

Historical Perspectives

Karen Pryor

(born 1932)

Brief Biography

Karen Pryor is a writer, a businesswoman, a mother and grandmother, and a scientist focusing on innate and learned behavior in animals and people. Through her work with dolphins, she pioneered modern, force-free animal training methods based on operant conditioning and the conditioned reinforcer. She has made numerous contributions to the scientific literature: most recently, with coauthor Kenneth Ramirez (2014), “Modern Animal Training: A Transformative Technology” in *The Wiley-Blackwell Handbook of Operant and Classical Conditioning* (Frances K. McSweeney & Eric S. Murphy, Eds.).

Pryor is the author of nine popular books, including *Don't Shoot the Dog!*, the “bible” on training with positive reinforcement, and *Reaching the Animal Mind*, the story of clicker training, a technology for creating positive, effective learning and communication for pets and other animals, including people. With Kenneth Norris, she was senior editor and contributing author for *Dolphin Societies: Discoveries and Puzzles* (University of California Press, 1991).

She is the founder and CEO of a behavioral publishing and teaching company, KPCT; of ClickerExpo, a twice-a-year national conference for clicker trainers; and of TAGteach, LLC and the Karen Pryor Academy, providers of reinforcement-based instruction programs for trainers and educators. She is an affiliate faculty member of Hunter College, New York. She lives in Watertown, Massachusetts.



Early days of dolphin research. Editors Kenneth S. Norris and Karen Pryor on the deck of a fishing boat in Hawaii in 1966, creating an instrument belt for a trained dolphin to wear during open ocean diving tests. Odds and ends from the hardware store were used to make a belt with a ratchet on it, which was supposed to measure how much the animal's chest compressed during a dive. Unfortunately, the dolphin got so much smaller in circumference, even during relatively shallow dives, that it usually came back with the belt around its tail. (Photo by Henry Grozhinsky for *LIFE* magazine) (Frontispiece and caption from *Dolphin Societies: Discoveries and Puzzles*, K. Pryor & K. S. Norris, Eds., University of California Press, 1991).

A Dolphin Journey

Karen Pryor

Watertown, Massachusetts
E-mail: karenwpryor@gmail.com

The Start

From age 8 or so, I was a naturalist, raising white mice and collecting butterflies, bird watching and botanizing in the ponds, fields, and woods around my mother and stepfather's house in Connecticut. The first marine mammals I ever saw were a couple of bottlenose dolphins in a pen at the Lerner Marine Lab on Bimini Island in the Bahamas. My father, writer Philip Wylie, was on the Board of the Lab, which he had helped establish with big-game fisherman Mike Lerner. Phil and my stepmother, Ricky Wylie, often spent August at the Lerner's house on Bimini. At the age of 13, I joined them. Under the patient eye of Angelo, a local fisherman, I spent most of my time in the Lerner's glass-bottomed dinghy, watching the coral reef through the glass, and carefully choosing and hooking especially spectacular reef fish for the aquarium pools at the Lab's dock. I suppose it seems odd now, but the two gray dolphins swimming back and forth on the far side of a large dockside stockade interested me not at all.

At 15, I went to live with the Wylies in Miami, Florida; all three of us bird-watched, studied tropical plant life, and went fishing together—happy years! When college came, I chose Cornell, partly because I wanted to be a biologist. But majoring in biology in those days forced you into a pre-med track, requiring courses useless to me, such as organic chemistry and embryology, and imprisoning, too, occurring entirely indoors, involving a lot of glassware and memorization, without a live animal in sight. So I majored in English literature, which was easy for me and had minimal requirements, and then pilfered my scientific education from electives in the Agriculture School: a year each of ornithology, botany, entomology, geology, paleontology, horticulture, and scientific illustration.

On graduation day, I married a fellow Cornellian, Tap Pryor. We lived in Pensacola, Florida, while Tap, a Marine, went to flight school; we spent a lot of time snorkeling, and I, free from parental supervision, filled the house and the yard with livestock, including a pet screech owl. The Marine Corps taught Tap to fly helicopters and then moved us to Hawaii. We bought a cabin on the beach with a bit of land behind it. I had three children in the

next five years, raised pheasants commercially for the Fish and Game Department, and started a small herd of Welsh ponies.

Tap completed his military service and went to graduate school at the University of Hawaii to study marine zoology. Between babies, I too went to graduate school, first to research a book on breastfeeding (Pryor, 1963) and then to add a year each of ichthyology, oceanography, and marine invertebrate zoology to my science education.

Tap's graduate advisor studied shark perception. There was no place to keep live sharks on Oahu, so Tap and his professor used Navy tanks in Eniwetok. To continue his work more conveniently in Hawaii, Tap conceived of building an oceanarium, a large marine animal exhibit, designed for research as well as display. A drawing made with a stick in the sand in 1958 became a reality: Sea Life Park and the neighboring Oceanic Institute opened in 1963.



Sea Life Park, the Oceanic Institute, and the Institute's research pier in Oahu, Hawaii, about 1972

Meeting My Own Dolphins

Paul Breese, director of the Honolulu Zoo and one of the early supporters of Tap's project, convinced Tap that performing dolphins would be a necessity. We would therefore need a marine mammal advisor, and Paul knew just the right person: biologist Ken Norris, Ph.D., curator of Marineland of the Pacific in California, one of the few oceanariums then in existence. Ken gladly accepted the job of being our scientific consultant. Ken was full of great new ideas. For example, he wanted a

new kind of dolphin show: not just a corny crowd-pleaser with pilot whales wearing funny hats, but a science-based educational experience.

Norris was studying dolphin sonar at Marineland of the Pacific. He had hired a graduate student, Ron Turner, to train his research animal. Ron was using a new training technology, first developed at Harvard, called operant conditioning. With this system, Norris said, any intelligent person could train a dolphin. Ken arranged for Turner to write a training manual for Sea Life Park—a 20-page typed document—on operant conditioning.

Georges Gilbert, a skilled Hawaiian fisherman, was hired to collect dolphins, using Marineland's cleverly designed device for safely noosing the animal from the bow of a boat. Nobody thought about what kind of dolphins to get: they were all the same as far as we knew then, and Georges just brought in whatever he saw. The first one was a little female spinner dolphin (*Stenella longirostris*) that lived in an Esther Williams plastic swimming pool in our backyard until the training tanks at the Sea Life Park were built.

Tap and his team hired three intelligent people and gave them Turner's manuscript, but they found it unintelligible, and, as Tap put it, the dolphins trained the trainers to give them fish for nothing. By June of 1963, the park was due to open in three months, and we had no shows. Tap panicked and called Ken. Forget the science, we need some kind of trainer, and soon, and cheap. Ken said why don't you hire your wife?

I was a trainer. Sort of. I had trained—and showed and competed with—one dog and one pony, using conventional jerk-and-praise methods. I had three little children. I didn't want a job. I thought that working for my husband would lead to trouble between us (and I was right about that). But I sat down with that training manual, and I was hooked. I could wade through the (unnecessary) math in the document. I could swallow the awkward new vocabulary. I could see, from my meager but enthusiastic training experience, what I'd been doing wrong with the dog and the pony and how good this new approach was. I just had to try it.

Until that point, my duties regarding Sea Life Park had consisted largely of giving dinner parties for potential investors. I was interested in the very innovative coral reef exhibit, but I had not paid much attention to the training facility and the dolphins that were accumulating there (in fact, outsiders, including me, were banned from the training facility). The day I became the head trainer, I walked through that gate and discovered that we had three pools and three entirely different species of dolphins: six little spinners, two spotted dolphins (*Stenella attenuata*), and two HUGE male

Pacific bottlenose dolphins (*Tursiops gilli*). All of these dolphins could eat a lot of food rewards before satiating. They were the perfect practice animals for a new operant trainer.

Of course, there was more to the job than just training the dolphins and helping the other three trainers learn the operant processes. Somebody had to create the actual shows. Luckily, along with the birds and the bugs, I had devoted a lot of time at Cornell to theatre, acting in plays and writing musical comedy. I thought up some shows that would be effective in the park's dramatic settings. I took the job "temporarily" to get those shows up and running before the park opened in 90 days. I would spend most of the next decade as head trainer and curator at Sea Life Park.



On Mondays, when Sea Life Park was closed to the public, we could play with the dolphins. Here, an adult male spinner dolphin named *Haole* solicits petting from Karen Pryor and daughter Gale Pryor in the Whaler's Cove exhibit pool, 1966.

Sea Life Park

When the plans for Sea Life Park were first announced in the newspapers, a distinguished professor in the zoology department at the University of Hawaii told reporters that the dolphin shows would certainly fail because Hawaiian waters had "a very impoverished marine mammal fauna."

Well, he just hadn't been looking. In the next decade, Sea Life Park would have 13 species of whales and dolphins in the tanks. None of them, except the pilot whales, had ever previously been kept in captivity; and one, the pygmy killer whale (*Feresa attenuata*), was known to science at the time only from two skulls in the British Museum.

The reason I took the job was that I was instantly fascinated, not by the dolphins exactly, but by this new sort of training. I am not going to go into detail about the training because I have written about it extensively elsewhere (Pryor, 1974, 1975, 1984, 2009; Pryor & Ramirez, 2014).



An adult female false killer whale named *Makapuū* performing at Sea Life Park

I will, however, share some of the joys of working at Sea Life Park.

Tap had an artist's eye; he set Sea Life Park on a talus slope with the sea and islands in the fore-view and the cliffs behind—a spectacular location. The dolphins themselves were fascinating; each species has its own ethos, as it were, and all are different. Getting to know the only *Feresa* we ever kept was the thrill of a lifetime. They are small animals but large-prey predators—dangerous, strong-willed, clever, and with binocular vision backwards as I discovered the one time I dared to slip into the water with this beast. We didn't just train mammals; we trained everything. We developed a resident breeding colony of trained, free-flying red-footed boobies (*Sula sula rubripes*). Sometimes they went out to sea to fish and then came back in time to do the shows—amazing! The other trainers—Marlee Breese (Paul Breese's daughter), Ingrid Kang Shallenberger, Lehua Kelekolea, Carol Chang, Randy Lewis, and David Alices, to mention a few—were wonderful company, creative, imaginative, and fun. Training for them was not just a job but an art form.

I got to know some great scientists. Norris, who had moved to Hawaii to direct the Oceanic Institute, became my scientific mentor (as he was

for many others). He provided my first opportunities to publish in the peer-reviewed literature, including a summary paper on dolphin training and behavior for the German journal *Die Naturwissenschaften* (Pryor, 1974). For that paper, Ken opened up his card files and gave me a crash lesson in putting together a reference section—a lesson which has served me well ever since.



Ken Norris, founding mentor and chief scientist of Sea Life Park and first Director of the Oceanic Institute

I'd first discovered Konrad Lorenz in my college years, through his writings on ethology. His approach, observing what the animal actually does, and especially its communicative signals of affect, or emotions, became a crucial element of marine mammal training, balancing the purely engineering aspects of operant technology. Konrad visited Hawaii and Sea Life Park, and I later visited Konrad and his wife Gretl in Austria. Konrad wrote a touching and prescient foreword to my second book, *Lads Before the Wind* (Pryor, 1975), and we maintained a correspondence to the end of his life.

I met Fred Skinner a few times and lectured at his lab once. His daughter, Deborah, worked at Sea Life Park one summer. Deborah and her older sister Julie became my lifelong friends. Julie and her husband, Ernest Vargas, remain direct pipelines to Skinner's thinking when I have a question. Philosopher/scientist Gregory Bateson worked at the Oceanic Institute and with his brilliant wife, Lois, became friends as well. John Lilly, who brought the Batesons to us, was dismissed by some for his wild ideas and drug habits, but he was brilliant, too, and a valued colleague to me. (Oh boy, could he give a realistic dolphin distress whistle! He scared my spinners to the bottom of the pool once; and they took so long to come back up, I feared they'd drown.)

Under the auspices of the Oceanic Institute, we trained dolphins to work at liberty in the open sea. At that time, Navy trainer Bob Bailey and I had a joking argument about who was the first to release a trained animal. Our *Keiki* first went loose one day after their first release of a dolphin named *Tuffy*, but *Tuffy* was attached to a buoy, so I maintain that didn't count. Ken Norris initiated a number of experiments requiring us to use our trained dolphins in the open ocean, including speed trials and deep diving experiments. I was the trainer on most of these pioneering efforts. It was tremendous fun for us, and I think for the animals, too. In perhaps a dozen different experiments, two of the trained animals left the working area and were not recovered; they were after all in their native waters and may have detected species mates in the distance. However, the majority seemed to enjoy the work and also appeared relieved to return to the safety of their floating pens after a day in unprotected open waters.



Open ocean research: speed trials. The dolphin, a juvenile bottlenose named *Keiki*, was trained to chase this boat over a marked course, offshore from Sea Life Park. Collectors Georges Gilbert and Leo Kama are managing the boat while trainer Karen Pryor (on walkie-talkie) cues and rewards the dolphin. Top speeds were about 12.5 knots. This research made the cover of *Science*, with a dramatic photo of *Keiki* surfing in the boat's wake.

In the 1960s, by necessity, much of what we trainers did was being done for the first time, ranging from the open ocean training challenges to operant training of invertebrates. The "creative porpoise" experiment, trained by Ingrid and me, funded by the Navy, and reported in the *Journal of Experimental Analysis of Behavior*, is still widely cited (Pryor et al., 1969). I think, though I have no way of proving it, that the Welsh pony herd I had established on Maui were probably the first "dolphin-trained" horses (Pryor, 2009), and I'm pretty sure David Alices produced the first operant octopus: it sat in his hand at the water surface, turned itself upside down, and, from its siphon, made a fountain of water into the air, all for a treat of crabmeat.

Changing Times

In the early 1970s, Sea Life Park ran out of money and was taken over by new owners. They fired the existing management, including me. Tap and I were divorced. Our children, Gale, Mike, and Ted were 14, 16, and 17. I promised them that I would stay in Hawaii and keep the four of us together until the boys graduated from high school, which was a couple of years away. I put together a book proposal about training dolphins and sent it to Harper & Row, the firm that had published my first book, *Nursing Your Baby*. They said yes and paid me a \$5,000 advance. The boys both got after-school jobs to help out. Thus, we covered the minimal necessities (housing, gas, and groceries) for me and three teenagers for the year it took to write *Lads Before the Wind*. At the end of the year, I went job hunting and landed a day job with an advertising agency and a night job as drama critic for the morning newspaper. As I went to work writing ad copy and theatre reviews, I assumed my dolphin days and indeed my training days were over. Well, I was wrong about both.

The Tuna-Porpoise Problem

From other trainers in Hawaii, I had heard of a new problem for dolphins: fishing boats surrounding schools of spinner and spotted dolphins in purse seine nets in order to catch the tuna that sometimes swim with them. Of course, I'd had lots of personal experience with these two members of the genus *Stenella*. I knew how silly and helpless they can be in the presence of any sort of barrier. I decided that if those boats came to Hawaiian waters and netted our animals, I would go to the newspapers instantly with all the reasons why that's a really bad idea.

Instead, the tuna industry came to me. I was home with a cold one morning when a man from the canning company, Bumblebee Tuna, called to invite me—to order me, really—to come to lunch, right now, in Waikiki, with the president of Bumblebee. I said no, thanks, I'm sick today, but he persisted. Finally, faintly curious, I gave in and drove to town. We were three at table: the president, who seemed like a decent sort, the sidekick from the phone call, and me. While we ate, they explained how the fishing worked. They discussed the efforts the industry was making to reduce dolphin mortality. Then, the sidekick described the environmentalists who were picketing the tuna fleet's docks in San Diego and making a considerable fuss in other ways. Did I think that really made much difference?

I said “I think they’re going to close you down. Thanks for the crab salad” and went home. That was the end of that, I thought.

Meanwhile a scientific publishing house had written me in reference to a book on dolphin behavior being put together by Lou Herman, a professor at the University of Hawaii. There was to be a chapter on dolphin training by R. H. Defran, a psychology professor at San Diego State University whom I did not know. The publisher wanted my opinion: good idea or not? I said a chapter on dolphin training would be a good idea if I wrote it. Herman thereupon asked me to co-author it with Dr. Defran, and I agreed.

My boys graduated from high school. The Pryor grandparents stepped in to help them, so both boys were headed for college on the mainland. I packed up myself and my daughter, Gale, and moved to New York, my hometown, with introductions and job leads in the advertising world. En route, I spent a few days in San Diego to work with Dr. Defran on the training chapter (Defran & Pryor, 1980). I was slogging away in a borrowed office in a summer-emptied building at San Diego State when the phone rang. Not for me, I assumed, but I picked it up. It *was* for me. It was the tuna industry’s representative in New York, offering me a consulting contract.

When I got to New York, I met with the representative and took the offer. I could stay in New York, take care of Gale, and be on call as needed. No need to hunt for that job in advertising! Ken Norris told me they’d have hired me if I’d been a plaster saint—in other words, all I would be was a figurehead. A distinguished environmentalist told me I was a “biostitute,” a great word. But I thought that the fishing industry and especially the fishermen themselves were the ones who would have to solve the problem, and I would be most useful if I could help them directly.

Often, that just meant providing a little common sense. In my capacity as the industry’s marine mammal expert, I sometimes attended government-based meetings. In one U.S. Senate hearing, an environmental group proposed that the tuna fishing boats be required to have on board a trained bottlenose dolphin that could be turned loose in the nets to lead the wild dolphins to safety. The row of senators in the front of the room looked confused. I realized they had no way of knowing if that was a sound, fundable idea or nonsense. So I raised my hand. The chairman called on me. I explained that (1) spotted and spinner dolphins would be afraid of strange bottlenose dolphins and wouldn’t dream of following them anywhere, and (2) dolphins in tanks on shipboard can get seasick. There were other reasons why this idea would be impractical, but those two

sufficed. I was called to a lot more hearings after that. Whether I actually made a difference, I don’t know, but I never personally heard another biologically absurd proposal being put on the table when I was sitting in the room.

The Dedicated Vessel

Gradually, the problems were being reduced. Skippers Joe and Harold Medina devised a fine-meshed lining for the escape route in the net so that dolphins could not get caught by the rostrum (mouth) or a fin by accident as they were being set free. An Expert Skippers’ Panel was established to train new or less skilled skippers to set the huge nets in relation to wind and current, so they did not close over the dolphins and drown whole schools. An on-board observer program facilitated data collection at sea. A consortium between industry and government was formed to fund a full year of research, putting scientists aboard an actual purse net tuna seining boat doing the actual fishing.

The program was called The Year of the Dedicated Vessel. The vessel involved was the *Queen Mary*, with one of the most capable skippers in the fleet, Ralph Silva. Quarters were refitted to house six scientists for a series of three- to six-week trips to study the tuna, the net, the fishing methods, the weather, and the dolphins. I was invited to participate as a principle investigator. I asked Ingrid Kang Shallenberger, head trainer at Sea Life Park since I left, to come with me. Ingrid had a degree in ethology, with many years of experience, and no one, including me, knew more about the behavior of spinners and spotted dolphins or “spotters” as the fishermen called them.



Karen Pryor and Ingrid Kang on the bow of the tuna vessel, *Queen Mary*, at the start of a chase, 1979

I will not take space here to describe the ludicrous and time-consuming bureaucratic snafus that preceded our trip, but eventually Ingrid and I were allowed to go. We were well-prepared. I was

at the time also consulting to the National Zoo in Washington, DC, on operant training of zoo animals. The team at their research facility in Front Royal, Virginia, taught me about Jean Altmann's Focal Animal Sampling (Altmann, 1974), the perfect method for making some sense out of behavior in a large group of animals. Bill Perrin, a lead scientist at the National Marine Fisheries Service laboratories in La Jolla, California, requested that I prepare all our data to be computer processed. This was in 1979 when I'd never even seen a computer; however, that was a very good idea, and we conformed our data collection process so everything could later be keyed in. A friend, Jon Lindbergh, a biologist and ex Navy Seal (and my future husband, though I didn't know it at the time) showed me how to make Plexiglas slates you could write on underwater with an ordinary lead pencil. We went to sea with stacks of them.

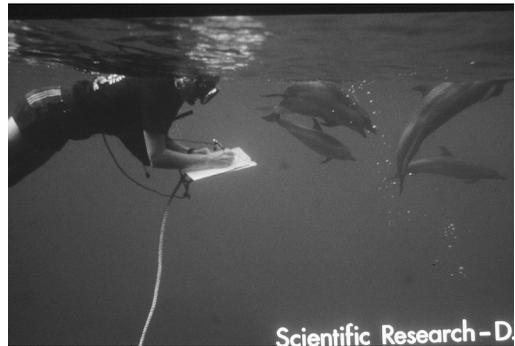
Ingrid and I created an ethogram, a list of the spinner and spotted dolphin behavioral events we'd observed in captivity, from different sorts of respiration to threat displays, social greetings, and aerial behavior. And the government provided the research team with an underwater camera that was easy to use and gave us some truly wonderful results.

We had been warned by the bureaucrats that fishermen did not like scientists, and we would be treated with hostility. I had experienced a hostile civil service crew on a government research vessel the year before, and it was a real pain; but this trip was different. From the moment we cheerfully signed on to the ship's dishwashing roster, we were treated with kindness and respect by all. Aside from being scared in rough seas now and then, and getting scraped, bumped, and bruised whenever we got on and off the rolling ship and into the net, we had a wonderful time all the way.



Ingrid, Karen, and biologist Philippe Vergne, our driver, in the Avon that carried us into the net; getting down (and back up) the slippery ladder from deck to water was always difficult, especially in rough seas.

The fishing occurred in the Eastern Tropical Pacific, a thousand miles or more from land, in abyssal depths. The water was lukewarm and wonderfully clear. When the net was set, we put our gear into an inflatable raft, lowered the raft, and climbed down into it. A young industry biologist, Phillippe Vergne, kindly served as our boat handler and shark guard (sharks were sometimes present in the net, but they only showed up when the very last part of the net was brought aboard; apparently they stayed in the bottom the whole time because Ingrid and I never glimpsed even one). We went out into the net and took data under water for about an hour in each set, once doing three sets in one day. We focused on spotters since spinners were not often in the nets on this trip and were hard to observe, moving fast and almost always keeping far away.



Snorkeling in the net amidst a school of spotted dolphins. Ingrid is taking a focal animal sample using a plastic slate and an ordinary lead pencil. The words "Scientific Research" identify this photo as not being representative of normal fishing activities. The black cord tethers the slate to Ingrid's waist, and the white line below Ingrid tethers her wrist to the raft—a requirement of the captain so he wouldn't lose sight of us and a great nuisance at times. (Photo by Karen Pryor)

When the net was gathered in, the animals released, and the tuna, if present, iced down in the hold, we came back aboard and spent the next hour or two transferring our data to paper. The government wanted us to look at fear levels. We did that, but what interested us most was how spotters might be organized into social groups. Aerial photography had shown that in the wild, spinners and spotters can assemble at times in the thousands. Research by Norris and others (1994) had demonstrated that spinner societies are very fluid and fluctuating. However, from what we'd seen of spotters in captivity, we suspected that spotters might have tightly organized and relatively permanent social groupings that might remain intact during a chase or in huge aggregations, and we wondered if that was so.

Here, briefly, is what we learned:

The animals are not dying of fright. With the exception of one school in one set, those we saw gave evidence of previous experience with nets and fishermen. They were calmly awaiting release, carrying on their normal social life with their activity level related to time of day. The smallest individual schools we saw in the nets were under 30 individuals; the largest were around 300. We soon learned that spotters live in separated social groups or schools. In one set, there were several hundred spotters in the net. They looked like one school from the surface, but under water we could see they were actually in three entirely separate schools.



A mother-young subgroup in the nets. Spotted individuals are both senior females; the grey animal in the foreground is a juvenile. The close inter-animal distance indicates close relationships between all three. The animals are surprisingly tolerant of the close approach of Karen taking the picture.

Every school is made up of subgroups of animals. Bill Perrin had identified the way spotter color patterns change with age, so we could identify the age class of subgroups, even when size was not much help. The subgroups are mother/calf pairs; mother/young subgroups consisting of two or more females and young, sometimes including a senior adult female as well (this would probably be a grandmother with a daughter and her calf in the group); small groups of four to six juveniles swimming in formation, not seen in every set; large subgroups (10 to 25 or so animals) of young adults, males and females mixed, with a good deal of activity, including play, sexual play, and small fights or play-fights; and the very dramatic senior male subgroups of three to six large, heavy-set, fused-pattern males swimming in tight formation like fighter planes. The only solitary animals we noticed were an occasional “lost” baby, circling and crying by itself, probably separated from its mother during the speedboat chase that herded the animals to the ship and the net.

I wrote a detailed government report publishing our data (Pryor & Kang, 1980). I was at the



A senior male subgroup formation of five animals moves through the school (upper right) while threatened (jaw gape) by another senior male group coming up from below.



In close quarters as the net is drawn in, just before backing down and releasing the animals. A senior male subgroup of three looks curiously at the photographer (KP) while another male subgroup of four (note the white rostrum tips) passes behind them. A female-young subgroup is at lower right. The vertical diving and then surfacing of animals in the background is a common behavior of spotted dolphins in the net which we labeled “columning.” It is not visible from above the surface.

time attending Rutgers University part-time as a Ph.D. candidate in Zoology, using the government report as the basis for my thesis. I also crafted a summary paper of our findings and submitted it to peer-reviewed journals. One after another they turned it down, and always for the same reason: the reviewers had rejected our findings.

I’m sure the submittal needed improvement, but flat rejection gave no room for that. I surmised what might be happening. Only a handful of scientists had been to sea and actually watched the fishing: Perrin, Norris, and a few others. Those scientists had all seen the dolphins at the surface from the ship’s rail (nobody was crazy enough to actually jump in the water). On the surface, you see two dimensions; but the schools actually live in three dimensions, and it looks very different from below. The reviewers had probably been

drafted from that population of surface observers; who else would there be, after all? And the most convincing objections probably came from the one with a long background in field studies: Ken Norris.

So, given that government reports are somewhat ephemeral, I would have to get this information published in some other way. An editor from one of the scientific presses, George Narita, had been talking to me about a possible book. I had by now spent a lot of time at the National Marine Fisheries Service offices in La Jolla, so I proposed a book on the many different ways NMFS scientists and others have devised to investigate the lives of cetaceans in the wild, where your study animals are largely visible only as rolling backs disappearing in the distance. Some people did computer analysis of aerial photographs; others studied cross-sections of teeth to determine age and pregnancies of animals killed in the fishery. Russian scientists were following dolphin schools in the Black Sea from shore by bicycle; and there were more, including, of course, Ingrid and me diving in the nets. Narita gave me a contract. I persuaded 13 other scientists to start producing chapters.

By and by, Narita's boss decided the book needed an editor better known than me (and maybe not a woman). Ken Norris was suggested. I asked Ken. He said sure, provided my name came first, which was fine with me since I was going to do most of the work. However, Narita's boss rejected that idea and threatened to cancel the contract if Ken's name were to come second. We agreed to cancel the contract. Ken was now a professor at the University of California at Santa Cruz and had already published with their press. The university press gave us a contract at once; and our female editor liked having a woman's name first.

The other authors' contributions started coming in, and they were excellent. Then, I finished my chapter and sent it to Ken. He said he didn't believe it; that it wasn't publishable. At last I could address a critic directly. Look at the data, I said, and sent him the government report with all the numbers such as respiration rates on focal animals as indicators of levels of stress in each set. Ken accepted the chapter, and it ran as written (Pryor & Shallenberger, 1991). It was 12 years from the first dive in the nets to the first formal published account—and worth it.

The Marine Mammal Commission

Gale and I had three happy years in New York together; and then she went away to college and off to her own life. The boys were living far away. The tuna consulting had come to an end.

Jon Lindbergh and I decided to get married. Jon is uncomfortable in cities. I couldn't expect him to live in New York while I fulfilled my final doctoral requirement, spending a year full-time on campus at Rutgers, so I junked that project and moved out to Jon's terrain in the Pacific Northwest.

NOW, surely, I would be done with the dolphins. Well, no. I was sitting peacefully at my first computer, writing the book I had long hoped to write—a handbook on positive reinforcement for people (Pryor, 1984). The phone rang. It was Bill Evans, chairman of the Marine Mammal Commission, and he was inviting me to be one of three Commissioners, a presidential appointment requiring Senate approval.

Please note that as with most of my other dolphin-related adventures, I didn't look for this, I didn't particularly want it, and I had no idea why my name was on the list. I can only suppose that my qualifications were that I had something to do with marine mammals; that the Reagan White House was starved for female appointees; and that perhaps the Commission's director, John Twiss, assumed from my modest demeanor over a lunch in Washington, DC, that I would be docile and biddable. Oops. However, it's a virtuous deed to do government service once in one's life, right? So, again, I said yes.

Again, I will not describe the ludicrous and time-consuming bureaucratic labors that preceded my appointment, full details being available elsewhere (Pryor, 1995). The job involved inspecting, commenting, and advising on research proposals, permit requests, and outgoing Commission documents and correspondence related to the well-being of every seal, polar bear, and cetacean in U.S. waters as well as participating in the annual meetings and other gatherings as required.

I did help some programs get funding. I put an end to some misguided ideas. I commented on a lot of permit requests. Possibly, I improved some regulations (yes, you may release captive dolphins back into their native waters, but please give them freeze-brand IDs first so we might be able to learn what happened to them afterwards). The one thing I'm sure I accomplished during my three years of service was that no documents went out of the Commission riddled with split infinitives.

Under the leadership of John Twiss, the Marine Mammal Commission was instrumental in developing conservation programs with marine mammal benefits (save the sea otters from drift nets, say) but also with oceanic implications (save a huge number of sea birds while you're at it). Considering that the Commission is probably the smallest agency in the entire U.S. government, its beneficial reach in my opinion has been huge.

South American Dolphins

Jon Lindbergh was an aquaculture pioneer with business interests in Chile, Argentina, and Brazil. I went to South America with Jon at least once a year all through the 1990s. Wherever we were, I spent most of my time bird watching, but we often glimpsed marine mammals, too, such as Dall's porpoise (*Phocoenoides dalli*), from the decks of ferry boats. Biologist Natalie Goodall invited us for several visits to Harberton, the Goodall ranch in Tierra del Fuego, as she and her husband were interested in possible salmon farming projects. Natalie, a botanist, became interested in marine mammals and had collected carcasses and skeletons from the beaches of Tierra del Fuego for many years. I spent hours with Natalie in her huge, beautifully prepared and annotated collection of marine mammal skeletons, at that time housed in a government museum in the town of Ushuaia, with additional materials at Harberton and the Goodall residence in Ushuaia.

In Laguna, Brazil, we blundered into a commercial mullet fishery, taking place in an industrial port, involving men and dolphins working cooperatively. It was not some sporadic curiosity but an almost daily and year-round event. Across two visits, I was able to gather enough information for a publication on this interesting fishery (Pryor et al., 1990). The work has now been much extended by Brazilian scientists. However, the fishery has reportedly been impacted since then by factory ships harvesting the mullet before they reach their inshore breeding grounds.

In a bay in Ayesen, in southern Chile, I got a good look at the elusive little inshore marine mammal, *Cephalorhynchus eutropia*. Ken Norris had been in these waters too, and dubbed this animal the "Chilean black dolphin." Going from shore to an aquaculture project in the Ayesen bay, I spotted a small group in the distance, persuaded the skiff driver to stop, and asked one of the crew to make noise under water by banging two bits of pipe together. He rapped out a nice little samba rhythm, and the animals, curious, came over at once, circling the boat at arm's length, upside down and rightside up, proving themselves to be sort of beige-gray with attractive hourglass patterns underneath and, in some cases, a white ring around the neck like a dog collar. I took pictures. They're not black, Ken. Incidentally, I heard later that because these animals usually avoid boats, and did so again after Jon and I had left, the fish farm crew decided I was probably a witch.

Clicker Training

By 1991, *Don't Shoot the Dog!* had been out for several years in paperback with modest sales. I decided to draw it to the attention of the behavior analysis community and sent a copy to the then president of the Association for Behavior Analysis International (ABAI), Phil Heline. He asked me to give the President's Invited Address at their next annual meeting in San Francisco in May of 1992. In addition, I organized a panel of modern operant trainers, including Ingrid, to show the behavior analysts what we were doing with their science. I also accepted an invitation to give a two-day seminar for dog trainers in the Bay area to cover expenses. One of my panelists, Seattle area dog trainer Gary Wilkes, suggested a new marker stimulus for dogs: not the dolphin trainer's whistle, but a novelty item, a box-shaped clicker. We ordered 500 and distributed them at the ABAI conference and at the dog seminar.

For 30 years, modern operant training had been almost exclusively the province of marine mammal trainers. In the hands of this community, the technology evolved to a very sophisticated level, but somehow it was stuck there, as if it were only useful for dolphins. Now, that changed. Clickers caught on instantly with the San Francisco dog trainers. What we did had a name now—clicker training. It was identified and defined by this little plastic talisman on which, handily, you could print your contact information. Every clicker became a sales pitch for clicker training.

Other dog trainers wanted seminars. I had arranged for the taping of my speech and the panel discussion at the ABAI meeting. I took the resulting videos to dog training seminars, and we sold out. Another new phenomenon, the Internet, helped spread the concept. I was selling the videos I'd made by mail order and online, and now people wanted books, too. Computers made it easy to print books without needing a publisher. Suddenly, Jon and I were in the publishing business ourselves, with Alexandra Kurland's *Clicker Training for Your Horse* as our first smash hit (she had found *Don't Shoot the Dog!* and our clickers on the Internet).

The dog trainers who started using the modern operant training found it wildly exciting. The dog/handler dyad became my new intellectual focus: what's going on here, and how do we make it work better for both sides? Meanwhile, the business was making money, and that's always fun, too. While I tore off down this new path, Jon was ready to retire. He had helped with the formation of the business, doing the accounting, editing videos, even packing and shipping orders, but none of this was fun for him. After 15 years

of marriage, our lives were diverging. We parted amicably, and I moved to Boston, where I could be near my family and the business could grow.

New Ideas

And grow we did. I started with one employee and two rented rooms. We spread. At the time of writing this essay (autumn 2013), the business (Karen Pryor Clicker Training) now has many branches, including an education division (Karen Pryor Academy), a series of educational conferences (ClickerExpo), a publishing arm, and a line of products. We also have a sister company, TAGteach International, LLC, that teaches our technology in human applications, ranging from classrooms and sports coaching to medical and industrial staff training, mental health, and autism.

I know now that I was extremely fortunate to have learned operant conditioning from the dolphins and not in a laboratory or classroom. I was thus detached from the conventions both of traditional animal training and of behavior analysis. From the start, I have been free to drop the customs of deprivation, correction, and punishment, and to proceed purely on what actually works best: managing reinforcement contingencies.

And what about the marine mammals? Did they follow me to Boston? Except for taking grandchildren whale watching or swimming with dolphins, not really. However, another encounter did occur. For many years, I had been following, online and with some envy, the field work of Robin Baird and the Cascadia Research Collective, who track individuals and groups of the many species of cetaceans around the Hawaiian Islands. In 2012, I extended a family trip to Hawaii by spending two days of cetacean-watching with Robin Baird's team. I had no expectations. We might see a lot of animals; we might see none. We were lucky. Across the two days, we had 11 close-up encounters with four different species, including a slowly traveling school of spotted dolphins.

I had always worried about people saying, of Ingrid's and my report on spotter social groupings and behavior, that the animals were under artificial conditions in the nets, and things might be different in the wild. But from the bows of Baird's little research vessel, I saw—and videotaped—four of the five groups we'd identified in the nets: mother/infant pairs, mother/young subgroups, young adult groups, and, at last, a six-animal senior male group. Only the small juvenile type of subgroup was missing, and probably not every school has them anyway, so I was not surprised.

After we'd been among the spotters for an hour or more, the motor revved, and we started to leave, throwing up a fine stern wave. And there, surfing in

the stern wave, were six little juveniles, in tight formation—the fifth type of subgroup. As they sank out of the wave, one of them threw itself into the air in a high horizontal display leap that is specific to spotters. Back in the Sea Life Park days, our collector, Georges Gilbert, had described this leap to me, but I had never seen it for myself, not in captivity and not in the nets. Now, here it was; and as if to make sure I saw it, the little juvenile did the jump again. You can see my subgroups video and the display leap video, and hear me and a fellow researcher jumping up and down and cheering at www.clickertraining.com/node/3635. Mahalo, keiki! And Aloha nui loa, spotters—until we meet again!

Karen Pryor

All photos contributed courtesy of Karen Pryor.

Literature Cited

- Altmann, J. (1974). Observational study of behavior: Sampling methods. *Behavior*, 49, 227-267. <http://dx.doi.org/10.1163/156853974X00534>
- Defran, R. H., & Pryor, K. (1980). The behavior and training of cetaceans in captivity. In L. M. Herman (Ed.), *Cetacean behavior: Mechanisms and functions* (pp. 319-362). New York: John Wiley & Sons.
- Norris, K. S., Würsig, B., Wells, R. S., & Würsig, M. (1994). *The Hawaiian spinner dolphin*. Berkeley: University of California Press. 408 pp.
- Pryor, K. (1963). *Nursing your baby*. New York: Harper & Row (Revised, 2nd ed., 1973; 3rd ed. with Gale Pryor, 1991; 4th ed. with Gale Pryor, 2005).
- Pryor, K. (1974). Learning and behavior in whales and porpoises. *Die Naturwissenschaften*, 6, 412.
- Pryor, K. (1975). *Lads before the wind: Adventures in porpoise training*. New York: Harper & Row.
- Pryor, K. (1984). *Don't shoot the dog!* New York: Simon & Schuster (Bantam Books, 1985; Revised, 1999).
- Pryor, K. (1995). When the president appointed me. In K. Pryor (Ed.), *On behavior* (Chapter 15). North Bend, WA: Sunshine Books, Inc.
- Pryor, K. (2009). *Reaching the animal mind: What clicker training teaches us about all animals*. New York: Scribner.
- Pryor, K., & Kang, I. (1980). *Social behavior and school structure in pelagic porpoises (Stenella longirostris and S. attenuata) during purse seining for tuna* (Southwest Fisheries Center Administrative Report #LJ-80-11C). La Jolla, CA: Southwest Fisheries Science Center.
- Pryor, K., & Ramirez, K. (2014). Modern animal training: A transformative technology. In F. K. McSweeney & E. S. Murphy (Eds.), *The Wiley-Blackwell handbook of operant and classical conditioning*. New York: Wiley-Blackwell.
- Pryor, K., & Shallenberger, I. K. (1991). Social structure in spotted dolphins (*Stenella attenuata*) in the tuna purse

- seine fishery in the Eastern Tropical Pacific. In K. Pryor & K. S. Norris (Eds.), *Dolphin societies: Discoveries and puzzles* (pp. 293-303). Berkeley: University of California Press.
- Pryor, K., Haig, R., & O'Reilly, J. (1969). The creative porpoise: Training for novel behavior. *Journal of Experimental Analysis of Behavior*, *12*, 653-661. <http://dx.doi.org/10.1901/jeab.1969.12-653>
- Pryor, K., Lindbergh, J., Lindbergh, S., & Milano, R. (1990). Dolphin-human fishing cooperative in Laguna, Brazil. *Marine Mammal Science*, *6*(1), 77-82. <http://dx.doi.org/10.1111/j.1748-7692.1990.tb00228.x>