrieving tiger, after all?) but felt that it interfered with the animals' "natural behavior" as well although, given the alien zoo environment, much of the behavior we see is not at all normal.

In a few weeks, some people had successes to demonstrate to the class. Melanie had trained Junior, one of the young orangutans, to clean up his cage and toss trash into her bucket in return, not for a food reward, but for the chance to blow on a whistle; Junior was fascinated by the whistle. Next to his cage there was a large female orangutan who seemed to me to be suffering from clinical depression. She sat slumped against the wall all day long, looking like an exhausted shopping-bag lady. Melanie, with food, taught her to play a simple Simon Says: I pat my head, you pat your head; I clap my hands, you clap your hands; I rub my stomach, you rub your stomach. To everyone's amusement, the orang discovered she could play this game with the public, especially with groups of schoolchildren. It was gratifying to see her, active and bright-eyed, clapping her hands, then rubbing her stomach, while a corridor full of hilarious children copied her.

Melanie also began playing the training game with melancholy Ham, the chimpanzee (our first U.S. chimp in outer space), now a grown male with formidable fangs. She paid him with food for various actions, and slowly, he began to participate. One morning, Melanie informed us, she was about to let Ham outdoors after having given him his breakfast. When he saw that she was going to open the outside door, he graciously rewarded her by handing her a piece of celery. He understood the game.

Grayson Harding, in the small mammals building, had trained a chinchilla to weigh itself by hopping in a basket which could then be put on a scale—a big improvement over chasing it all over the cage with a net to catch and weigh it. Bela, at the reptile house, had trained two thin green lizards about 18

inches long to take insects from the tip of a forceps. He then held the forceps higher, shaping an upward jump. By the time he showed the behavior to the class, the lizards ran to the cage door as soon as he opened it and then, eyes bulging and pink, toothy mouths agape, jumped two feet straight up to the forceps tip with a tiny ferocity that was funny to see. Bela really did have leaping lizards. He himself wasn't impressed, though I pointed out that this Olympic-effort, straight-up leap is the high point of all dolphin shows and is trained in exactly the same way.

Meanwhile, Art actually was making progress with Peela. Peela got into the spirit of things and came bounding down the hill when he caught sight of Art. He learned to get into the water and to get out. He played with the keg. Training sessions, however, took a long time, because Peela appeared to have trouble making up his mind. He could take 20 minutes to get into the water and 45 to get out again. It's a trait common to cats, as anyone knows who has ever opened a door to let an unfortunate house cat out and then had it stand in the doorway. Peela just did it on a bigger scale.

In the long run, Art did accomplish his behavior chain and, I am sure, acquired in the process training skills that can be applied henceforth to any animal in his care. By the end of the program, Melanie's work with the apes was generally recognized as valuable; Barbara Bingham had some partially trained reindeer and had discovered that currycombing was reinforcing to them. The giraffes now came indoors when the keepers rang an electric bell. A few keepers, a few animals had benefited. The program had been fun for the participants, but did it have any value for the whole zoo?

Six months later, I went back to see. In the elephant house, where training sessions had previously been brief, with fixed routines, and held before opening hours, training demonstrations were now being given daily for the public. In the great ape house, morose Ham now laughed, played games, and even let himself be tickled; gorillas opened doors and tidied cages on request; the zoo had sent Melanie to night school to learn American Sign Language; she was teaching Junior.

I found that keepers were being hired specifically for their training skills. A Hollywood-trained keeper had all the bears going indoors on command for a food reward; previously, it had sometimes been necessary to chase them in with fire hoses in order to clean the yards. A new seal and sea lion exhibit, Beaver Valley, which had been under construction during my time at the zoo, was being run by an experienced trainer. On the site where I had once stood and listened to a head curator worry about how they would ever catch an individual seal for medical care since the pool was so large, I was now able to look over the completed pool and its barking inhabitants and hear a curator tell me that every animal was being trained to come out of the water on command and that he considered training to be integral to the staff's daily work.

The polar bears had also come under the care of the Beaver Valley keepers. They had noticed, I was told, that one of the bears had a broken canine tooth. This called for veterinary attention, since a broken tooth can get infected. Customarily, the bear would have had to be "knocked down," or shot with a tranquilizer gun—and with a stiff dosage, too, since you certainly do not want a polar bear to wake up while you are examining its teeth. To spare the bear this risky and potentially even fatal procedure, keeper leader Kayce Cover and her staff trained the bear to stick its nose out through a slot in the door and allow its lip to be lifted. When the behavior was shaped, they called the vet, the trainer signaled the bear, the bear poked its nose out, and the vet inspected the tooth and pronounced it healed. No trouble at all. And they did it with raisins.

That, I thought, was exactly the use of training as a zoo-management tool that Dr. Reed had been hoping for. The incident had nothing to do with me or my class, directly. The keepers had learned their obviously excellent training skills from others. But their success depended on a favorable climate of opinion at the curatorial level, in which such keeper-animal interactions are not forbidden but permitted, perhaps encouraged, maybe even expected. There, I thought, our class may have broken the ice.

What about other zoos? At the New York Zoological Park—the Bronx Zoo—director William Conway and some of his curators have also been interested in operant conditioning as a zoo-management tool. They have installed some automated exhibits, such as a “honey tree” that makes bears stand to their full height and show off their long tongues to get the occasionally dispensed honey. They have also undertaken a pilot training program, hiring an experienced marine-mammal trainer, Jerry Winsett, to be trainer-at-large in the zoo for a year. Some of the behavior problems Jerry solved seemed routine to him, but they were serious to the keepers. For example, a certain gorilla took to sitting in his doorway, refusing to go in or out, when the keepers wanted to clean the cage. No amount of banana waving could coax him from that position, and with his huge strength he prevented the door from being closed. Jerry pointed out that banana waving is bribery; you are reinforcing behavior that hasn’t occurred yet, and trainers know that doesn’t really work. Jerry suggested ignoring the gorilla when he sat in the doorway and rewarding him when he went out by himself. Problem solved.

The Bronx Zoo has an exhibit of nocturnal creatures, “The World of Darkness,” in which many small birds and mammals are displayed under a dim, or red, light going about their normal lives. It is difficult for the keepers to check on the health or even the viable presence of each specimen in the darkness. Jerry taught the keepers techniques for “shaping” animals to come to their hands. To coax a timid douroucouli (a nocturnal monkey) or galago (a tiny primate) to take food from your hand might take weeks of patience. To shape it to do so, however, by reinforcing every step closer to you with morsels of food, which at first are put in a dish or on a branch where the animal can reach them easily, is a matter of a few five-minute training sessions. Now almost every important specimen in that exhibit is shaped to take food from a keeper’s hand every day, which not only allows the keepers to count and inspect the fragile creatures but also facilitates catching animals who must be doctored or moved.

The Brookfield Zoo near Chicago has experimented extensively with automated exhibits in which animals are conditioned to show natural behavior, such as hunting, and are reinforced

by food from an automatic dispenser when the behavior is performed correctly. Moral and esthetic objections are often loudly voiced in the zoo community to this “mechanizing” of the animals, but surely it is kinder to keep them active than to let them doze their lives away in hopelessness and apathy. Properly designed, automated exhibits appear to be fun for the animals. Brookfield’s cougar, which was conditioned to lie on a branch until an artificial marmot (a sort of ground squirrel) stuck its head out of a hole, and then to leap on the marmot before it disappeared again, would go on playing long after the food dispenser was empty.

Humanists often view operant conditioning, or any use of Skinnerian techniques, as inhuman, monstrous, Machiavellian. Yet with captive animals it is more often the failure to use the techniques that is inhumane. Positive reinforcement training constitutes an exchange of deeds for goods in which a pleasant communion arises, a salutary sort of equality between animal and trainer. One cannot work without the other, and both must do their part. That is reinforcing in itself, for both parties. I was just as pleased, just as reinforced, by Mary the rhino’s taking violets from my hand as she was pleased to eat them. The baby rhino’s learning to pick up its foot so quickly was reinforcing to Melanie. Operant conditioning in zoos is not only a benign addition to animal management practices, but rewards staff and animals alike. I am sure B. F. Skinner would not be surprised to hear that; he would just wonder why it took so long.