TRAVELOGUE

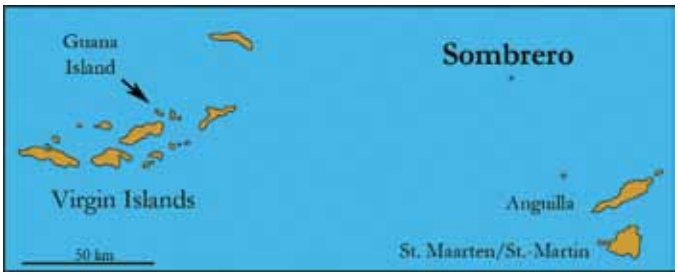
Sombrero: Lizards Among the Ruins

Elizabeth Wright

Department of Forestry, University of Missouri, Columbia, Missouri

This is an interesting time to be alive. Humans are running out of land and constantly searching for new opportunities to fuel economic growth. At the same time, we see a growing awareness of the natural environment, the resources it provides, and the harmful effects of human population growth on the Earth's other species. Some people deny that a problem exists and suggest that we should continue as we are. Others believe that we should park our cars, move into the woods, abandon technology, and become one with nature. Most of us fall somewhere between those two extremes. I believe that we must learn to coexist with nature while finding a way to foster economic growth without destroying our planet. I am fascinated by that goal and think that the first step is in understanding what is at stake. How can we coexist with nature if we remain ignorant of her components? I had an opportunity to witness a few implications of this age-old paradox during a recent visit to Sombrero, a tiny island about 60 km north of Anguilla.

On a fine morning in October 2010, I was one of a team boarding the aptly named *Ocean Girlz*, a catamaran chartered by The Conservation Agency for a trip to Sombrero. Sombrero is unique. Rising out of the ocean some time in the early Pliocene, it is about 1.5 km long and about 0.4 km at its widest point and has never been part of another body of land. Sombrero is the northernmost of the Lesser Antilles, and is part of the nation of Anguilla. Life on the 38 ha of marly limestone arrived by migrating from the mainland or smaller islands on floating debris, by flying, or



JOHN S. PARMERLEE, JR.

As the northernmost of the Lesser Antilles, Sombrero is a long way from everywhere, sitting on its own island bank and never connected to any other landmass.

ROBERT POWELL

Sombrero is one of three Lesser Antillean islands that harbor black Ameivas. In addition to *Ameiva corvina* (named after equally black crows), *A. corax* lives on Little Scrub Island off the northeastern coast of Anguilla, and *A. atrata* lives on Redonda, another isolated "rock" emerging from the sea.

ROBERT POWELL

Access by ladder is necessary for scaling the sheer walls of the island, limestone cliffs shooting 12 m straight up out of the water.

GAD PERRY

The anoles of Sombrero are very similar to *Anolis gingivinus*, which is ubiquitous on the Anguilla Bank. Genetic studies will determine if they are the same species.

GAD PERRY

Island Girlz, here anchored off Sombrero, made the expedition to the island a comfortable experience — although the captain had not previously been to Sombrero.

GAD PERRY

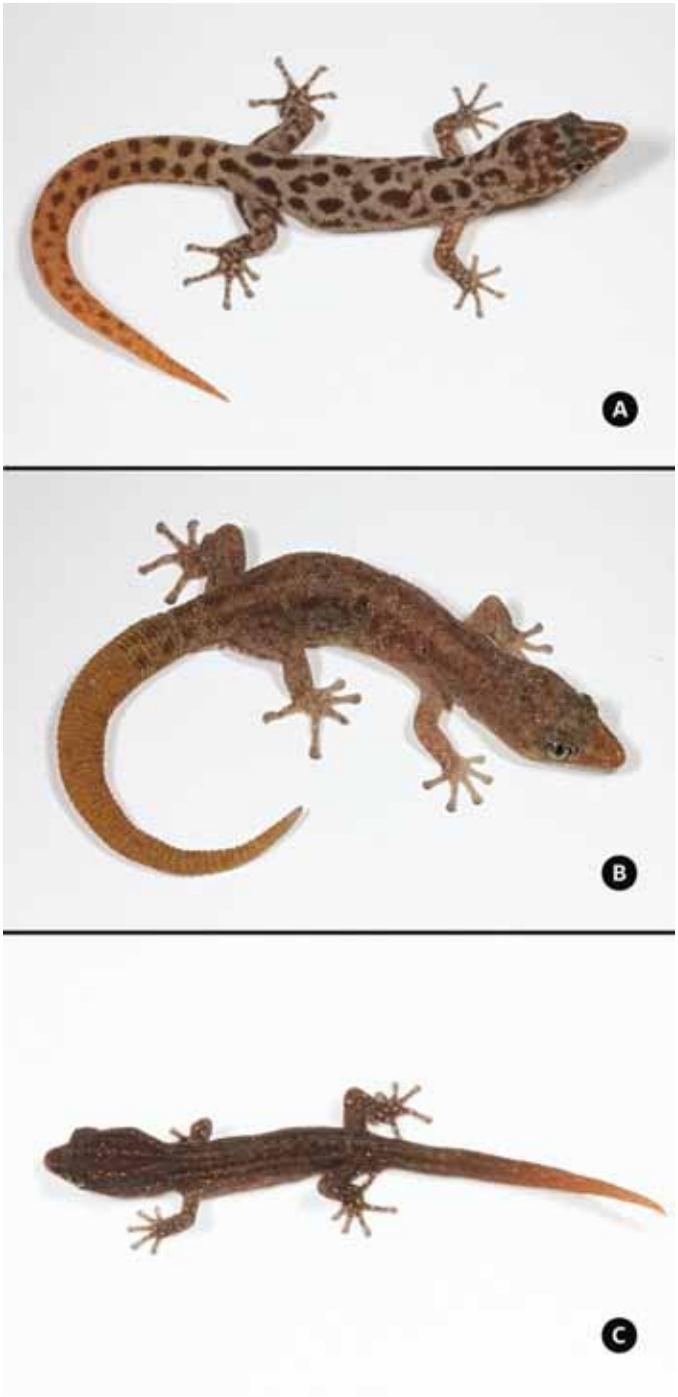
A Brown Booby (*Sula leucogaster*), silhouetted against the sunlit sky on what looked like a rusty loading crane, greeted our arrival.

ROBERT POWELL

Although proficient scavengers when birds or people provide welcome meals, the Ameivas of Sombrero usually have to dig and root for food.

being carried by storms, birds, or humans. The island is frequently deluged by giant waves, and might be entirely submerged during severe hurricanes. Such conditions make it hard to get there and even harder to survive. The resulting founder effect — the sometimes considerable impact that the few founding individuals can have on later generations — dramatically increases the chance of endemism (Ivie 1999). This is why we were going to Sombrero.

The trip was organized by Dr. Robert Powell, a herpetologist at Avila University, who wanted to learn more about the lizards of Sombrero. Dr. James Lazell, the president of the Conservation Agency, had visited the island in 1963 and had discovered that three species occurred on the island (not just the one that had been previously reported): An anole currently identified as *Anolis gingivinus*, the common species on the nearby Anguilla Bank; a Dwarf Gecko, which Lazell described as *Sphaerodactylus* "near" *sputator*, the species that occurs on both the Anguilla and St. Christopher banks; and the spectacular black Ground Lizard, *Ameiva corvina* (Lazell 1964). In



S. BLAIR HEDGES

The Dwarf Geckos on Sombrero exhibit variable patterns, some spotted, some almost unicolored, and others with stripes, as seen on these two adults (A/B) and one juvenile (C).

S. BLAIR HEDGES

The powerful claws on the forelimbs of Ameivas are ideally suited for rooting and digging for food.

GAD PERRY

The author, with aspirator in hand, searches for small arthropods among the ruins.

the 1960s, when Dr. Lazell visited Sombrero, no one was yet dreaming of the secrets that DNA might one day reveal, and tissues collected during a survey by Dr. Jenny Daltry (1999) were subsequently lost. The time had come to collect some more samples so that the relationships and perhaps true identities of these lizards could finally be established. Our team also included Dr. Gad Perry, a conservation biologist at Texas Tech University, Dr. Wenhua Lu, an entomologist with the Conservation Agency, and Susan Valentine-Cooper, an experienced entomologist, who, like me, had been invited to come along and help collect small arthropods.

So, there we were aboard *Ocean Girlz*, on our way from Guana Island in the British Virgin Islands, where we were conducting long-term research projects, to Sombrero. I was in awe of the flying fish as they exploded out of the water and soared for what appeared to be hundreds of meters across the waves. As we approached the island some three hours into our voyage, we saw a small vessel anchored near the ladder that provides access to the island. Access by ladder is necessary for scaling the sheer walls of the island, limestone cliffs shooting 12 m straight up out of the water. I almost fell into the water on my first attempt to step from the bow of our catamaran, moving up-and-down with the waves, onto the ladder, and was saved only by the quick action of the crew. My second attempt was successful and I climbed up, the metal hot under my hands.

ELIZABETH WRIGHT

ELIZABETH WRIGHT

ROBERT POWELL

Migratory Blackpoll Warblers (*Dendroica striata*) darted about, searching for the same insects we were trying to collect (A). These tiny birds, which began their voyage in the northeastern United States, had flown over open ocean for days. Totally spent, some individuals unlucky at making their first landfall on a desolate island like Sombrero, were unable to scrounge for sparse food in time to fend off exhaustion and death (B). Although unfortunate for the birds, the Ameivas readily scavenged the carcasses (C).

GAD PERRY

Windows in the ruins of the old lighthouse keeper's quarters look out over the desolate landscape of Sombrero to the Atlantic Ocean beyond.

The other boat had carried the immigration official from Anguilla who was to meet us and check our passports. I was nervous as I approached the top of the ladder, expecting a large Anguillian official with a scowl. What I encountered at the top of the ladder, however, was the most non-threatening immigration officer I could imagine. He was slender and wore a straw hat, a loose-fitting button-up shirt, and khaki pants, and he was sweating and smiling and settled on a rock. We gave him our passports, he verified that we were who we said we were, and began his long journey home. We turned to take in our surroundings.

The landscape was desolate. Not a tree in sight, just viney plants criss-crossing the rocks. Overhead, a Brown Booby (*Sula leucogaster*) was silhouetted against the sunlit sky on what looked like a rusty loading crane. Black Ameivas were abundant, scurrying a bit when we got too close. Magnificent Frigatebirds (*Fregata magnificens*) hovered in pockets of hot air, their red throat sacs flapping a little in the wind. Migratory birds, mostly Blackpoll Warblers (*Dendroica striata*) darted about, searching for the same insects I was intending to catch.

Despite its relative isolation, humans have had a considerable impact on Sombrero. Old rusty metal structures jutted up all over the island. Giant pits in the limestone peppered the otherwise flat terrain, testament to 19th-century American and British mining operations that quarried considerable volumes of phosphates (mineralized guano) for use as fertilizer in an effort to resuscitate the soils of the southern states that had been exhausted by the plantation system. They even blew up whole sections of the hat-shaped island until only the brim remained (Pappalardo 2001). However, this was not the only time the island was threatened by human activities. In 1999 and 2000, Beal Aerospace of Texas was considering Sombrero as a potential launching site for rockets carrying commercial satellites into space. Triggered by resistance from bird enthusiasts who claimed that Sombrero was an important nesting site for many West Indian species, Beal conducted an environmental assessment that claimed that the nesting site was not that important and that only one species of lizard lived on the island — and that the rockets would not affect them. Beal ultimately decided not

GAD PERRY

Ravaged by 19th-century mining activities and eroded over time by rain and waves of water violently washing over the island, the surface of Sombrero is a maze of sharp and porous "dog-tooth" limestone.

GAD PERRY

One of the larger mining pits, relicts of 19th-century efforts to extract mineralized phosphates (guano) that had accumulated over the centuries courtesy of innumerable generations of nesting seabirds.

ELIZABETH WRIGHT

Catching elusive little geckos in the rubble of Sombrero was not always successful. In this instance, however, the broken tail will provide DNA for genetic studies to determine if the Dwarf Geckos of Sombrero are "near" *Sphaerodactylus sputator*, as Lazell (1964) indicated. The lizard escaped and will regenerate a new tail.

ROBERT POWELL

During the heat of the day, nesting Brown Boobies (*Sula leucogaster*) lifted their bodies off their eggs to prevent overheating. Squawking a bit if we approached too closely, they were otherwise indifferent to our presence.

to use Sombrero, not because of the destructive nature of the project but because the weather was not to their taste (Pappalardo 2001).

The island's guano deposits were exhausted by 1890, leaving "dog-tooth" limestone that is sharp and porous, eroded over time by rain and waves of water violently washing over the island. I was very aware of how exposed my feet were in Chaco sandals. Despite the apparent desolation, I knew the island was teeming with creatures. "Well, we don't have much time," Dr. Powell said, awakening me from my state of awe. "Let's start collecting." Drs. Powell and Perry went off in search of lizards. "Catch 'em if you can, ladies!" Dr. Perry called, referring to lizards, of course, as he trudged in the direction of the lighthouse.

The entomology team started collecting. Typically, we beat vegetation and catch falling insects in our nets below or sweep through grasses with


ELIZABETH WRIGHT


ROBERT POWELL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The abundance of down-covered Booby chicks testified to the dearth of predators on an isolated island.


ELIZABETH WRIGHT

On a food-limited island, lizards must actively search for meals. This Ameiva was foraging through the remains of a Booby nest in search of food.

nets — but Sombrero has no tall vegetation. So, we started turning over rocks and pieces of rusty metal. We would be prepared with our aspirators — devices involving a small plastic jar equipped with tubes to suck up little critters. A rubber cork in the jar has two curved metal tubes sticking out either side, a short one with a screen that leads into the jar that is connected to a long rubber tube that you suck with and a longer one that is placed near the insect you want. You suck in and the insect is vacuumed into the jar (and not into your mouth because of the screen). I tried looking under rocks all over the island, but insects were few and far between — until we climbed down into one of the mining pits, where I found something that I had not seen — huge congregations of tiny mites. Perhaps they were in the pit because the temperature was lower or perhaps the pockets and crevices retained a little moisture.

After little success while flipping rocks, I started picking apart some of the small plants and, lo and behold, I found webspinners (order Embioptera). Webspinners are very cool primitive insects with silk glands used to spin the galleries in which they live. I ruthlessly sucked them up with my aspirator. I also looked through an old booby nest, where I found several beetle and fly larvae. I sucked those up, too — assisted by an *Ameiva* with whom I gladly shared the trove of insect larvae.

Already sunburned and with little time left on the island, I decided to explore some of the buildings. The lighthouse, built in 1868 after a ship had run into the island in 1859, was in ruins. Even after mining operations were abandoned, the British Board of Trade maintained the lighthouse to guide ships through the Anegada Passage. In 1960, a hurricane destroyed the lighthouse, which was replaced and has gone through several incarnations since. It was automated in 2002, but left a history clearly portrayed by the decaying ruins.

GAD PERRY

The concrete base of the old lighthouse and the remains of the lighthouse keeper's quarters stand side-by-side with the new automated lighthouse.

ROBERT POWELL

This Sombrero Ameiva had just excavated a beetle grub.

GAD PERRY

Lacking trees, typically the favored habitat of West Indian anoles, the anoles of Sombrero lived on rock faces or the deteriorating ruins — the only vertical habitats available on the island. This male (A) and female (B) were on poured concrete walls near the lighthouse.

Despite their ghostly appearance, the buildings have been integrated into the island's ecosystem. As I entered what was left of one of the old staff houses, I encountered two large Ameivas — and one had something yellow and insect-like hanging out of its mouth. I crept closer, determined to steal their snack. The lizards scurried under a pile of plywood planks. As I carefully lifted them, the Ameivas slipped out a doorway with empty mouths, leaving a yellow and brown scorpion that lay lifeless and stingerless on the plank. I collected it immediately.

I wandered into another building and saw an anole on the windowsill with something in its mouth. I was very confident now, and edged closer — but the anole was more skittish than the more relaxed ground lizards and it sprinted down the wall, across the floor, and under a large loose tile. I tiptoed closer and slowly started to flip the tile. The lizard ran out but left his lunch, a lively cricket. I grabbed it before it hopped away and slipped it into the plastic bag with the deceased scorpion. I thanked the lizards and apologized for stealing their lunches before heading back to where the others had gathered.

As the last specimens were being collected, I decided that I needed to catch my first lizard. What better place to do it than on an island literally crawling with hundreds of imperturbable black lizards? I crouched low to the ground and waited patiently as the lizards drew nearer. As soon as I reached out to grab one, however, it would dash out of the way. Dr. Perry approached and asked if I wanted a little help. He handed me a noose. "Just stick the noose near the head and pull up — pretty complicated." With lizards crawling around me like sassy little black dinosaurs, I had one within a minute. Dr. Perry taught me how to correctly hold a lizard by grasping both legs of one side in the same hand. I named him Bobert. My two minutes of lizard-catching bliss came to an abrupt end as we decided to call it a day.

When the captain and crew saw us heading to the ladder, they picked us up one by one. This time we had to jump from the ladder to the bobbing boat. Again, I almost fell in trying to impersonate Indiana Jones and barely made it onto the boat. I begged the captain to let me take a dip to cool my sunburned body before we headed out and as soon as he agreed, I was out of my field clothes, in my suit, and diving off the side of the boat. I have NEVER swum in such clear water. What I had assumed was only about 15 feet deep was, in fact, more like fifty! It was like swimming in liquid glass.

On the trip home, I thought about what I had seen, a snapshot of a very complex and delicate ecosystem. I wished that we had had more time, a chance to collect at night, to make more observations. I'm sure a whole book could be written about the ecology of Sombrero. Despite the mining operations and the proposed rocket-launching site, Sombrero has hung on. For the moment at least, little black lizards and big Brown Boobies live largely undisturbed by human interlopers — and maybe that's how it should stay.

Acknowledgements

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