

CHAPTER 3

Beefworms in Belize



I HAD BEEN HOME less than a week when I received a call from my mentor, Dr. Jack McCoy, at the Carnegie Museum. He called to ask if I wanted to participate in a herpetological research project in Belize, Central America. Since I still had not unpacked from my recent Costa Rica trip, I told him to count me in; I would meet him at the airport in fifteen minutes. He laughingly informed me that the trip was not scheduled for another three weeks. I could not believe my good fortune. Not only was I being asked to accompany the Carnegie on such a prestigious outing, but the museum was also going to pick up all my expenses. Was it the specimens I had donated in the past that prompted the invitation or my dedication to long, arduous fieldwork under harsh conditions? Or maybe it was my incessant daily phone calls begging to be invited on any future trip that the museum planned. Whatever it was, I really did not care; I was in.

The project was ambitious; a complete herpetological survey of the country, the results of which would hopefully lead to a photographic field guide (ideally using my photos). This effort would, no doubt, take several years and require visits to Belize at different times of the year to ensure the best chances of finding the indigenous reptiles and amphibians in both wet and dry seasons. I was certainly willing to devote as much time as possible to the endeavor.

To be honest, I was not certain where Belize was located. I had heard several recent news reports about this tiny nation but had no idea it was a mere two hours by air from Houston. Since Belize is only 174 miles long

and 68 miles wide, it is impressive that the country is home to approximately 160 species of reptiles and amphibians.

While it is true that English is the country's primary language, it did not seem so when I was discussing local herp species with natives. Instead of more traditional names of snakes, lizards, and frogs, Belizeans use some downright bizarre names for their wildlife. One of the treefrog species common throughout the country (*Phrynohyas venulosa*) is referred to as a "spring chicken." I have no idea why, as it certainly does not look like a chicken or sound like one. Since its skin is quite toxic, it cannot be eaten like a chicken.

Many local lizards are referred to as "escorpion," and in no way do they resemble the animals for which they are named. I will even wager that the gecko they call the "weatherman" (*Aristelliger georgeensis*) can probably predict the weather just about as well as meteorologists in the United States. Other oddities include the striped basilisk (*Basiliscus vittatus*), known locally as "cock lizard"; the helmeted iguana (*Corytophanes* sp.), called "old man"; and the spiny-tailed iguana (*Ctenosaura similis*), a.k.a. the "wish-willy." Perhaps the strangest vernacular name of all, "snake waiting boy," is given to a common species of skink (*Mabuya unimarginata*) that occurs throughout Belize.

Peculiar names are also applied to some local snakes. The brown vine snake (*Oxybelis aeneus*) is called the "tie-tie" snake; the speckled racer (*Drymobius margaritiferus*) is the "Guinea fowl" snake; and the small, hook-nosed snake (*Ficimia publia*) is referred to as "barber pole." Many natives generally refer to all snakes as "tommygoff," a name usually applied to their most feared and venomous snake species, the "yellow jaw" (erroneously referred to as "fer-de-lance"), *Bothrops asper*. The mentality is similar to that in the United States, where many snakes are referred to as "rattlers" or "moccasins," whether they are venomous or not.

Belizean town names are also unusual. There is Orange Walk, Young Girl, Never Delay, Double Head Cabbage, and my favorite, Go To Hell Camp, to name a few.

••

Belize airport's diminutive size left me chuckling with amusement. The entire setup was little more than a modest runway with a small building that housed the control tower. As our aircraft made its final approach, we passed directly over an impressive network of waterways that snake their

way through dense jungle. This was my first view of the countryside, and I let my imagination go wild with thoughts of exotic reptiles living in the trees and lining the banks of this most inviting habitat.

As we taxied to the main terminal (actually, the only terminal), I could see several military planes scattered around the landing strip, all marked with British insignia. In addition to the planes, armed British soldiers were in evidence on the tarmac. Unfortunately, this small nation, which gained independence in 1972 (only a dozen years before my visit), is still threatened by its larger neighbor to the west, Guatemala. At the time of my visit, Guatemala did not officially recognize Belize (formerly British Honduras) as an independent nation; as a result, British militia are stationed throughout the country to help keep the peace.

As I stepped off the plane, I was greeted by a wall of thick, damp air that fogged up my glasses and frizzed my already curly, black hair. Although I had lived in Houston for several years (a city which I had believed to be the all-time humidity champion), I had never really known what it was like to breathe water until now.

After undergoing a cursory search through my bags by customs agents, I exited the terminal and was met by Dr. McCoy. He had just said goodbye to one of the Carnegie Museum workers who was on his way back to the United States. After loading my gear into the jeep, we headed to the main campsite, where the rest of the field researchers awaited our arrival. Here I was introduced to other expedition members. This was obviously more than just a herpetological research trip, as I was greeted by several ornithologists as well as a few mammalogists. I could not help notice that one of the mammalogists was picking at a small wound on his stomach. He was preoccupied with this, not even bothering to look up as we were introduced.

“Mosquito?” I asked, trying to initiate some friendly conversation.

“Beefworm!” he shot back in a somewhat irritated tone.

“What the heck is a beefworm?” I asked, at the risk of raising his ire.

“Parasite,” was his one-word response. I could not help it, but I was so intrigued that I had to pursue this further.

“Does it hurt?” I asked. For the first time since our introduction, he stopped what he was doing and looked up at me.

“Picture this,” he said. “Take a piece of wire, heat it up until it glows red hot, then plunge it into your flesh while you wriggle it around. You think that might hurt?”

After stumbling around camp for a while, I asked Jack if he needed me

to do anything in particular. He said no, and within seconds I was a mere speck on the horizon. As I wandered through the tall grass of a nearby field, I occasionally spotted an anole fleeing for cover. Belize has nine varieties of these lizards, but I never collected any of these particular species. I had something more spectacular, more exotic, in mind. I was looking for something on the order of a “Wow, am I glad I invited you on this trip” kind of animal.

I was thinking of heading back when I saw a flash of red in the tall grass ahead. I quickly turned in the direction of the movement but was unable to pinpoint its source. I remained still, and in a moment I saw it move again. This time I could clearly see that it was a snake, although I had no idea what kind. The thick undergrowth made it impossible to see all the way to the ground. I made one feeble attempt to pounce on it, but my effort was so half-hearted that I was certain there was nothing under my cupped hands except weeds. I was right; the snake was nowhere to be seen.

As I wiped the sweat from my face with a cloth bag that I kept tucked under my belt, I glanced down at my feet and noticed a violent thrashing beneath my boots. It was unbelievable; I was standing on the snake. I immediately reached down to grab it but then stopped dead in my tracks. I still had no idea what it was. Although its color pattern was similar to that of some coral snakes, it could also have been one of the harmless coral snake mimics. I was 95 percent sure that it was a harmless species, but I did not want to take an unnecessary risk. Because it was only a matter of time before I either crushed the struggling serpent or it eventually freed itself from under my eight-and-a-half triple-E's, I knew I had to act quickly. Using the cloth bag like a glove, I grabbed the snake at midbody and quickly inverted it into the bag. Peering into the sack, I was finally able to get a good long look at the snake, and I was now 99 percent sure it was harmless.

When Jack saw me back in camp, he asked if I had had any luck on my first outing. “Yep, one snake,” I proudly beamed.

“Really, what is it?” he asked. Not knowing exactly what it was, I just handed him the bag, certain that he would blurt out its identity. Peering into the bag, his face lit up with excitement as he exclaimed, “Choice!” (This phrase became his trademark.) “That’s one of the prettiest *Micrurus diastemas* I’ve ever seen.” I gulped silently to myself. I had been positive it was harmless. Fortunately, I had taken all the right precautions in capturing this eighteen-inch-long coral snake.

The simple poem that almost everyone learns as a child to tell venom-

ous coral snakes from harmless look-alikes, “Red touch yellow, kill a fellow; red touch black, venom lack,” just did not work in this situation. In the United States there are only three species of coral snakes and the poem applies. However, there are more than fifty species of coral snakes in Central and South America, and many of those species displaying “Red touch black” are venomous and can kill you.

••

After planning our itinerary, we stopped in town to stock up on provisions before heading off into the field. While everyone else ran around the marketplace stocking up on “frivolous” things like coffee, tins of fish and meat, fresh fruit, and bread, I rounded up the really important stuff: orange soda, chocolate, and cookies. This was the best I could do, since no shop sold chocolate Twinkies.

In each small town or village we entered, I saw the same disturbing sight. On nearly every street corner was a vendor selling large turtles that either were struggling to right themselves or were tethered by a string attached to one of their rear legs. All were Central American river turtles (*Dermatemys mawii*), an endangered species protected throughout its limited range in Mexico, Guatemala, Honduras, and (supposedly) here in Belize. They have been designated as Appendix I, according to CITES (Convention on International Trade in Endangered Species), which means that special permits are required before they can be collected, studied, or, most importantly, exported from the country. However, as is too often the case, especially in Third World countries, these regulations are seldom enforced against locals who regularly exploit their wildlife, especially when it is used as a food source. In fact, on this occasion, the sale of these turtles was probably sanctioned by local authorities, who themselves partake in the Easter tradition of dining on *hickety*.

A fisherman or hunter walks along the shallow banks of a river or other body of water where a *hickety* can be found and waits for the animal to come to the surface, whereupon he impales the turtle with a pointed stick or spear. After pulling the reptile onto land, he removes the weapon and fills the open wound with sand or mud. This is usually done for cosmetic reasons, as few of the locals are willing to purchase a food item with a bloody, gaping wound. The turtles are then brought to market where they are kept on their backs in the sweltering sun without water, sometimes for days, until they are purchased for the family dinner pot.

I, too, could have eaten a dozen *hickety* turtles every day in Belize with-

out any questions from the authorities. But if I had wanted to capture a single turtle and take it back to the States to perhaps pair it up with another captive one, I would have needed to go through a lengthy, expensive permit request process that would likely have been denied due to the animal's endangered status.

••

One of the first onerous tasks we faced each time we arrived at a new campsite was to set up mist nets to capture birds. I have assisted with their construction on many occasions, and this has helped me learn a great deal not only about birds but also about people who study them. Mist nets are marvels of technology. They are simple in their concept and design yet versatile in their application and function. The same fragile and virtually invisible net that can capture a bee-sized hummingbird without injury can also trap and incapacitate a 140-pound herpetologist. It is hard to believe that this wispy shadow of material, which looks like a badminton net (only with finer, smaller mesh), has enabled scientists to catch, study, and release birds with relative ease.

A major highlight of each day occurred when the ornithologists came back to camp with birds they had removed earlier from mist nets. Whenever I saw someone walk into camp carrying an armload of cloth bags, I ran to fetch my camera. It was like Christmas. Choruses of "oohhs" and "aahhs" often erupted from the gathered masses once the bags were opened. Some birds were spectacular for their gaudy appearance, whereas others were impressive because of their especially large or diminutive size. What made this ritual of "emptying the bag" so exciting was the endless diversity of birds that were collected. Though we rarely caught the same bird species more than once, these occasional repeat performances did not diminish each bird's beauty in my eyes.

Birds were not the only creatures caught in the nets (present company excluded). Large insects, such as cicadas, grasshoppers, and huge beetles often found their way into these subtle traps as well. Sometimes an insect inadvertently brought about its own demise by attracting a large lizard to the mist net. Once, I witnessed a large male basilisk in the middle of a net munching contentedly on a giant insect, and the next day I observed a giant spider doing the same.

In addition to birds and herps, the tropics are also home to a large array of mammals. We had no mammalogist in camp, because their collecting needs took them to a different region of the country. I was nonetheless

interested in seeing as many mammals as I could find. I asked Jack if there were many species of bats in this area, to which he replied, "At least several dozen."

"Can we try to catch some? I would really like to get some photos of them."

"Paul, do you have any idea how difficult it is to remove a live, struggling, irritated bat from a mist net?"

"Worse than removing a bird?" I asked.

"Not even close," he said, shaking his head. It really must be quite difficult then, because I watched the crew remove some of the birds from the nets, and I swear, they must practice sewing soap bubbles together to become that nimble and dexterous. If it were up to me, I would cut the bird out of the net each time.

As luck would have it (at least for me), we were late in closing down the nets one night. By the time we visited the last site, we found dozens of bats entangled in one net, all attempting to chew their way out. Several different species were present, each one looking more bizarre than the last. Most were leaf-nosed bats (phyllostomatids), which were adorned



Leaf-nosed bat entangled in a bird mist net in Belize.

with exaggerated, weird-looking nasal appendages. With flashlights burning dim and bugs biting hard, the group began the laborious task of removing the toothy furballs from the mist nets. The ordeal went rather well. The mist net was only slightly chewed up, we had enough Band-Aids to go around, and I finally got the pictures I had hoped for.

••

My timing for this particular trip was not as well planned as it had been for my previous two trips. It would be at least a month before any appreciable precipitation could be expected. Although the dry conditions would have little effect on the ornithologists, they would severely curtail my work. The absence of rain would mean a paucity of animals, especially snakes and amphibians. Thus, it was in Jack's and my best interest to separate from the birders and meet with them again several days later, allowing us to explore wetter and more varied habitats.

As Jack and I headed down one of the main highways running through the center of the country, we passed a modest lodge whose large green and yellow sign read: "Tropical Jungle Paradise." Beneath the sign was a list of what the establishment had to offer a weary traveler, including private cabins, jungle tours, horseback riding, Mayan ruins, and last, but not least, "hanging out." Jack and I were both amused and intrigued. We decided to stop for a snack and to check out the place as a possible temporary campsite. Proprietor Tom Dale, a young man from New York, had decided to retire to Belize where he planned to live a very "laid-back" lifestyle. When he asked what we were doing in Belize, we told him we were here to collect and study local reptiles and amphibians. He invited us to stay at his facility at a generously reduced rate, because, as he put it, "This place is crawling with wildlife." Since the lodge was on the bank of a river, with good habitat on all sides, Jack and I decided it was potentially an excellent location.

There were twelve cabins in all, none presently occupied. Although Tom's place was clean, it was not very popular. Each cabin had a double bed, but it was far more comfortable to use the large hammock that hung on the porch overlooking the river. Despite the lack of amenities (there was no electricity and everyone had to share a communal toilet), the place had class and charm. Tom went out of his way to prepare special meals for us, and he even let us use his rowboat to hunt along the shore of his property.

One morning I got up rather early, and Tom asked if he could accompany me on a short outing to a wooded area across the river. I was happy

Sign at Tom Dale's place offering all the available comforts in Belize.



to have him along, as I have always lived by the motto “the more eyes, the better,” although most times “misery loves company” seems more appropriate. After we climbed the steep embankment on the other side of the river, we had to walk only a short distance to reach a pristine tract of forest where numerous fallen trees lay in various stages of decomposition—a good source of shelter for reptiles and amphibians. We spent the better part of the morning flipping logs and peeling loose bark from numerous trees. Tom really enjoyed this activity, and each time we found something, he wanted to learn everything there was to know about it. When I split open a rotten log and caught a huge night lizard (*Lepidophyma flavimaculatum*) in its center, Tom became really animated. In my haste to catch the lizard, I miscalculated its distance and grabbed it too far back, causing it to lose its tail. When the severed tail fell to the ground and started to wiggle on its own, Tom just stood there speechless, pointing in disbelief at the writhing appendage.

Soon I found another lizard—one I was very pleased to catch. Under a pile of dead palm fronds, I discovered a beautiful adult female elegant gecko (*Coleonyx elegans*), similar to one I had collected a year earlier in Costa Rica but a different species. When I discovered her hiding place, the gecko immediately assumed a threat posture, standing on the tips of her toes in an effort to appear larger and more ominous. Since I wanted to get a picture of her in that threatening pose, I delayed catching her. I cautioned Tom not to move, so that she would maintain that position. My warning was unnecessary. Not only did she stay on her tiptoes after being picked up, but she assumed that position repeatedly over the next two days whenever she was threatened.

By noon we were back at the lodge, where we showed Jack the day's catch. He nodded in approval, uttering the "choice" word several times. After the show-and-tell, Tom prepared lunch before we took our obligatory midday siesta. These breaks were not due to any fatigue on our part, but they kept us from burning to a crisp in the steamy afternoon temperatures that frequently soared above one hundred degrees.

Without fans to stir the breeze, we found it nearly impossible to fall asleep in the oppressive heat. After I had finally nodded off, I was irritated to be awakened sometime later by Tom's voice, asking if I was interested in capturing a small lizard that was moving about on the end of my hammock.

"Tom, you're hallucinating, it's over a hundred degrees now. There is no way a lizard would be foolish enough to be out in this heat," I whispered back. Just to humor him, I put on my glasses and glanced at the end of my hammock. I was surprised to catch a brief glimpse of what I thought was a lizard's tail disappearing behind the pole holding up my bed. I quickly scrambled over to the post to see if it was indeed a lizard. Sure enough, walking around the base of the hammock, completely oblivious to every-



Jack McCoy holding a tiger rat snake, one of the many snakes we found in Belize.

one, was a two-inch-long gecko (*Sphaerodactylus glaucus*). Although its coloration was mostly light gray, the underside of its tail was bright orange, and it elevated that tail in display as I tried to catch it. After securing the lizard, I tried again to get some rest, but on such trips, rest is something I had learned to live without.

By sunset, Jack and I were anxious to try our luck at road cruising. Due to its diminutive size, Belize does not have many roads to choose from, so we ended up driving down the only road at our disposal, the “Hummingbird Highway.” At no time was the effect of the drought more significant in terms of finding snakes and amphibians than during road collecting. Even on a “bad” night under wetter conditions we could expect to find several species of frogs and toads and perhaps a snake or two; but without rain, we had absolutely no luck at all.

Now and then we saw what appeared to be some kind of animal on the road ahead of us, the sight of which gave us a brief rush of anticipation. But each time we approached these objects, we nearly always found them to be birds—more specifically pauraques, pronounced poor-ah-keys (*Nyctidromus albicollis*), a species closely related to nightjars and whip-poor-wills. Like these other nocturnal aerialists, pauraques have relatively small beaks and enormous mouths, which in flight they fill with mosquitoes, moths, and other flying insects.

Seeing literally nothing on the road for nearly two hours, we became discouraged, but finally we had a break. Yelling “snake” and slamming on the brakes, I flew out of the car just in time to intercept a snake nearing the edge of the road. With Jack’s help, I bagged the eighteen-inch-long yellow jaw tommygoff (*Bothrops asper*) and carefully placed the bag far in the back of the jeep. We definitely did not want any accidents to happen while blindly reaching back for something to eat or drink. With their inch-plus-long hypodermic fangs, most pit vipers can easily bite through a cloth bag and envenomate a careless handler.

The rest of the night was disappointing. Except for another small tommygoff, which was badly squashed, we saw only a treefrog that bolted across the road before we could stop to catch it. Although it was not the most productive night, we were pleased to have caught at least one snake—and thankful it was not an eight-foot-long adult.

The next morning I was up early trying to figure out how to photograph the viper without being bitten or allowing it to escape. The solution was simple. I placed the snake in our ice chest for several minutes until it was cool enough to be safely manipulated. However, instead of

concentrating on photographing the snake, I was now distracted by the wonderful smells emanating from the kitchen, and soon I found myself with fork in hand and a mouthful of the fluffiest scrambled eggs I had ever eaten.

“More eggs, Paul?” Tom asked, after my third helping.

“No, not for me, I don’t eat breakfast,” I explained. At that point, I remembered what I had initially intended to do before I got sidetracked. I jumped up from the table and ran over to the ice chest.

“Damn it,” I bellowed, as I opened the ice chest. The pillowcase that contained the snake had fallen and was now submerged under three inches of ice water.

“Problem?” Jack asked.

“I just killed the *Bothrops*.” I was hoping to keep it alive to bring back to the States, as I had promised a colleague that I would save him any live pit vipers I came across. On the bright side, I no longer had to worry about the snake escaping or biting me while I tried to photograph it. I carried it by hand to a small clearing near one of the huts. Placing the reptile in various “naturalistic” poses, I took several photographs that I thought made the snake appear to be alive. (This is a common technique I have used on many expeditions and is referred to in the business as “nature faking.”) Following the photo shoot, I returned the snake to the cold, soaked bag, tied a knot in it, and hung it on a nail in the main dining room for Jack to preserve. Half an hour later, Jack removed the bag from its perch, untied the knot, and poured the contents on the table. Before grabbing the snake, he gave it a long, hard look, then turned and gave me a long, cold stare. The “dead” snake was flicking its tongue as it slowly crawled off the table.

Two days later, another herper wanted to photograph the snake, but since the viper had had time to recover, I decided it would be safer if once again we cooled it down first. After nearly forty-five minutes in the cooler, I was both astonished and extremely upset with myself to discover that, once again, I had killed the snake. This time, however, I was careful not to use my hands during the photo session, just in case we were dealing with some kind of supernatural snake. The precaution was well founded. Several minutes after the “dead” snake was exposed to the warm environment, “Lazarus” was once again among the living. This was one snake I was not going to turn my back on and would never again try to photograph. Despite the failed attempts on its life, the snake survived the trip to the United States. It was welcomed by my colleague who, after hearing

Yellow-jawed
tommygoff
(*Bothrops asper*),
“Lazarus,” collected
crossing the road on
Belize’s Humming-
bird Highway.



the story of its miraculous recoveries, made sure it was kept in a double-locked, escape-proof cage.

••

After we had spent a few days at “Jungle Paradise,” it was time again to rendezvous with the ornithology team at a quaint little resort on the Macal River. Although Chaa Creek was nothing more than a few modest bungalows bordering a deserted stretch of forest, it nonetheless had a tremendous amount of ambiance. Owned by Mick and Lucy Flemming, this tiny oasis was a breath of cool, fresh air in an otherwise hot, dank environment. The Flemmings’ gracious hospitality, combined with their fantastic culinary expertise, made our stay here a truly memorable experience.

In addition to the handful of simple, well-kept bungalows, a large central building doubled as the main dining area and gathering place for those who wanted to spend their time exchanging stories of the exquisite wildlife they had encountered at the resort.

Jack and I were directed to put our gear in one of the larger huts, which two of the bird researchers, Scott and Bob, had occupied the day before. Accommodations were simple but functional, consisting of three beds on the main floor and another upstairs in a small loft. I requested the upstairs bed, and since no one else wanted to climb constantly up and down stairs, my wish was unanimously approved. Besides, the others felt that their nightly toilet run could be hampered by a nearly fifteen-foot fall to the ground.

While we dined on one of the finest home-cooked meals we would eat during our stay in Belize, we filled each other in on events of the past few

days. It was wonderful to have a bellyfull of good food and to be so exhausted that despite the ridiculously hot nighttime temperatures, we fell asleep as soon as our heads hit our pillows.

The next morning I was up early and raring to go, but despite high hopes of seeing every herp species in the area, I was able to find only a single anole and a couple of insects—rather humble pickings indeed.

I returned to camp to drop off my “massive” catch and to ask Jack if he wanted to join me for some “real” herping. After finding a rather sizable stand of palm trees, many of which were in various stages of decomposition, we began the task of raking through the fallen, dried palm fronds in search of wildlife. Under a pile of decaying leaves, I uncovered a somewhat nondescript, three-inch-long scorpion. Despite my great interest in scorpions, I discovered that this one was just a blackish brown run-of-the-mill arachnid. I turned away from the scorpion and continued to rake through the debris. A moment later, I felt a sharp, burning sensation on the back of my neck. Instantly my hand found the source of the pain. The scorpion had apparently climbed up the back of my boots and onto my pants, then eventually made its way to my shoulder. The pain was both immediate and intense. I called out to Jack for help, but he was out of earshot. Not knowing which species had stung me, I was not sure if I should try to make it back to camp for help or sit down in the shade of a tree and make out my will. Instead, I decided to catch the scorpion and ask Jack to identify it.

“Nice, *Centruroides pococki*. . . Choice.”

“*Centruroides*?” I gulped. I immediately recognized the genus as the same one that occurs in Arizona: the only species in the United States that can be lethal to humans. (That species is the sculptured scorpion, *Centruroides sculpturatus*.) “Is it dangerous?” I asked, almost not wanting to hear the answer.

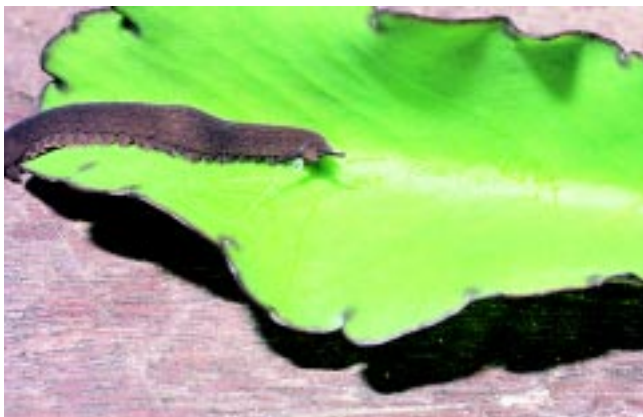
“Not unless you’re an insect,” he replied. Jack had a way about him that with very little effort could turn anyone’s anxious moment into a smile and a sigh of relief. In a few minutes, both the pain and the scorpion were gone.

In addition to the scorpion, there was an abundance of other wildlife on this ridge. After turning over every last piece of debris, we ended up with two red coffee snakes (*Ninia sebae*), a small eight-to-ten-inch-long harmless species; a juvenile elegant gecko (*Coleonyx elegans*); and a “*Peripatus*”—the latter a most unusual creature, sometimes referred to as a velvet worm. This creature is so different from any other animal that for

Belizean scorpion
(*Centruroides
pococki*) that stung
the author in the
neck.



years scientists could not even agree on which *phylum* it belonged to. Although it superficially resembles a caterpillar, it is not an insect nor is it an annelid worm. It is classified as an onychophoran, presumably a missing link between arthropods and annelids. There are about 120 species of velvet worms, mainly in the world's tropical regions, ranging in length from a few inches to nearly one foot long. The one I found was just over two inches long. Although not much to look at and certainly not very menacing in appearance, *Peripatus* has evolved an effective defense to deter would-be attackers. When molested or touched, these animals “spit” a noxious and sticky fluid that, on contact, can leave a small animal incapacitated and in severe distress. I observed this firsthand when I initially picked up the animal and watched it squirt a minute thread of clear, viscous liquid onto my fingertips. I felt how sticky it was, and I realized how



An odd invertebrate,
the “velvet worm,”
in “midspit”—
eastern Belize.

difficult it would be for an insect, spider, or even a small vertebrate to gain the upper hand in a confrontation with such a formidable foe.

I took it back to camp, hoping to capture its defensive act on film. If you think photographing a two-inch-long, constantly moving animal is easy, try getting it to “spit” on command. But patience has its rewards. After many hours of trying, I was fortunate to capture on film a *Peripatus* in midspit.

By late morning, when the temperature soars into the upper nineties and the humidity is not far behind, it is too uncomfortable to be in the field looking for specimens. Thus, I spent the rest of the day photographing an endless parade of beautiful birds that had been snared in mist nets. Species diversity was staggering. In a few hours, I had exposed half a dozen rolls of film on such birds as collared trogons (*Trogon collaris*); masked tityras (*Tityra semifasciata*); white-fronted parrots (*Amazona albifrons*); and a most interesting bird, the tiny, five-inch-tall ferruginous pygmy-owl (*Glaucidium brasilianum*). This species is also known as a “four-eyed” owl due to distinct markings on the back of its head which resemble large, black eyes. Such a “face” makes potential predators think twice about trying to sneak up on this small raptor.

Throughout the day, more birds were caught in the mist nets, their beauty nearly beyond description. When we first removed one specimen from a holding bag, it seemed rather plain looking. However, after quickly surveying its surroundings, this robin-sized bird erected a crest of brilliant red feathers, the upper margins of which were tipped with an absolutely gorgeous fluorescent blue. When it got its bearings, it swayed its head from side to side and opened its mouth to expose a bright yellow interior—an impressive sight. This bird’s common name suits it well: the royal flycatcher (*Onychorhynchus coronatus*).



Royal flycatcher (*Onychorhynchus coronatus*) displaying its brilliant head crest after having been removed from a mist net in Belize.

Crimson-collared tanager
(*Phlogothraupis sanguinolenta*)
showing what is perhaps the most vivid red coloration in the animal kingdom.



Yet, the bird that most enamored me was the crimson-collared tanager (*Phlogothraupis sanguinolenta*). This seven-inch-long species is jet black except for the majority of the head, neck, throat, rump, and eyes, which were the most vivid red I had ever seen in the animal kingdom. Adding to its stunning overall appearance is its silvery white beak, which stood out in stark contrast to the vibrant red-and-black plumage.

My main regret is that I could take pictures of a bird only while it was in someone's hand; the animal would have escaped, of course, if it had been perched in a more naturalistic setting. This meant I could photograph only the bird's head and neck; any more would have revealed the handler's hand or fingers. I vowed that if I ever were invited on another such expedition with ornithologists, I would devise a way to photograph these animals more appropriately. (Ultimately I did; see chapter 5.)

With a few hours to wait before the evening meal, I went out into the bush to search for insects and spiders to feed to the elegant gecko I had captured a few days earlier at Tom Dale's place. In Belize, or anywhere else in the tropics for that matter, you do not have to go far to find invertebrates, so in a matter of minutes, I returned with a container full of culinary delights for my traveling companion. I placed a few of these in the large Styrofoam container that housed the gecko and returned after dinner to check the box to see if the gecko had eaten. When I opened the container, all I found inside was a solitary insect but no lizard. It was obvious the insect did not eat the lizard; it must somehow have escaped. But how? On closer examination, I discovered that the plastic handles on either side of the Styrofoam box had fallen off, exposing two large holes big enough to allow the lizard to crawl through. I searched every detail of the cabin, lifted everything off the floor, and looked inside every bag, shoe,

and container, but to no avail: the lizard was gone. Great. I had promised a friend I would bring him this specific animal for his research project, and now I had lost it. Needless to say, the whole ordeal depressed me. I spent the rest of the evening walking around the bungalow with my flashlight, hoping to find the little “ulcer maker.”

Feeling discouraged, I climbed into the upper loft to sleep. Before long, something caught my attention. Flying and hovering above me was what appeared to be a pair of tiny car headlights. However, without my glasses on, I could have mistaken an avocado for a vacuum cleaner. Yet, within arm’s reach was some type of creature that was releasing a tremendous amount of bioluminescence. I eventually caught it and was especially pleased that I had accomplished my mission without causing serious bodily harm either to myself or to this strange aerialist. My catch did not have the same effect on the rest of the crew as it did on me, but their lack of enthusiasm did not diminish my own exuberance at having caught this marvelous creature.

Jack told me that it was a click beetle, similar to the lightning bugs we have in the States, although they are in different families. These, however, were unlike any fireflies I had ever seen back home. Their bodies were about three times the size of those of their northern cousins, and instead of lighting up periodically, these elaterids (the family of insects to which they belong) stay lit for as long as it remains dark.

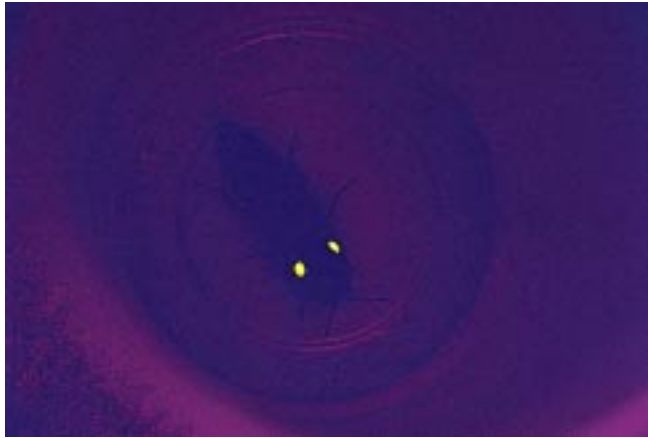
Like a child who has collected fireflies, I placed the insect in a small jar and walked around in the dark using my “living” flashlight as a would-be night-light. I was so impressed by the brightness of this single insect that I just had to find a way to translate this phenomenon into a photograph. By using a tripod and placing the bug in an open container, I was able to take several long exposures that yielded excellent results.

With my spirits high again, I drifted off into a deep and peaceful sleep—sleep that would soon be interrupted by a most dramatic and bizarre event.

Just after 3:00 A.M., I was awakened by slapping sounds, followed by murmuring voices and a barrage of flashlight beams piercing the darkness in every direction. Putting on my glasses, I called down to ask what all the commotion was about.

“Army ants,” was the unified response, “millions of them!” At first I thought it would be best if I remained in the loft and stayed out of harm’s way. Then I realized that I was probably needed downstairs to assist the others with moving our gear to safer ground and helping to remove the ants. It was truly an awesome sight. There were literally millions of ants

A click beetle
photographed in
a cup using a thirty-
second exposure
(and no flash)
in Belize.



on the march, and it appeared that their path took them directly through our bungalow. All the stories and movies about massive ant swarms marching through the jungle and devouring anything too slow to get out of their way now took on a whole new meaning for me. Watching this scene, I realized there were only two choices when encountering these six-legged marauders. Get out of their way or die.

As we observed from a safe distance using our flashlights, we occasionally caught a glimpse of some unfortunate creature being chased out from under the bungalow by the hoard of ants. In addition to two red coffee snakes, several other herps were attacked, including the female elegant gecko that had escaped earlier. Except for a few stubborn ants still clamped to her skin, however, she was in good condition. Another victim was especially significant, although we did not confirm this until we returned to the United States. It was about two feet in length and was later identified as a species of slug-eating snake (*Sibon* sp.). It also had several ants imbedded deep in its skin, and it appears it would not have survived except for our intervention. Jack picked the ants off the snake and studied it carefully. Although it looked to me like the common slug-eating snake (*Sibon nebulata*), Jack thought otherwise. He instructed me to take several detailed pictures of the animal, so we would have good photographic documentation just in case the snake managed to escape. When I asked what he thought it was, he said he was not sure but that it might be a species of slug-eater known from only a single specimen. Jack was right. The snake proved to be an obscure species (*Sibon neilli*) known from a single example found many years ago in the capital of Belize in—of all places—a pharmacy, where it had been kept in a bottle of alcohol with-

out any specific locality data. This particular species has since been classified as a subspecies of the pygmy slug-eating snake, *Sibon sanniola neilli*.

About a year after its capture, Jack wrote a brief article in one of the herpetological journals about our snake's amusing rediscovery, noting in the acknowledgment section that he wished to thank the column of army ants for their assistance in its capture.

••

Overall, the trip was a success. The museum added valuable new specimens to its permanent herpetological and ornithological collections. There was already talk of another expedition the next year to continue the ongoing research in Belize.

My return to Houston marked a noticeable change in my overall behavior. I was restless, and I had difficulty concentrating on my day-to-day activities. I was certain my problem was depression brought about by the fact that I was home when all I really wanted was to be back in Belize. I assumed that in a few days I would return to normal (whatever that was).

Several more days passed before I discovered the real reason for my irritability. On top of my head was an area that had become more and more sensitive to everyday activities such as brushing my hair or putting on a shirt. The cause of the discomfort, however, was not yet clear. With each passing day, the pain became more intense. Since the location of the pain was directly on top of my head and because I have rather thick, bushy hair, I was unable to see exactly what the problem was. I finally relented and asked my friend Debbie if she minded having a look at my scalp.



Rare slug-eating snake (*Sibon sanniola neilli*) that was forced out from under our bungalow in Belize by a giant column of army ants.

After carefully examining the area, she reported the presence of several pimplelike structures. I found it hard to believe that I was nearly incapacitated by a couple of zits.

By the next day my head hurt so badly that I could not even endure a light breeze blowing through my hair. This was getting ridiculous. I could not begin to imagine what was going on up there, but then it suddenly dawned on me. I immediately called the Carnegie Museum and asked Jack if my symptoms could be those of an unwelcome visit from Mr. Beefworm.

"Sure sounds like it to me," Jack said. I then asked if anyone else on the expedition had been experiencing the same problem. "No, not that I'm aware of," he said sympathetically. "I think you're alone on this one." The best advice he could offer was that I see a doctor and explain what I might have been exposed to in the field.

Unable to eat, drink, or sleep, I was in no condition to report to work. For the first time in my five years of employment at the zoo (and the only time in the twenty plus years I have spent on the job), I was forced to call in sick. As much as I wanted to avoid it, I could no longer put off the inevitable—I was doctor bound.

Before leaving for the doctor's office, I asked Debbie to take another look at my head. She said she could see several small furrows of dried, caked blood that resembled miniature crayfish holes, from which trickles of fresh blood would ooze periodically. I asked her to *gently* try to clean away the dried blood so that a clear view of the "problem area" could be seen. This was by no means a simple task, and as soon as I was peeled off the ceiling, I was on my way to the doctor's office.

After trying to explain my dilemma to the nurse at the HMO clinic, I was finally able to convince her to call in a doctor to examine me. Forty-five minutes had passed before an elderly physician entered the room reading the nurse's report. Without even looking up, he asked me if there were any of these "worms" that he could take a look at. I told him there were several on top of my head and one on my neck just behind my right ear. He briefly glanced at my head then wrote out several prescriptions for me to have filled. And just like that, within thirty seconds, he was gone.

Out of desperation, I went to the nearest pharmacy to have my prescriptions filled. I was somewhat puzzled by the doctor's choice of medications. One was an antihistamine, one was a weak painkiller, and I am not exactly sure what the third one was, but to this day, I cannot have children. Needless to say, my condition worsened, and I subsequently discontinued taking the medications. As the pain became unbearable, I was still

no closer to finding an answer to my problem. I had no choice now but to do the unthinkable—go to a specialist.

As I knocked on the dermatologist's door, I began to have visions of numerous electrodes protruding from my shaved head, sending high voltage shocks to the area in an attempt to barbecue my little beefworm companions. I was relieved, however, when a calm, pleasant-looking gentleman asked me into his office to explain my problem. He listened intently to my story until I spoke the magic word: beefworm. At that point, he jumped up from his chair and lunged for one of his medical textbooks on the shelf behind him.

"*Dermatobia hominis*. I can't believe you have them, that's *fantastic*. This is so exciting to me," he said. "You see, I read about this back in 1958, and I never thought I would actually get to see one except in a book. I don't suppose you still have any of them on your person?" he inquired.

"Well, as a matter of fact I do, and I'll make you a deal," I told him. "You remove them from my head, and you can keep them for yourself." As tempting as that was to the doctor, he explained that this whole issue was beyond his expertise, and all he could do was recommend a specialist in tropical medicine. I thanked him and made my way over to the Baylor School of Medicine.

I told the nurse at Baylor that I had recently returned from an expedition to Belize, Central America, and that I might have been parasitized by a beefworm.

"Beefworm," she said excitedly. "Stay right here." In a moment, three doctors surrounded me and began to poke and prod at my head.

"It appears that you're right," one of them said. "It does seem to be some sort of parasite."

"With your permission, we would like to attempt to remove them," another doctor said. He did not have to ask twice. In a matter of minutes I was lying face down on an operating table while scores of doctors crowded the room carrying cameras and small glass vials. After several injections of anesthetics into my scalp, the doctors began digging around in my skull with their scalpels.

"We got one," one of the doctors said excitedly. "It's pretty small but it's definitely a *Dermatobia*." All the doctors then gathered around the vial containing the tiny invader to get a better look. Before it was all over, they had removed six worms from my head.

"Hey guys, do me a favor," I asked before they finished stitching up my head. "Save me one of those things so when I retell this story I'll have

some proof that I'm not completely out of my mind." So, armed with a small glass vial and its strange-looking occupant, I made my way home, triumphant that I had endured a most harrowing and exhausting experience and thankful that it was all over.

A couple of days after surgery, I occasionally felt a slight twinge of pain coming from the general vicinity of where the parasites had been removed. I tried to dismiss it until one time when the pain was so severe, I jumped to my feet and screamed, "They're back, someone get them out—*now!*"

Sure enough, when I went back to the doctor's office a week later to have the stitches removed, they found another beefworm.

Great I thought, now I have to go through the pain and expense of another surgery, but the doctor was quick to offer me an alternative.

"You know, Paul, since this whole ordeal started, I've been doing some reading on this subject, and I've found what I believe to be a painless and simple solution to your problem. Since this parasite is fairly common and widespread in the tropics and since most of the indigenous people can't afford to pay a doctor to remove them, they often solve this problem simply by placing a small piece of meat on top of the parasite's burrow. This ultimately causes the worm to suffocate, during which time the parasite tries to bore into the meat, thereby exiting the human host."

I stared intently and silently at the doctor, waiting for him to burst out laughing. Of course he had to be kidding, but his facial expression never changed. He was totally serious.

"Do you expect me to believe that story?" I asked in disbelief.

"Paul, I sincerely recommend you give it a try. If it doesn't work, you can always come back and have the surgery."

At one time or another, everyone has stood in front of a mirror to prepare for a big night out or an important date, but I will wager that few people have had to watch themselves tie a piece of meat to their heads in the hope of enticing a beefworm out of their scalp.

With my head held high (and motionless) and my dignity as low as it could be, I remained frozen in position for several hours. Later that evening, I convinced Debbie to come over for what I hoped was the final check on my status. The look on her face was priceless when she entered the room and saw me sitting there with meat strapped to my head. Her demeanor changed, however, when she carefully untied the cloth that held the chunk of meat balanced so precariously on top of my head. Slowly, she lifted the meat off my head until she was able to determine what progress, if any, the parasite had made. With remarkable calmness, she



Larva “beefworm” (*Dermatobia hominis*) removed from the author’s head sits on the piece of meat used to “entice” the parasite from its hiding place.

explained that the worm was indeed half-buried in the now soggy, smelly piece of steak.

“Quick, grab it before it changes its mind!” I yelled to her. She rapidly flung the beef from my head and with a small pair of forceps grabbed the parasite midbody and pulled it from its burrow. We both cringed as we heard the faint popping sound it made as its body tore away from mine. There it was: a half-inch long nightmare complete with several rows of black spines encircling its body, designed to make it nearly impossible to dislodge the larvae from its host. I stared at the creature in awe. On the one hand, it was the most repulsive thing I had ever seen, but as a scientist, I certainly could appreciate its place in the scheme of life. Unable to take my eyes off the worm, I did what any dedicated biologist-photographer would do: I shot an entire roll of “Wendy” (my nickname for “her,” from the popular commercial of the time when “Where’s the beef?” was at its height).

I thought my ordeal was finally over, but I was wrong. As Debbie was cleaning up the wound on my head, she noticed yet another beefworm inhabiting a spot next to the hole vacated by “Wendy.” By this time I was so exhausted and traumatized that I was not about to sit still for several additional hours with another slab of meat perched on my head. Debbie concluded that since the meat worked (probably because it acted as an asphyxiate), then some other substance, such as a thick hand cream, might work as well.

I applied a small glob of hand cream to the area where the remaining beefworm resided. In about twenty minutes, the last parasite made its way up through the layer of cream, and I was finally free of these most unwelcome tenants.

My retelling of this experience has affected different people in different ways: some are amused; others turn away grimacing in absolute horror. Personally, I cannot wait to return to Belize.

••

Since my involvement with the beefworm, I have read a great deal about this unusual animal. This parasite, which is sometimes referred to as a botfly, primarily infects cattle and other large domestic hoofstock. It is considered a serious pest because of the damage it causes by burrowing into the skin of its host (there can be sometimes over several thousand individuals per animal), rendering both the meat and the hide unusable.

This particular species, *Dermatobia hominis*, has an interesting life cycle. The adult, which is actually a fly, catches a female mosquito in midair and cements four to ten eggs to its abdomen. The mosquito, in turn, lands on a warm-blooded animal (usually cattle, but sometimes dogs and even humans) whose body warmth soon causes the eggs to hatch. Tiny larvae immediately burrow into a host's skin and remain there for up to six weeks, during which time they continue to grow as they feed on the host. When the worms are about half an inch long, they emerge from the host's flesh, fall to the ground, and enter a pupal stage, during which they complete their life cycle by metamorphosing into adult flies.

Another way a beefworm can transmit its offspring to a host is to place its eggs on the abdomen of a tick. Like a mosquito, a tick searches for a warm-blooded host on which to feed, passing the hatchling larvae on to the unsuspecting animal. As I often had ticks all over my body because of my frequent forays into wooded and grassy areas, I most likely was infected in this way.