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Big Rivers, Big Snakes and Tall Tales



This juvenile anaconda, *Eunectes murinus*, probably eats mainly fish, but as an adult it will be able to eat large mammals, such as capybaras.

Photo by Bill Magnusson.

One of the precursors of the Amazon River flowed north through what is now the Orinoco River in Venezuela. At that time, there was a lake covering most of the west of the basin that was home to many giant animals, including crocodilians and turtles. With time, the Amazon cut a channel through the highlands to the east, lost its connection to the Caribbean, and started to flow east into the Atlantic Ocean. Although the basin no longer forms a lake, much of the low-lying land around the Amazon and its tributaries floods each year, forming the World's largest freshwater wetlands. Therefore, much of the fauna, including the lizards and snakes, is adapted to an amphibious life style.

Soon after I started working in Manaus, another researcher gave me the tanned skin of a caiman that he said belonged to a species with a red head. As everything was very new to me when I arrived, I didn't pay much attention and I hung the skin, which was about an arm length long, on the wall behind my desk. A red-headed caiman would be very interesting, but when I got around to investigating it I realized that the skin was from a lizard, not a caiman. The back scales were expanded into large scutes that resembled the armor on the back of a caiman. I asked around and found out that the only lizards with armored backs that lived around water were caiman lizards of the genus *Dracaena*.

The northern caiman lizard¹²⁸, lives around the flooded forests of the Amazon and its bright red head makes it very attractive, but it is extremely hard to observe in the wild. Even though it may be over a meter long it is difficult to see unless basking because it spends most of its time in the water. You usually just hear the splash as the lizard dives in. Its bulky head with rounded teeth is adapted for eating water snails, but most of what is known about its behavior comes from captive animals.



Photo 9.1 A Paraguayan caiman lizard uses its blue tongue to delicately wipe the fragments of the shell of a water snail it has just eaten from its lips.

Photo by Bill Magnusson.

Many years later, I was lucky to be able to follow a Paraguayan caiman lizard¹²⁹ in the Brazilian Pantanal. This species is similar to the Amazonian one, but it doesn't have a red head. The lizard ignored me and I filmed its behavior from a few meters away. It swam along the bottom in a field that was flooded to a depth of about a hand span, only coming up at intervals to breathe. When underwater, it poked its head into clumps of leaves and other refuse. Twice it surfaced with snails in its jaws, which it deftly munched until the shell had been removed so that it could swallow only the soft parts. After the meal, it delicately licked its lips with its forked tongue to rid itself of the remaining pieces of shell. The people in the Pantanal call the species vibera, which means viper, and they are terribly scared of it. It's hard to believe that this heavily armed lizard has a diet consisting exclusively of escargot!

While searching for caiman lizards in the Amazon, I often came across another species of large lizard, the crocodile tegu¹³⁰. These lizards look much less like a crocodile than the caiman lizards. In fact, they looked and acted like the mangrove monitors I had seen in northern Australia. They were never far from water and swam with their long necks and heads held high in the air, propelled by sweeps of their flattened tails. I thought of studying them, but I didn't have money for radio-tracking equipment and they were far too wary to be followed by any other means.

Although there weren't many species of lizards in the flooded meadows, they were spectacular. I had seen many cocha whiptails on the banks of the main river that were similar to the forest whiptails, but much less colorful. In general, their nondescript coloration blended in well with the grey mud of the riverside. However, Albertina and I searched for lizards on the floating grass mats and we found cocha whiptails with sky blue necks and bright green further back¹³¹. We do not know why the color of the lizards varies so much, but we suspect that it is because the lizards have to balance sexual and natural selection. It is possible that females prefer bright blue males, but the blue males would be too obvious to predators if they weren't on the floating-grass mats. We never got any further in working out why the color varied so much, but I was starting to realize that color is probably much more important in the social relationships of lizards than generally realized.





Photo 9.2 An Amazonian crocodile tegu, *Crocodylurus amazonicus*, perched on a log. These active predators are ecological equivalents of water monitors in Australia.
Photo by Renato Cintra.

The most famous reptiles on the Amazon floodplains are the anacondas¹³². There are many stories about giant anacondas, and a visit to a fisherman's house involves obligatory cups of coffee and hearing stories about people being eaten by anacondas. My favorite is one about a man who was eaten by an anaconda when riding near the river. His neighbors got together and, armed with rifles, axes and other weapons, they managed to kill the snake. When they cut off its head, the man rode out still mounted on his horse!

Soon after I got to Manaus, a news report circled the globe accompanied by a picture of an anaconda with a huge bulge in its stomach. The article gave graphic details of how a father had fought to save his son who had been grabbed by the anaconda, but lost the tug of war. The anaconda was killed later with the help of neighbors. I was quite moved by the story, as I think most people were.

Many years later, I was in São Paulo and I saw the same photo in the window of a camera shop. I asked the owner about it and he said that he often asked clients to let him have a copy of particularly spectacular photographs he developed for them. I turned over the photograph and scribbled on the back was the caption: “An anaconda that ate a very large capybara.”

I had seen some fairly large anacondas, and I spent several hours watching one a few meters long fossicking underwater among rocks on the edge of the Curua-Una hydro-electric dam. I climbed down the jumbled rocks on the bank, put my head close to the water, and watched as it carefully inserted its head into crevices, apparently looking for fish, as do most water snakes. However, I had not seen any very big ones or any apparently hunting for humans, which the legends indicated were its favorite prey. Therefore, I was interested when the Director of the Institute called me to his office and told me that a 20 m anaconda had been seen near the town of Itacoatiara, about 170 km east of Manaus. He said that this was a confirmed report, the international press had already picked it up and the army was sending a unit to guarantee the safety of the population. I should accompany the soldiers to provide technical support.

I was of course delighted at the chance to see a giant snake, and Albertina and I climbed into the back of an army truck that was already occupied by a dozen soldiers holding submachine guns. We left at about two in the afternoon, and often stopped to ask travelers if they had news of the snake. Most did, but the strange thing was that the snake initially got bigger and then was reported to be smaller the closer we got to Itacoatiara. We arrived at about five p.m. and went straight to the Council offices.

Nobody knew exactly where the snake was, but the reports said that it was in a lake on the other side of the river. The councilors were trying to work out which lake so that they could ask the air force to bomb it, so avoiding having the snake,

which presumably had little food during the dry season, from swimming across the Amazon and eating the inhabitants of Itacoatiara.



Photo 9.3 *The anaconda, Eunectes murinus, is graceful in the water but ungainly on land. The species is common in Amazonian rivers, but rarely seen because of the murky water. Photo by Bill Magnusson.*

As we got no more useful information from the councilors, we started wandering around town trying to find the original source of the story and were eventually shown to the house of a local missionary who had apparently brought the story to the attention of the local authorities. He was a kindly man in his late fifties, and he invited us into his house for coffee so that he could tell the full tale. He had been doing the rounds of his pastoral on the other side of the river when he met a fisherman returning from a lake. The fisherman explained that he had gone to the lake, which was almost dry at that time of the

year, in search of turtles buried in the mud. He located the turtles by jabbing a stout pole into the soft bottom.

There weren't many turtles in the mud and the fisherman had almost given up when he thrust the stick down and hit something that did not feel like a turtle. He prodded it a bit more and couldn't work out what it was, so he rammed the pole down with all his strength. When he did so, a patch of mud stirred 10 m to one side of him and another 10 m on the other side. He then quickly left the area because the only thing that could be that big was a 20 m anaconda buried in the mud. The missionary, hearing the story, quickly returned to Itacoatiara to alert the authorities.

We thought about getting a boat to the other side of the river, which is less than 2 km wide at that point, but it was getting dark and we had just about used up all our gullibility. It was too late to return to Manaus, but one of the soldiers lived in Itacoatiara and we spent the night in his family's house, only to return to Manaus the next day to explain to the Director that the giant anaconda had dissolved into the mud.

I am sure that there are anacondas much bigger than any that have been measured, and I am sure that some people have been eaten by anacondas. However, on a scale of danger to humans in the Amazon, they lag far behind such things as urban dogs, buses and irate husbands.





Photo 9.4 Female rainbow lizards, *Cnemidophorus lemniscatus*, are well camouflaged by their pajama-stripe color when foraging in the savanna. All-female parthenogenetic species have similar cryptic coloration. Photo by Bill Magnusson.

For the first few months that I was in Manaus, I stayed in the INPA apartments reserved for students and visiting researchers. That was how I came to meet the curator of the Herpetology Collection of the University of São Paulo Museum, Paulo Emílio Vanzolini. He was short, grey haired, with a prominent, but well-trimmed, moustache. The students had Friday night jam sessions where all turned up to play guitar, sing or just drink beer. Dr Vanzolini came to several of these and engaged in ad-lib dueling competitions with the students. Each performer had to give a short refrain that usually belittled the other player, who then had to reply in tune to the melody with a rhyme that gave an appropriate response. This required fast thinking and amazing musical ability that I could admire, but could never consider trying to emulate.

Dr Vanzolini was an accomplished composer who had written some of Brazil's most famous sambas. He was also Brazil's most famous herpetologist and has had nineteen species and one genus named in his honor. I was only vaguely aware of all this when I met him, but he was very friendly to me, signed his letters "Vanzo" and invited me to visit him at the Museum in São Paulo. Other researchers at INPA were most impressed by this because, besides his fame as a musician and scientist, he was notorious for being temperamental. Basically, either you were with him or against him.

Vanzo had made the herpetology collection at the museum World class, and he used those invaluable resources as a weapon. If you were in his good books, you had access to the collections. If not, most of the important specimens of the Brazilian fauna would not be available to you. In fact, he didn't even have to know you to decide. If you were affiliated with an institution he didn't like, you would not get past the guard at the door of the museum! At least in the early days, I was in his good books, and he lent me his 22-caliber pistol with dust shot to collect lizards.

I visited the museum and I was impressed by the perfect order of the collection, which had hundreds of thousands of specimens. This was in the days before personal computers and everything was indexed on cards, including the fantastic collection of literature on the South American herpetofauna that Paulo Vanzolini had amassed. Many decades later, I was still using the two books he wrote listing the original literature for each species. At five in the afternoon, Vanzo put aside his work, took out a bottle of the Brazilian rum called cachaça, and spent several hours telling me stories from his long experience dealing with reptiles, amphibians and other researchers. He didn't seem to mind my dislike of the fiery beverage and drank sufficient for both of us. I thought that his liver would not be able to take such an onslaught, but it did so for another 33 years until he died at the age of 89.



Photo 9.5 A rainbow lizard, *Cnemidophorus lemniscatus*, from Alter do Chão in central Amazonia. This species is believed to be one of the parent species that gave rise to many parthenogenetic populations in the Amazon. Photo by Bill Magnusson.

I made only one indiscretion while I was at the museum. Vanzo suggested that I check over the caiman collection, which I did because I thought I should repay the hospitality. One of the caimans was mislabeled, so I noted the number and told him. He said “Thanks Bill, it’s the fault of my assistant who isn’t careful enough.”

I didn’t say anything, but later checked the tag on the specimen, which had written on it “Identification - P. E. Vanzolini.” However, my falling out of favor with the museum director would be because of a lizard rather than a caiman. Some of the most spectacular lizards in the Amazon basin are the rainbow lizards¹³³ in the genus *Cnemidophorus*. They only occur in open savanna-like areas, so their distribution in Amazonia is patchy. Males of the species are

brilliant blue and yellow when adult, but juveniles and females are brownish grey with black pajama stripes along the body. In some places, there are only females, reproduction taking place through parthenogenesis without the need for males. All the lizards in those places are dull colored.

There were many known parthenogenetic lizards, and all were thought to be the result of hybridization between two closely related species. However, when Vanzo alerted the World to parthenogenesis in rainbow lizards¹³⁴, he said that it was extremely unlikely that this case of parthenogenesis was due to hybridization because he believed that “In no place in South America is there geographical overlap of two species of *Cnemidophorus*.” Despite being very careful to point out the lack of collecting in many parts of the Amazon, he felt he could generalize to the whole continent.

I was initially not very interested in the question of parthenogenesis because I still hadn't seen any of the unisexual forms, but I went to a talk by Denise Peccinin-Seale, a researcher who had accompanied Paulo Vanzolini on an early expedition to Amazonia and who had since returned several times. She studied chromosomes and had described those from several sexual and unisexual forms. I didn't know enough about chromosomes to have an opinion, but Denise initially wrote her papers to support Dr Vanzolini's hypothesis that parthenogenesis in South American rainbow lizards was not due to hybridization.

Denise loved to talk, which made her quite famous. A friend of hers even wrote a humorous chapter in a book that depicted an attempt to have a two-way phone conversation with her. I am a good listener, and perhaps for that reason we remained firm friends for the rest of her life. Our conversations, and especially a chance encounter I had while collecting lizards with Albertina, changed both our opinions about the possible origin of parthenogenesis in rainbow lizards.



Photo 9.6 Left to right - Bill Magnusson, Carlos Lima, Denise Peccinini Seale, her son André and Megumi Yamakoshi in Reserva Ducke in the early 1980s.
Photographer unknown.

Albertina and I were planning to go on a boat expedition up the Amazon and had driven to the township of Manacapuru on the banks of the Amazon. While we were waiting for the boat, we wandered along the shoreline in front of the town and saw green lizards darting among drift wood and floating grass mats that had been left stranded as the river receded in the dry season. I got close to one and thought that it must be a species of *Ameiva* because it was robust and almost as big as the giant ameivas. They were very fast, but I lay in wait behind a pile of rubbish while Albertina drove the lizard towards me. I grabbed it before it knew what was happening and held it up to show Albertina.

It was the thickness of a garden hose, with bright green tail, stripes on its back and white spots on its side. It was like nothing I had seen before in the

wild or in the São Paulo Museum. We caught another one, but we didn't have time to chase the smaller lizards because our boat arrived. I sent the specimens to Vanzo, thinking that he would be overjoyed to receive what I believed was an undescribed species of *Ameiva*. I didn't even suspect that it might be a species of *Cnemidophorus* because it was about five times the weight and a different color from any rainbow lizard I had seen.

The last direct communication I received from Paulo Vanzolini was just a crumpled piece of paper with the words "CNEMIDOPHORUS LEMNISCATUS!" written in capitals. It was only then that I realized that it was in fact the other species of *Cnemidophorus* that he had said didn't exist. There was no longer any reason to believe in his new mechanism of parthenogenesis, though some 35 years later other researchers, including one of Dr Vanzolini's former students, would present evidence for nonhybrid origin of species in another genus of Amazonian lizards¹³⁵.

Denise studied the specimens I gave her and she reported that their morphology and chromosomes were similar to specimens she had sent to Dr Vanzolini before. I am not sure what species it is, but we have since found it in many other places. Possibly, it is *Cnemidophorus gramivagus*, a species with no common name that is common in Venezuela. It probably originally only occurred along major rivers, but quickly spread along roads and now even occurs in Manaus¹³⁶.

Years later, a friend from the Smithsonian Institution in the USA told me that Dr Vanzolini had given a talk there and afterward listed the undesirable researchers in Brazil. He said "You know what's wrong with Magnusson? - Drugs, alcohol and young girls!" In fact, I don't do illegal drugs, at that time I didn't drink alcohol, and almost all my girlfriends have been around my age or older. Anyway, it probably makes for a more colorful story than saying that I had grabbed a lizard I shouldn't have!



Photo 9.7 The wandering grass lizard, *Cnemidophorus gramivagus*, was thought to be restricted to northern countries, such as Venezuela and Colombia, but it is now known that it, or a closely-related species, is common in much of Amazonia.

Photo by Bill Magnusson.

