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Lessons from Captive Reptiles

Jeni being introduced to a captive olive python, *Liasis olivaceus*, by Anthony Stimson. Captive animals can start a life-long fascination, as happened with her father. Photo by Albertina Lima.

One of my few scientific papers based on captive reptiles was about reproduction in file snakes[63]. There are now known to be three species of file snakes, but at the time, only two had been described[64]. All three have the same body plan, which apart from being long and attached to a head with extendible jaws, is very unsnake like. The skin seems to be several sizes too big for them, making them look like badly filled cloth door stops, and their scales are tiny and do not overlap, much like the raspy skin of sharks. Someone had brought a lot down from northern Australia, but they refused to eat and all had died except one.

I put the snake in a large aquarium with water hyacinths and gave it live gold fish to eat. It did not eat the goldfish, and I assumed that it would eventually die, but I remembered the other snakes that did not recognize domestic animals as prey and I caught a large freshwater mullet for the snake. My mother recounted how happy she was when she entered my room a few hours later and saw the snake using body coils to push the fish down its throat. It probably would have started feeding much sooner if I had thought to use different species of fish. The goldfish I gave it were probably like white mice and had lost much of the chemical signals of fish in the long process of domestication.

The snake seemed ungainly and at first I couldn't imagine how it caught fish, but one day I watched it catch a freshwater mullet. The snake was loosely curled among branches near the top of the tank and the mullet bumbled into it at mid body. Loosely draped coils instantly formed a tight bag and engulfed the mullet, whose struggles just pushed it further into the middle of the ball. The snake's head then slowly moved back investigating the coils until it found the front of the mullet and started to swallow it. I have never seen any other snake capture prey without biting it.

Photo 4.1 *File snakes,* Acrochordus arafurae*, and other species in the genus are different from most snakes in that they have loose baggy skin covered in granular scales. Photo by Bill Magnusson.*

I could now see the reason for the bag-like raspy skin and another possible reason that it had not caught the goldfish I had given it; they were just too small to catch by its preferred method. Once we found that the snake did not require free-swimming fish to stimulate it to eat, we started feeding it on fish we caught or that were sold by the local seafood shop. I spent about eight months a year in northern Australia during my Ph.D. studies, and my father looked after the file snake when I was away. It learned to come to us when we approached the aquarium and we could even feed it on fish fillets. It got so fat from all the fish my father gave it while I was away that I usually starved it for the four months I was in Sydney.

The way it caught fish was not the only strange thing about the file snake. Seven years after it was given to me, it had convulsions and died. When I autopsied it, I found nine undeveloped eggs and a fully formed embryo. Either it had stored sperm for 7 years, or it had produced the embryo by parthenogenesis, the process by which some animals can reproduce without mating[65].

I liked to travel, which is not compatible with dedicated animal husbandry, so I had to impose on family members to look after the snakes while I was away. The following passage was written by my sister.

> "Mum, Dad and Bill, who was still a school student, were going on a holiday. As I had to work and couldn't go with them, it was my responsibility to take care of his snakes. Despite my protests, it was decided I must stay with our grandparents. This arrangement required me to rise early enough to drive Bill's old car from Gran's house to our home, feed and water various snakes, and return to Gran's in time to shower and change before catching a train to work in the city. Inexplicably this was considered the safest most practical option.
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> Grandma accompanied me on several days. Being an avowed city girl, she was always immaculately dressed and had never voluntarily interacted with the natural world. On one occasion, being too afraid to lift the lid of the tank that contained a small tiger snake, I tried to fill its water container by pouring the water through the wire mesh top. I accidentally spilled most of the water into the tank, submerging the surprised snake. Wonderful Grandma steadfastly guarded the lid of the tank as I tried to rescue the snake and we succeeded in safely scooping the water out and replacing the lid.

Photo 4.2 *Bill's grandmother, Nellie Webb, when she was 84 years old and went shooting the rapids in a jet boat in New Zealand. She also helped care for his snakes. Photo by Dorothy Magnusson.*

I was fairly stressed by this time and I had still forgotten to fill the water container. Again, I tried to pour the water through the lid and again inundated the poor creature - repeat performance!

Another day, we found the beautiful file snake had spectacularly defecated in her large fish tank. I gingerly lifted her out of the water, placed her on a towel and handed her to a calm, fascinated Gran to look after while I cleaned the tank."

I was only able to keep my animals because of dedicated helpers. I will be eternally grateful for the friends and relatives I don't deserve!

My father was typical of most people who had lived in rural and wilderness areas in the early part of the twentieth century and basically believed that the only good poisonous snake was a dead one. However, he carefully looked after the few snakes that I still had when I was a post-graduate student and had to be away from Sydney for long periods. One of those snakes was a king brown snake[66], one of the largest and deadliest of the Australian elapids. King browns are a bit like black snakes in general shape, but tend to have wider heads, and their coppery-brown color is much more like that of the eastern brown snake. They are generally placid and responsible for few deaths because you usually have to do something fairly drastic to make one want to bite you.

I kept the king brown, which was as thick as my wrist, in a large aquarium at the foot of my bed. The aquarium lid was made of heavy timber and mesh, but the snake easily lifted it by pushing up with its nose, so I put house bricks on the corners. The snake lifted the lid and the bricks, so I had to use large sandstone blocks to keep the cage closed. The king brown was almost as placid as the black tiger snakes and generally just lay with its head resting on its coils, looking toward the door. My father became strangely attached to the snake and when I returned from an eight-month absence he asked “You know that snake knows who’s family?”

Photo 4.3 *A king brown snake in captivity in Taronga Park Zoo. These highly-venomous snakes are generally docile and attentive to their keepers. Photo by Bill Magnusson.*

I was used to bush tales about snakes and had learned to contain a smile when some old bushy told me that snakes can grab their tails in their mouths and bowl like hoops, or that they can outrun a horse. However, this was the first time I had been told about supposed intellectual capabilities. I was inclined to explain to my father that snakes have relatively small brains that lack the convoluted grey matter that makes us so smart, and that there was no evolutionary gain in snakes being able to identify individual humans. Containing my skepticism, I asked "How do you know?"

My father led me to the door of my room, pointed at the snake and said "There!"

The snake was lying in its habitual position with its head on its coils and I replied “But it didn’t do anything”.

My father said “Yes, now I’ll call the neighbor - you watch the snake.” I stared at the snake as my father invited our next-door neighbor to stand in the doorway. Instantly, the king brown lifted its head off its coils. The movement was only about 2 cm, but it was unmistakable. We repeated the experiment many times. When a family member, independent of the clothes they were wearing, stood in the doorway, the snake didn’t move. When a stranger moved into the doorway, even for only a few seconds, the snake lifted its head. The snake must have been recognizing people from facial features, and over a distance of more than two meters, almost instantaneously. Laurie Vitt has a similar story about a prairie rattlesnake he kept when he was 9 years old. Birds[67], octopuses[68] and probably fish[69] can recognize human faces, and even tortoises follow the gaze of other tortoises[70], so why not snakes?

The stories my parents told me about snake behavior had already started me thinking about how a snake interprets human intent. My father described a time he was walking along the bank of a stream when he encountered a large eastern brown snake. He immediately picked up a stick and advanced on the snake to kill it, which responded by raising its head high off the ground and circling him. He assumed the snake was trying to get behind him and he circled with it.

Photo 4.4 *An eastern brown snake in defense position. Photo by Bill Magnusson and Anthony Simson.*

The hunter had turned into the hunted and my father did not know what to do because it would have been impossible to stop the snake if it had rushed at him. After circling him, the snake dropped to the ground and slithered off so quickly that he couldn't overtake and kill it. The snake may have been circling to get an opportunity to attack, but it may just have been keeping the predator's eyes in sight until a slight flicker of inattention meant that it could make good its escape. In any case, the snake had obviously decided that its survival depended on confronting the enemy for a while rather than immediate flight.

My mother described a similar encounter with a brown snake that had a different outcome. She was fishing beside the stream when she saw a brown snake moving along the bank towards her. Instead of picking up a stick, she just stood still watching the snake. When it was an arm length away it detected her

presence, but instead of rearing up in a strike position, it threw itself into the stream and swam to the other side. Some 70 years later, my mother still speaks with wonder of the beauty of the snake as it swam with its head several hand spans above the water and its body completely submerged.

Snakes can not only recognize people, they can probably recognize fear in unfamiliar humans. This was brought home to me by an unplanned experiment carried out by my mother. My aunt had a phobia about snakes and trembled just at the thought of being near one. My mother often looked after my snakes and knew that they are placid and basically ignored humans. After much cajoling, she convinced my aunt to enter the snake shed and see how unfrightening they were. My mother and I had been walking among the snakes several times a day.

As soon as my aunt passed the doorway, the normally placid black tiger snakes both reared up and started striking at the glass. When my aunt turned and ran out screeching expletives that my mother didn't know she knew, the snakes returned to their lethargic state almost immediately. My mother figured that my aunt's sudden appearance must have startled the snakes, so she cajoled her into entering the shed again, this time moving very slowly and keeping away from the tiger-snake cage. She was barely in the shed when the tiger snakes started striking at the glass again and my aunt ran out never to venture near the place again. The snakes did not respond that way to any of the dozens of other people we took to see them over the years. How did they detect her fright so quickly and why did they react the way they did? I don't know, but ever since I have been unable to look at a snake without wondering what it is thinking as it looks back.