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Adult male marine iguana, *Amblyrhynchus cristatus*, from Academy Bay, Santa Cruz (Indefatigable) Island. Note the powerful front legs and extremely long claws.

Photograph: Karl Switak

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Galápagos Marine Iguanas: A Living Heritage

By Karl H. Switak

“...this lizard is extremely common on all the islands throughout the Archipelago. It is a hideous-looking creature, of a dirty black colour, stupid and sluggish in its movements. I have seen a large one which weighed 20 pounds.”

—Darwin 1839

However, Darwin wasn't the only observer who used the term “hideous” when describing the marine iguana. Beebe (1924) quotes Captain Porter as follows: “... to our great surprise and no little alarm, on entering the bushes [we] found myriads of iguanas, of an enormous size and the most hideous appearance imaginable.” Obviously satisfied with his inapt description, Porter goes on with “...we soon, however, discovered them to be the most timid of animals, and in a few moments

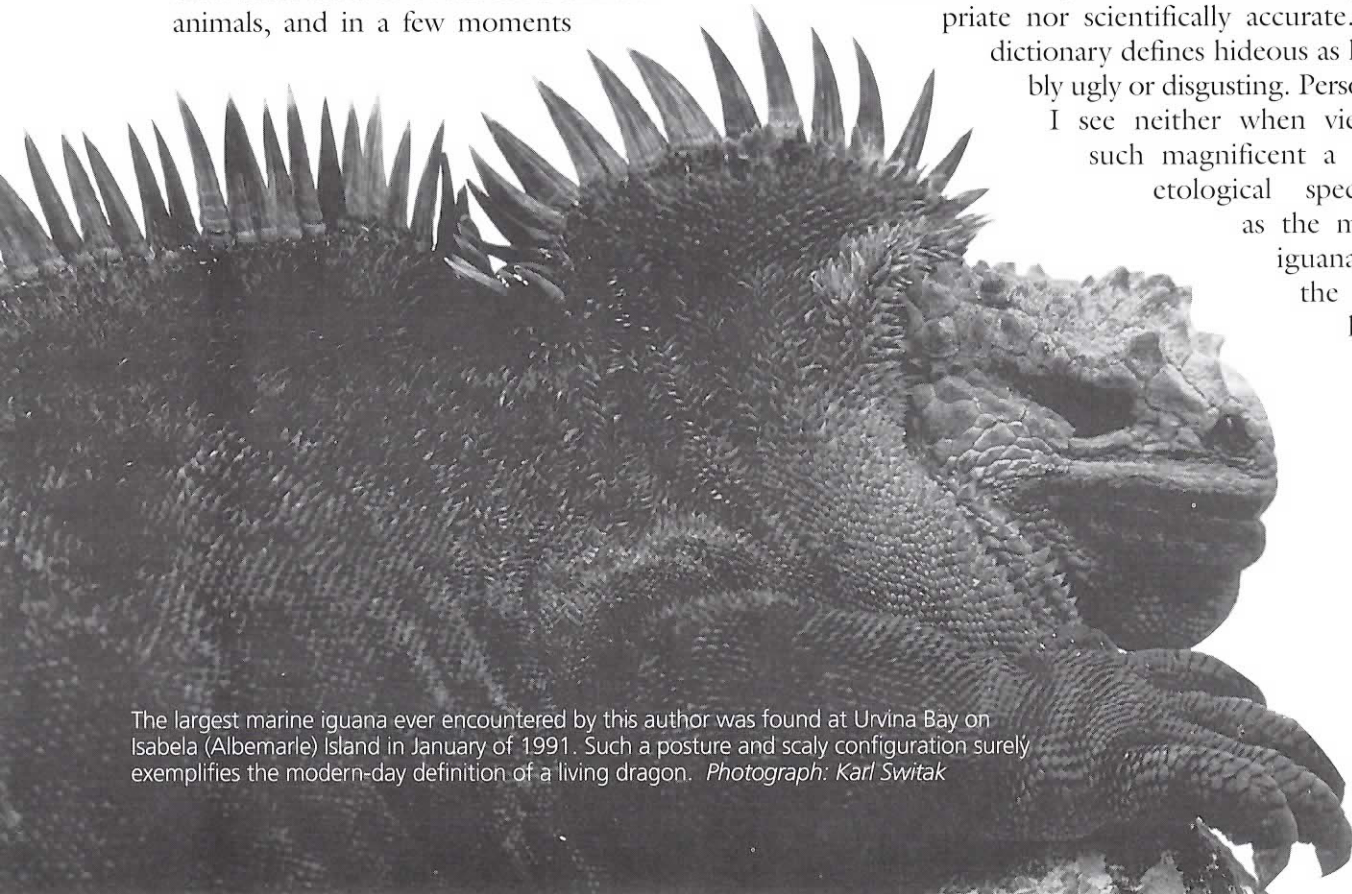
knocked down (killed!) hundreds of them with our clubs, some of which we brought on board and found them to be excellent eating, and many preferred them greatly to the turtle.” In this case Porter referred to Albemarle (Isabela) Island.

I certainly agree with Charles Darwin and others that this lizard species is extremely common on the Galápagos Islands. As a matter of fact, it is the most prolific reptile found there. But calling it a

“hideous-looking creature” is neither appropriate nor scientifically accurate. The dictionary defines hideous as horribly ugly or disgusting. Personally

I see neither when viewing such magnificent a herpetological specimen

as the marine iguana. On the other hand,



The largest marine iguana ever encountered by this author was found at Urvína Bay on Isabela (Albemarle) Island in January of 1991. Such a posture and scaly configuration surely exemplifies the modern-day definition of a living dragon. Photograph: Karl Switak



A colony of marine iguanas thermoregulating on the shores of Academy Bay, Santa Cruz (Indefatigable) Island. The plant is *Sesuvium*. Photograph: Karl Switak

I suppose, beauty (or the lack thereof) reflects in the eyes of the beholder.

Thirteen years have passed since my first visit to the Galápagos Archipelago. Since then I've undertaken three additional safaris, and plan on even more in the near future, but that first excursion back in August of 1986 must go down in history as one of my very best. During said maiden voyage our group sighted a number of marine iguanas on Isla Isabela that can only be described as "being of royal stature and of monstrous proportions."

My primary purpose for visiting the Galápagos has always been to study and photograph the reptile community, which numbers in the tens of thousands within the confines of this insular paradise. To this end I was never disappointed and Darwin (1839) put it sublimely when he wrote as follows: "[we] will now turn to the order of reptiles, which forms, perhaps, the most striking feature in the zoology of these islands. The species are not common, but the number of individuals of each kind, is extraordinarily great."

The geographical range for the marine iguana, *Amblyrhynchus cristatus*, encompasses all of the coastal areas of all the islands in the archipelago, which includes islets and sea rocks. It is endemic to the Galápagos and found nowhere else on Earth. On some islands this monotypic genus is represented by thousands, on others by but a handful, and on a few it is extinct—or nearly so. Bowman (1960) reported no marine iguanas being sighted in the vicinity of Black Beach on Floreana Island and neither did the California Academy of Sciences expedition in 1905-06. However, our group did find this species on Black Beach, Floreana Island, during January of 1991. Due to the jagged and unforgiving coastline that embraces many of the islands in the archipelago, obtaining a correct number of these lizards borders on the impossible. It has been estimated by some that as many as 200,000 marine iguanas may live on the various islands, and in really favorable years this maximum could even be closer to the 300,000 mark!

To exemplify the marine iguana populations that flourish in most regions of the archipelago, a

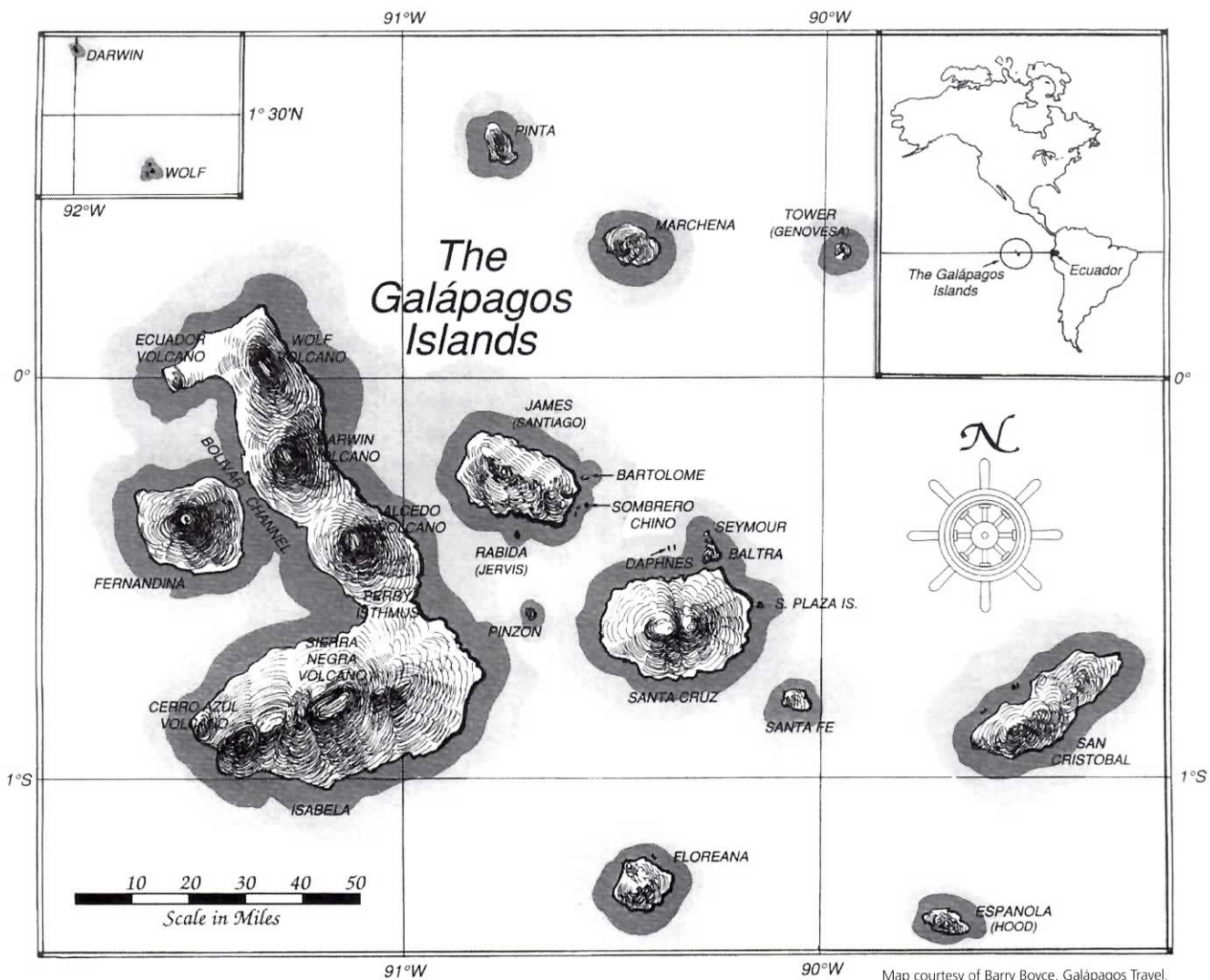
few noteworthy comments from previous authors are of great importance:

Carpenter (1966) writes that perhaps the most concentrated biomass of these lizards exists at Punta Espinosa, Fernandina Island. On a single rocky projection, measuring a mere 6m by 18m, the following density estimates were made. January 25, 1964 = 350 lizards, January 26 = 300 lizards, and January 27 = 500 lizards. A census taken of the entire point on January 27 yielded a total number of 1,885 lizards.

Nagy & Shoemaker (1984) estimated the number of marine iguanas at Punta Espinosa, Fernandina Island, to be about 2,000 strong and “that such a concentration would consume some 28 tons of fresh algae each year.”

Jackson (1993) writes that perhaps 3,000 marine iguanas may occur on a single kilometer of coastline.

Marine iguanas are large, robust lizards, with a long, vertically compressed tail, a somewhat chunky head, and extremely powerful claws. The average length ranges between 0.91 m to 1.2 m, although larger specimens have been recorded. Slevin (1935) mentions males reaching a length of 1.5 m and a weight of 20–22 pounds. During my first visit to the Galápagos in August of 1986, our expedition found several colonies of *Amblyrhynchus* at Punta Albemarle, Isabela Island, that were all of enormous size (especially the males). But the very largest specimen I ever ran across came from the western side of Isla Isabela at Urvina Bay, found in January of 1991. This individual (a male) and several like him definitely fit the description of a living dragon. Not actually being able to touch the lizards (this pertains to the entire endemic fauna) we could only estimate their



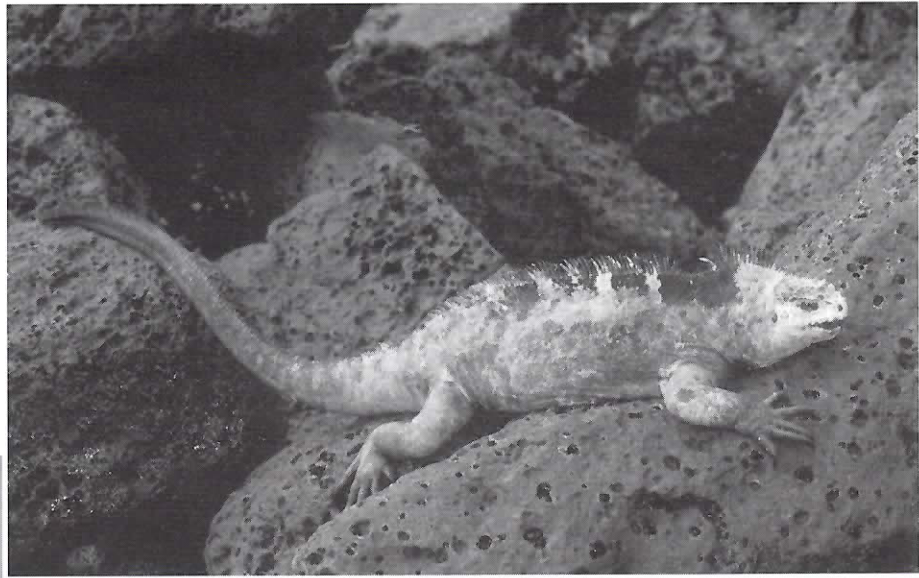
(Below) Adult female marine iguana from Academy Bay, Santa Cruz (Indefatigable) Island. These reptiles are brilliantly adapted to life on the shoreline, as exemplified by huge claws that serve as anchors among the jagged lava rocks. *Photograph: Karl Switak*



individual lengths. This, we agreed, was better than 1.5 meters from the tip of the nose to the very end of an enormous tail.

As many as seven varieties (sub-species) of marine iguanas are recognized by some authorities. The largest originate from the western islands of Isabela and Fernandina, and the smallest, *Amblyrhynchus cristatus nannus*, is endemic to the northern island of Genovesa.

As the name implies, marine iguanas are lizards that often frequent the rather tepid ocean waters that surround all of the islands in the archipelago.



(Above) Before entering the water to feed, marine iguanas usually spend a considerable length of time thermoregulating on top of lava rocks, demonstrated by this male individual at Academy Bay. *Photograph: Karl Switak*

But they only enter the water to feed or perhaps to cool off when the equatorial sun turns those black lava rocks on which they live into a hellish confinement. They are excellent swimmers and often seen in coastal surf where even the best of human swimmers would be demolished against such jagged and dangerous an environment.

To obtain speed while diving below the surface of the water in search of algae, this reptile propels itself forward by pressing all four appendages against its body. It then uses the vertically compressed tail as both a rudder and forward propeller and undulates through its aquatic abode with the greatest of ease. This motion might well be described as a sinuous action of body and tail. They have been known to dive to an incredible depth in excess of 21 meters. Huge hooked claws and powerful, very muscular legs, serve as an anchor among those ever present lava rocks while the lizard forages well below the surface of the water.

Beebe (1924) did not believe this species to dive for food and writes as follows: "I never saw the iguana dive for food, and indeed there would seem no need for it, for at ordinary times an abundance of the weed was always exposed. As this growth thrives only where there was active surf, so the feeding reptiles were often completely covered, three or four feet deep, by an incoming wave.



Marine iguanas often congregate by the "hundreds." This colony was photographed at the Fur Seal Grotto on Santiago (James) Island in August of 1986. Photograph: Karl Switak

Never did I see one dislodged, and from my experience of trying to drag them out of crevices, I count any such danger as negligible."

The estimated length of time that a marine iguana can stay submerged varies considerably. Hobson (1965) reports of a specimen staying submerged for over 30 minutes. Darwin (1839) reports of a seaman aboard the *Beagle* who attached a heavy weight to a marine iguana, "...thinking thus to kill it directly; but when an hour afterwards he drew up the line, the lizard was quite active."

Although considered a herbivore and feeding primarily on several species of algae, *Amblyrhynchus* has been known to accept food items other than algae. Carpenter (1966) mentions a specimen from Hood Island (Española) that had fragments of small crabs in its stomach, and another had shrimp remains. On Punta Espinosa, Fernandina Island, Carpenter also observed a marine iguana eating the dried fecal remains of its own species.

Perhaps the most noteworthy records (up to this point in time) on the non-algae feeding habits of marine iguanas, are those from Karl Angermeyer who at that time resided at Academy

Bay, Santa Cruz Island. Karl's house was built on a lava ledge very near the water's edge, where these lizards wandered back and forth over his porch and even into his living room. Karl stated that he often was able to call the iguanas to the porch to be fed and they never showed any fear of his large dog. Karl made quite a ritual out of feeding these supposedly "herbivorous" reptiles.

He placed a dish, containing pieces of raw goat meat, on the porch. First only one iguana approached. It was then followed by as many as five or six. Each one snatched up a piece of that raw goat meat and gulped it down quickly. Karl further stated that they would also eat oatmeal and other foods, and he had seen them feeding on cockroaches in his living room. Karl also has a photo where he is feeding a marine iguana by hand in the presence of his large dog.

Marine algae are definitely the mainstay in the diet of *Amblyrhynchus*. In this respect the lizard may even show a preference for specific types of algae, as stomach contents have indicated. At least ten genera of algae have been recorded from stomach remains.



At James Bay on Santiago (James) Island numerous marine iguanas use self-dug burrows below a sandstone ridge for night-time retreats. These individuals made an appearance prior to 0745. Photograph: Karl Switak

Marine iguanas are excellent swimmers, but before entering the often tepid waters that surround the islands (on the equator!), they first enjoy a thorough basking on the black lava rocks to elevate their body temperature. Galápagos waters are fed, in part, by the Humboldt (Peru) Current and sea temperatures range from approximately 16°C to 28°C , depending on seasonal weather activity. Cloacal temperatures taken of 129 *Amblyrhynchus* at Academy Bay on Santa Cruz Island (Carpenter 1966) ranged from 28.2°C to 40°C . It appears that the optimum body temperature is approximately 34°C . Such a high body temperature is undoubtedly required when the lizard dives into the cold water where it often remains submerged for up to 20 minutes in search of food. It is then that this species truly demonstrates its “cold-blooded” existence. Immediately leaving the turbulent water they once again assume that spread-out position atop those hot lava rocks and in no time at all regain optimum bodily function. But life isn’t always that simple for the otherwise placid marine iguana. Sea lions have been observed to pull these lizards back into the surf, apparently for amusement only, just as the reptiles reach the safety of shore.

The start of the breeding season varies considerably from island to island, but usually commences in January and lasts into March. Prior to this period male marine iguanas are quite docile and blend perfectly into the masses of this reptilian presence on the Galápagos. However, when duty calls, and the instinct to mate erases all previous commitments, these otherwise tranquil males take on an altogether different attitude. They become edgy, and antagonistic, quickly reacting to an intruding male by not only threatening to fight, but by actually butting their heads together and often biting viciously.

Adult marine iguanas practice a “harem syndrome” when it comes to reproduction. Some males swim, or even crawl, for long distances along the coast, or even venture to other islands, in order to establish territories that include a number of females. Harem groupings were noted at Punta Espinosa, Fernandina Island, by several researchers, one of whom I must now quote: “[a] curious promiscuous polygamy evidently prevails among them (marine iguanas), the group of females forming a harem for the old males.” I have observed this grouping of a single male with

(Right) While swimming, the movement of a marine iguana might best be described as "a sinuous action of body and tail." They are excellent swimmers and capable of diving to great depths. Photograph: Karl Switak



Marine iguana tracks on La Loberia Beach, Wreck Bay, San Cristóbal (Chatham) Island, clearly demonstrate how far these lizards venture from the ocean's shore. Photograph: Karl Switak

numerous females during the mating season at Academy Bay on Santa Cruz Island in January of 1991. After the mating season concludes, everything returns to a colonial, peaceful coexistence.

Actual courtship is simple and straightforward. First the larger and more robust male seizes the smaller female by the scruff of her neck. He then presses his body against hers and at the same time uses one of his front legs to hold her down. Now

he tactfully twists his tail under hers, after which intromission takes place.

Nesting activity usually commences after territorial tendencies have all but subsided, and after those combative males have once again grouped into massive aggregations. Females may start digging several nest sites before deciding on just the right spot. Once completed, the female positions herself in the burrow so that her head points outward, after which the actual egg laying commences. Only one to four leathery white eggs are deposited once a year. Incubation period lasts from three to four months, being regulated by the ambient temperature that surrounds the eggs.

Even though the female lays very few eggs, they are quite large in comparison. A total of 38 eggs collected at Punta Espinosa, Fernandina Island, measured between 7.8 cm and 10 cm in length.

No parental care exists. Therefore, predation on hatchling and very young marine iguanas is extensive. Many fall prey to gulls, herons, hawks, snakes, and feral pests such as dogs and cats.

Adverse weather conditions, such as the "El Niño" phenomenon, have a direct impact on the number of marine iguanas and other animal species that inhabit the archipelago.

Late in 1982 and well into 1983 a most dramatic El Niño wrought havoc with the islands. Ocean water temperatures rose considerably (up to 31°C) killing off algae that these lizards feed on. In turn, thousands died of starvation.

According to Dr. Cayot (pers. comm.) approximately 70% of all *Amblyrhynchus* died during

(Right) Prime habitat for *Amblyrhynchus* at Sullivan Bay, Santiago (James) Island. Photograph: Karl Switak



Adult male marine iguana from Academy Bay, Santa Cruz (Indefatigable) Island. Note powerful front legs and extremely long claws. Photograph: Karl Switak

the reign of this powerful El Niño. On the western islands of Isabela and Fernandina, flight-less cormorants were observed actually using the dead bodies of marine iguanas for nesting material. Boobies and other sea birds virtually disappeared and the fur seals on Fernandina took a real beating. However, strictly land dwelling animals (tortoises, land iguanas, etc.) fared much better. The extensive

amounts of rain associated with El Niño cause vegetation to grow rapidly and naturally provide many a fresh water pool. From December 1982 to July 1983, the Charles Darwin Research Station on Santa Cruz Island received 3,224 mm of rain. Compare this to the mean annual rainfall of a mere 200 mm for the years 1965 to 1970 (Harris 1974).

Fortunately, El Niño comes and goes, and in no time at all the plant and animal populations return to normal. By mid 1986, less than four years after one of the most dramatic El Niños on record, Dr. Cayot (pers. comm.) estimated that the marine iguana colonies in the archipelago had returned to numbers between 200,000 and 300,000 strong. Such an explosive breeding potential, following extremely adverse weather conditions plus a 70% decline in numbers, must indeed be solidified as a most remarkable recovery.

Evolution in Progress?

During the last few years, starting as early as 1993, a number of people have observed a most noteworthy occurrence in the feeding habits of marine iguanas living on the small island of Seymour (also North Seymour). I was fortunate to witness this extraordinary phenomenon personally in April of 1995, and again in March of 1997.

Historically, marine iguanas have always fed in and under the water, or from algae-covered rocks next to the ocean's shore (tidal region). Algae, consisting of numerous species, have been the lizard's major food intake—until now!

On Seymour Island, which lies just to the north of the much larger Santa Cruz Island, these lizards are now feeding **on dry land** some 75-100 meters away from the ocean. The plant they are freely ingesting is a succulent-type known as *Batis maritima* of the family *Batidaceae*. Thus far only marine iguanas living on Seymour have been observed feeding on this plant species, although it is found on other Galápagos Islands such as Baltra, Bartolomé, Isabela, San Cristóbal, Santiago, Santa Cruz, and Floreana.

The specific region on Seymour Island where these marine iguanas are feeding on *Batis* is often bone dry, but may also be flooded by rainwater from torrential downpours. There exists the possibility that during a violent storm, and consequent high seas, some salt water may enter this region. However, there is no direct seepage from the ocean and any water, fresh, salt, or a mixture of both, soon dries out under the powerful equatorial sun. Marine iguanas have been observed to feed here both during **completely dry periods** and when rainwater was present. Additionally, mating activity plus digging burrows for egg deposition has been recorded for this locale.

It was my dear friend, Dr. Fred Caporaso of Chapman University in Southern California, who first mentioned this feeding phenomenon to me back in April of 1993 when he visited Seymour Island with a group of students. At that time the entire region was flooded with rainwater. In April of 1995 Fred and I both observed quite a few *Amblyrhynchus* feeding on *Batis* (region almost completely dry), and again in March of 1997

when only a shallow puddle of water was evident. The number of marine iguanas feeding on *Batis* in 1997 was much greater than in 1995. Some of the lizards were eating the plant that was partially in the water (non-salt), but most were “vigorously grazing” on completely dry land. Not just the occasional mouthful, but serious feeding!

Because *Batis maritima*, like marine iguanas, is found on many of the Galápagos Islands, it can be assumed that the lizards may very well be feeding on this plant elsewhere. But to this date no such activity has been officially reported except from Seymour Island.

However, in March of 1997, I observed another case of unusual feeding behavior for *Amblyrhynchus cristatus*, this time on the large island of Santa Cruz. The specific locale was Academy Bay near the Hotel Galápagos. A group of marine iguanas, sunning themselves in a massive growth of the plant *Sesuvium* attracted my attention. Upon closer examination I found one of the adults (a female) with a small piece of this “non-marine” plant sticking out of its mouth. Other individuals



In August of 1986 our expedition found a sizeable colony of large marine iguanas (mostly males) at Punta Albemarle, Isabela (Albemarle) Island. Note the adult lava lizard just below the iguana. Lava lizards (and finches) often pick off the flies that land on the iguanas' bodies. Photograph: Karl Switak



Marine iguanas are not common on Black Beach, Floreana (Charles) Island, but our group did locate a few individuals in January of 1991. Pictured here is a large male.

Photograph: Karl Switak

showed greenish coloration on both upper and lower jaws, suggesting that the entire group had feasted on this plant species. *Sesuvium*, like *Batis*, is found on many of the Galápagos Islands. I have to assume that marine iguanas from this locale on Santa Cruz Island may on occasion feed directly—on dry land and away from the ocean—on yet another “non-marine” plant species.

Are we in fact witnessing an evolutionary process that could in time find most all of the marine iguanas feeding on land far away from the ocean’s shore? It is well documented that during an El Niño year (or years) thousands of marine iguanas perish due to starvation. The marine algae they feed on do not thrive in warmer waters. By switching to a plant, or plants, that in fact flourish during a warm and wet El Niño season, the lizards would be assured of a constant food supply. After all, it was here in the Galápagos Archipelago that the theory of evolution was spawned, and I am certain that if Charles Darwin were still alive today he would love to see his hypothesis in working order.

This is only a preliminary report, one that needs many years of research before a viable explanation or scientific reason can be ascertained. I for one will surely travel to the Galápagos Islands again and again, with the specific goal in mind of keeping a close eye on those “land-loving” marine iguanas on Seymour Island and Academy Bay.



(Editor’s note: At least three species of Bahamian iguana are also consumers of *Sesuvium*.)

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Recent Update (August 1999)

It has come to my attention (pers. comm., Dr. Fred Caporaso) that the latest El Niño of 1998-1999 had, in part, a devastating effect on certain (if not all) marine iguana colonies. Recent observations indicate that all of the marine iguanas on Seymour Island have died. This of course includes the colony that freely ingested the plant *Batis maritima*. In addition, the plant itself has disappeared from the region in question on Seymour Island. Furthermore, and this needs additional verification and research, it has been suggested that during a severe El Niño season marine iguanas actually reduce in body size. Such a phenomenon would require further research.

How long will it take for a viable marine iguana colony to re-establish itself on Seymour Island? If so, will the plant *Batis* also re-appear and will the “new” iguanas use it for food? Some very good questions, but without immediate answers. However, it does mean additional journeys to this island paradise in the not too distant future.

Now follows a real test for evolution.

Can a Spiny-tailed Iguana Survive in L.A.?

John Aristei

In September of 1995, a 14" spiny-tailed iguana, *Ctenosaura similis*, named Tom escaped from my house. I saw him a few times in the yard but was never able to get close enough to capture him. When winter came, he disappeared.

I live in a coastal suburb of Los Angeles, California. Winters are typically rainy and damp with temperatures sometimes dropping into the low 40's. There are weeks when the temperature does not get above 65°F. For a lizard that is indigentous to the tropical and semi-tropical climates of Central America, this seems like a sure death sentence. Can a spiny-tailed iguana survive in L.A.?

The first year I was not too surprised as we had a relatively mild winter. Summer 1996, I often saw Tom feeding on wild dandelion flowers and leaves from an ice plant ground cover that grows on an embankment in the back yard. I would sometimes throw him mealworms from a deck, which he cautiously accepted, never getting close enough to capture.


One time I chased him into a storm drain that exited 15' down the hill to an asphalt run-off. I tried to flush him out by running a garden hose down the pipe with no success. Finally, I filled a trashcan half-full of water and created my own mini-flash flood. Out popped Tom, but even after being cooled and swamped by water, he was too quick to catch. Attempts at noosing and luring him under a trap door box with mealworms failed. After a while, my wife began to joke that I was like the Coyote trying to catch Road Runner.

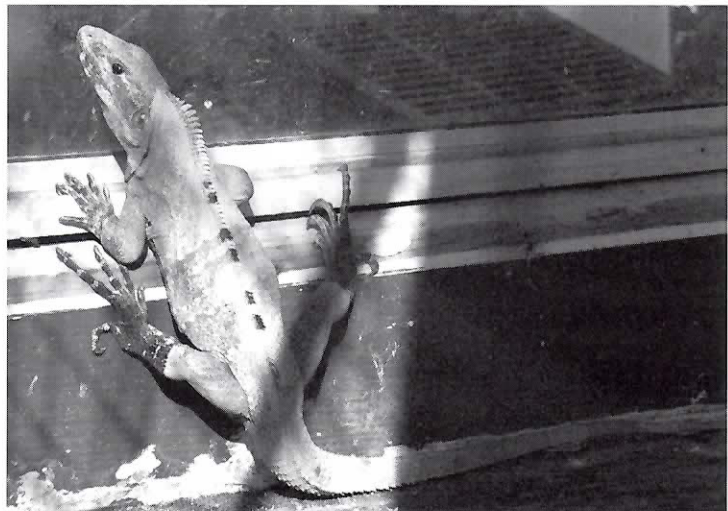
In the summer of 1997, I did not see Tom at all and figured that the long cold wet El Niño winter of 96-97 had done him in. During a cold rainy week in February of 1998, a neighbor from six houses up the street came by claiming to have found an unusual lizard in his storm drain. It was Tom! He was in terrible shape—skin and bones. I nursed him back to health and by springtime he was hearty enough to share an 8' by 12' outdoor enclosure with a rhinoceros iguana, *Cyclura cornuta*. This lasted

about a week until he escaped by squeezing through a large electrical duct.

I was not too upset because he has been a survivor. His survival techniques include absorbing heat from the asphalt storm run-offs and black PVC storm drainpipes that run throughout the neighborhood. The PVC pipes in my yard have a 5' section, which is exposed to the sun that can get very hot to touch on even a mildly sunny day.

The winter of 98-99 had freezing temperatures that destroyed much of California's orange crops. Guess who I found back in the cage he had escaped from a year before? The cage has just been modified with a large gauge screen that Tom can easily squeeze in and out of. I sometimes see him eating off the rhino iguanas' food plate, or sunning on the shelves below the UVT plexiglass roof. The shelves are about 12" below the glass and it gets hot like the dashboard of a car. My rhino iguanas don't seem to mind him and he darts back out in the yard whenever I get near the cage.

Tom is a wary spiny-tailed iguana—I guess he has to be to avoid the neighborhood cats, dogs, and occasional hawks, snakes and raccoons as well as me. During the last five years Tom has spent about six months in captivity. He has otherwise been surviving on his own in the relatively harsh climate of Los Angeles, California. 



Tom, an adult *Ctenosaura similis*, spends most of his time exploring the suburbs of Los Angeles, CA. Photograph: John Aristei

IGUANA NEWSBRIEFS

Pillaged Iguanas

Thousands of Guatemalan iguanas are being sold in Honduras because these reptiles are the main entrée in a typical dish. The lack of vigilance and police protection have made it easy for the pillagers to commercially gain profit from the sale of iguanas.

More than 300,000 reptiles are being sold on the Honduras black market. Honduran pillagers are illegally coming into the country to hunt for the iguanas that inhabit the communities of San Francisco del MAR, Puerto Barrios and Izabel according to Yvonne Ramirez, manager of the organization for conservationist Mario Dary.

Ramirez indicates that year after year this situation occurs during the egg-laying period of the iguanas from February to April. These reptiles lay their eggs along the local beaches and people from the area and surrounding countries come into the country illegally by boat across the open sea.

According to Mr. Edgar Rodas, engineer in charge of deep sea fishing for the Ministry of Agriculture, Livestock and Food, more than 300,000 reptiles have been sold on the black market over a period of three months.

In addition, evidently the pillagers arrive in national territory pretending to be visitors and there is nothing that is being done. In Ramirez' opinion, because it's an open sea, illegal shipments leave the country.

Rodas stated that the Hondurans come into the country as tourists and later they go out to set traps to catch the iguanas alive. He also indicated that there is an effective operation of control in the area. The operation has managed to

stop a boat en route to Honduras containing one thousand two hundred iguanas and was able to return them back to shore. It was unknown how many survived after being released because of injuries while in captivity.

The job of capturing the iguanas is very easy according to Ramirez. These reptiles are full of eggs and it's hard for them to move fast. She also added that a lot of Guatemalans are collaborating with the pillagers.

Geron Alvarez, assistant to the forest region, indicated that not only is there illegal traffic of iguanas but also of monkeys and turtles. The lack of personnel and the excess of work have made it very hard to keep control of the plundering.

Source: Prensa Libre: Guatamala, April 12, 1999. Translated by Lupe Lewis.

Iguana Lovers Unite over the Internet!

Iguana lovers united over the internet to help raise money for the critically endangered Grand Cayman Blue Iguana (*Cyclura nubila lewisi*).

International Iguana Society member, **Marie Eguro** of Los Angeles, CA, made home videos of her pet iguana documenting the entire egg-laying process to help other pet owners deal with their gravid iguanas. She sold these videos over the internet, and the profits from these sales as well as other donations were given to Grand Cayman's National Trust to help their Blue Iguana Captive Breeding Facility. Through this fundraising, a \$300 donation was given to the Breeding Facility in the spring of 1999. Next year's goal is \$500!!

The Blue Iguana, *Cyclura nubila lewisi*, is one of the most critically endangered lizards in the world, numbering less than 100 individuals in the wild. The Captive Breeding Facility directed by Mr. Fred Burton (Scientific Program Manager), releases captive bred pureblooded *lewisi* into protected areas for endemic Cayman Island wildlife. The Facility also educates the public about the importance of preserving native flora and fauna for future generations. They are in need of cage repairs as well as manpower to care for the iguanas, and can use any help they can get. If you are interested in purchasing an Iguana Egg-laying home video, please visit:

<http://the.ThoughtShop.net/~meguro/sapphire/sapphire.html>

To make cash donations directly to the National Trust, please contact:

National Trust for the Cayman Islands
P.O. Box 31116 SMB
Grand Cayman
(345) 949-0121

Iguanas Banned in New York City

Amendments to New York City Health Code
Amendments to New York City's Health Code prohibit the sale and ownership of many native and exotic animal species including all members of the family Iguanidae. The new legislation will be in effect as of August 9, 1999.

The portions of the new regulations pertaining to reptiles were drawn up based on comments received from the New York Herpetological Society. The NYHS suggested a ban on several varieties of poisonous and constricting snakes, many of the larger monitor

species and on common green iguanas. These are the species that are most commonly relocated by their owners once they attain a certain size and which would benefit the most from being excluded from the pet trade. Unfortunately, the original list was expanded by the drafters of the legislation to include ALL species of iguanas and a number of other reptiles. Further changes have been proposed to regain the original intent of the NYHS proposal. However, the changes cannot be enacted until city legislators resume sitting in the fall.

The current amendments to the Board of Health code state that "no person shall sell or give to another person, possess, harbor or keep wild animals other than in a" zoo, a laboratory, a circus or other place licensed by the Department of Health. Native wildlife rehabilitators licensed by federal or state agencies are exempt from these restrictions. The Board "authorize[s] seizure of prohibited animals by officers of the Department and authorize[s] the Commissioner to determine disposition of a prohibited animal that has been seized, offering the owner an opportunity to be heard and present proof as to whether an animal is a prohibited animal.... Owners [are allowed] the opportunity of arranging to remove the animal from the City of New York to another jurisdiction where such animal may be lawfully possessed."

Reptiles currently prohibited include gila monsters and Mexican beaded lizards, all venomous snakes, teids, iguanids, snapping turtles and crocodylians, as well as certain boid, pythons and varanids.

LIZARD LETTERS

Observations from the I.I.S. Conference in Belize, February 24–March 1, 1999

It was a leap of faith—going to a country I had never seen with people that I had not previously met—but it promised to be an adventure. How refreshing it was to find people who loved lizards and didn't laugh about going to an iguana conference, as my musician friends had!

From the start, Belize fascinated me, and the more I knew about Belize, the more I admired it. The study of any life form is incomplete without studying its environment, the climate, and other living things, including indigenous people. I admired the fact that as a developing country, Belize is striving to build a strong economic base while balancing human needs with those of its natural resources. Few, if any, developed nations have come close to achieving this goal, and it is exciting to witness the efforts of the Belizean government and various conservation agencies in making this a reality.

Approximately sixty-five percent of Belize is completely undeveloped. The remainder is put to urban and agricultural use. Fishing, lumber, sugar, citrus, corn, beans, livestock, and tourism are the main sources of income for this little country. The people are ethnically diverse, and include Carib blacks, Mayan

Indians, Creoles, Spanish, Mennonite and a small percentage of Caucasians. While most Belizeans speak English, many also speak a second or third language according to their ethnicity.

The name "Belize" is Mayan for "muddy water," and was adopted in 1973. It encompasses some 8,867 square miles, which consist of coastal plain, swamp, mountains, and rain forest. The main topographical feature is the Maya Mountain range, which rises to a height of 3,862 feet at Richardson Peak. Belize's population is approximately 230,000.

From time to time, hurricanes cause extensive damage. Belize City, the former capital of Belize, was extensively damaged by a hurricane in 1961. With a grant from the British government, the new capital of Belmopan was built further west, on the Hummingbird Highway. This is the current governmental seat.

British loggers settled in Belize during the seventeenth century, under repeated attacks from the Spanish, who felt that they had a claim on the region. In 1862, the British declared that British Honduras (as Belize was known at the time) was a crown colony and it became part of the Commonwealth. The British government granted autonomy to British Honduras in 1964, but Guatemala, citing a provision of an 1859 treaty, challenged it. Shortly before Belize's independence was celebrated, Guatemala broke off diplomatic ties with Britain. Britain's



Counter-clockwise: I.I.S. members crossing a small creek on the Tiger Fern Trail in Cockscomb Basin Wildlife Sanctuary; an adventurous canoeing duo sets out; one of the *Ctenosaura similis* released at Red Creek Biological Reserve. Photographs: Angela Saunders



LIZARD LETTERS

Right: Iguana enclosures at the Tropical Education Center's Green Iguana Breeding Project. *Below:* Incubators for hatching the captive-bred green iguanas. *Photographs: Angela Saunders*



response was to maintain a military force in Belize to forestall an invasion by Guatemala. In September 1991, Guatemala recognized Belize as a sovereign state and established diplomatic relations with it.

A friend told me before I left that Belize is a third world country. This implies that the nation is in the process of establishing its economic growth and that conditions are primitive. I would rather say that parts of Belize are in a sort of time warp, doing business in ways that the rural United States did, say, 30 years ago. The market, particularly in rural areas, is informal, and many goods and services are traded on a barter system. Of course, this makes it difficult to calculate a country's gross domestic product! The minimum wage in Belize is about 80 U.S. cents per hour, and although goods are priced about the same as for the U.S., they are, of course, a lot more expensive to Belizeans.

The infrastructure is still a work in progress, as witnessed by the condition of major highways, and the I.I.S. members' enthusiastic response to a road crew laying tarmac on a major dirt road. Electricity is apparently available to most areas, but it is expensive to Belizeans and is contracted from Mexico. The local tap water at Toucan Sittee (where some of us lodged) was potable and good. Most villages have their own water tower, supplied by groundwater.

Public transportation is available even in rural areas but I cannot say how reliable or frequent it is. Travelling on dirt roads in a school bus (as we did) takes some adjustment, but the locals appear to take

the rough ride in stride.

I.I.S. conferees were treated to a first-hand transportation experience on the trip to our accommodations at Toucan Sittee and Sandy Beach (both in the Stann Creek District) from the airport in Belize City. While most of the roads in and around Belize City were paved, once we were out

of the metropolitan area they were gravel.

Our first sightseeing destination was Altun Ha, a Mayan ruin close to Belize City. I leave it to others to relate the history of this settlement, but I did pick up a few tidbits of information from Matt Miller, our faithful guide and bus driver extraordinaire. A number of small, spiral snails were seen in the ruins themselves, attached to the stones. The Maya harvested countless numbers of these mollusk shells and ground them to make mortar for building. An attractive, red-flowered epiphyte was growing in a tree and Matt identified it as a bromeliad. Deep in the plants are little pools of water where insects are trapped and subsequently drowned.

The first full day of the conference was spent at Cockscomb Basin Wildlife Sanctuary, a refuge for jaguars and many forms of wildlife. A steamy hike up the Tiger Fern Trail gave us some excellent views across the basin. The forest was surprisingly cool and pleasant, in contrast to the more open areas. It was like walking through a greenhouse with philodendrons hanging from trees usually found only in greenhouses in less tropical climes.

After a descent for lunch, several of us took a short hike to a river, which wound through the heart of Cockscomb. The water was clear and cool, and populated with schools of fish, which were just as curious about us as we were about them. A visit to the river later in the week revealed regurgitated material on the rocks in the river, which Matt suggested had come from otters. I looked for other otter evidence but didn't find any. Wendy Townsend found a basilisk on some debris by the side of the river. Two more basilisks were also found. On the trail to and from the river there was an ant "turnpike," where thousands of leaf-cutter ants carried leaf fragments to large mounds. Their travels had worn a bare strip across the trail.

The second full day was highlighted by a boat ride up the Sittee River. I was one of the fortunate few who didn't have to paddle. We spotted a number of

LIZARD LETTERS

green iguanas in trees overhanging the river. A large male was sighted near the Toucan Sittee resort, and a very gravid female was seen further upriver. The highlight of the ride was the sight of a single Morelet's crocodile basking in shallow water. It was very wary of our approach and swam to safety before I could photograph it.

One of the special purposes of the conference was the release of *Ctenosaura similis* at the Red Creek Biological Reserve in Stann Creek. This property is adjacent to Cockscomb and is the site of a large tract of tropical forest. Bob Ehrig and Richard Moyroud have purchased 605 acres to enhance and enlarge the Cockscomb area set aside for wildlife. Two ctenosaurs were tagged, had blood drawn for DNA testing, and released on this site. One took off in the direction of Bob's proposed lizard lounge, which is exactly what I would have done, given the circumstances.

We returned to Belize District for a visit to the zoo, which displays only indigenous fauna. The zoo is the inspiration of the late naturalist Gerald Durrell, and it is well laid out. It gave us the opportunity to see some of the animals close up (including some Morelet's crocodiles), and it served as a reminder for all of us to be good stewards of our environment. Another stop was the Tropical Education Center, which houses a green iguana-breeding project.

On the way back to Toucan Sittee/Sandy Beach, we stopped at Monkey Bay Wildlife Sanctuary, whose director (and our bus driver), Matt Miller, explained the watershed project undertaken there. Water

and energy conservation is a way of life at Monkey Bay with constant reminders of the ways in which we can minimize our impact on the environment.

The last full day was spent at Cockscomb, with the group splitting into several smaller groups. One went to look at the wreck of Alan Rabinowitz' plane from 1984, which crashed while tracking jaguars over the forest. The crew survived. On the way back to Sandy Beach, we stopped at a sugar mill to examine a tree full of bats, a couple of herps and the workings of a nineteenth-century sugar mill.

The Garifuna Women's Cooperative hosted our last evening in Belize at Sandy Beach. A few of us swam before dinner in the tepid ocean. After dinner, we were entertained by a Garifuna "orchestra" of a large drum (these were used in African villages as signaling devices), drums of hollow logs, and songs. The Garifuna women, who would haul reluctant male dancers to the dance floor, allowed no party poopers. The *Ctenosaura similis*, which live on and around the buildings at Sandy Beach, are probably still discussing the party.

Sighting ctenosaurs parked on tombstones in cemeteries highlighted the return trip to Belize City. The flight back to the States was uneventful, with entertainment provided by John Bendon. By way of a postscript, I have been blessed with the adoption of a *Ctenosaura similis* shortly after my return to Memphis. She serves as a permanent reminder of a splendid conference in Belize. My thanks and appreciation go to all those who made it happen.

Respectfully submitted, April 14, 1999

Angela G. Saunders



Clockwise: A giant Ficus tree stands amidst the ruins at an old sugar mill; brown bats sleep while clinging to the trunk of the tree; and Steve Reichling examines a red-rumped tarantula, *Brachypelma vagans*. Photographs: Angela Saunders

I.I.S. Bookstore

Photograph courtesy of Jayme Gordon



As a service to our members, a limited number of publications will be distributed through the I.I.S. Bookstore. The following publications are now available:

The Green Iguana Manual, by Philippe de Vosjoli. 1992. **\$7.00** (including postage); **\$8.75** (non-members).

Schwarze Leguane, by Gunther Köhler. 1993. **\$19.00** (including postage); **\$24.00** (non-members). Excellent *Ctenosaur* guide book, photographs, range maps, text in German.

Send check or money order (payable to International Iguana Society) **to:**

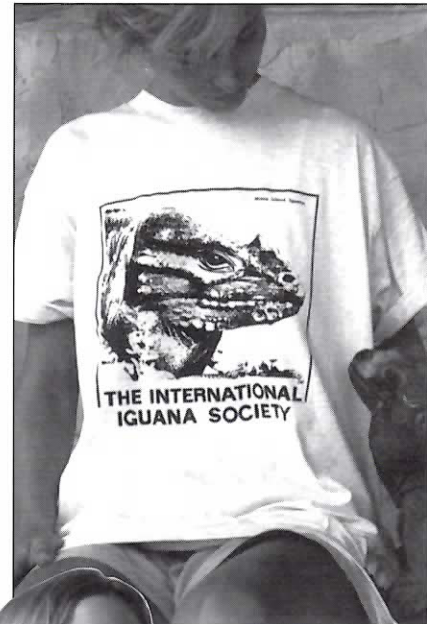
I.I.S. Bookstore
P.O. Box 366188
Bonita Springs, FL 34136

Corrections and Acknowledgements from *Iguana Times* Vol. 7, #3

1. Omission: At the end of the Booby Cay article, the copyright should have read: All text, maps and photos ©1998 by Joe Wasilewski and J. S. Bendon.
2. Acknowledgements for the Booby Cay article: Head-scale drawings: John Bendon wishes to thank Joe Wasilewski, Glenn Gerber and Steve Reichling for their photographs which greatly assisted in the production of drawings.
3. Correction: Also in the Booby Cay article: It was incorrectly stated that *Cyclura cyclura inornata* on U-Cay in the Exumas sometimes reaches a weight of 9 kg (20 lb). None have yet been caught at that weight. A specimen of *Cyclura cyclura figginsi* has been weighed at 8 kg (17 lb) by Chuck Knapp (IT7.3).

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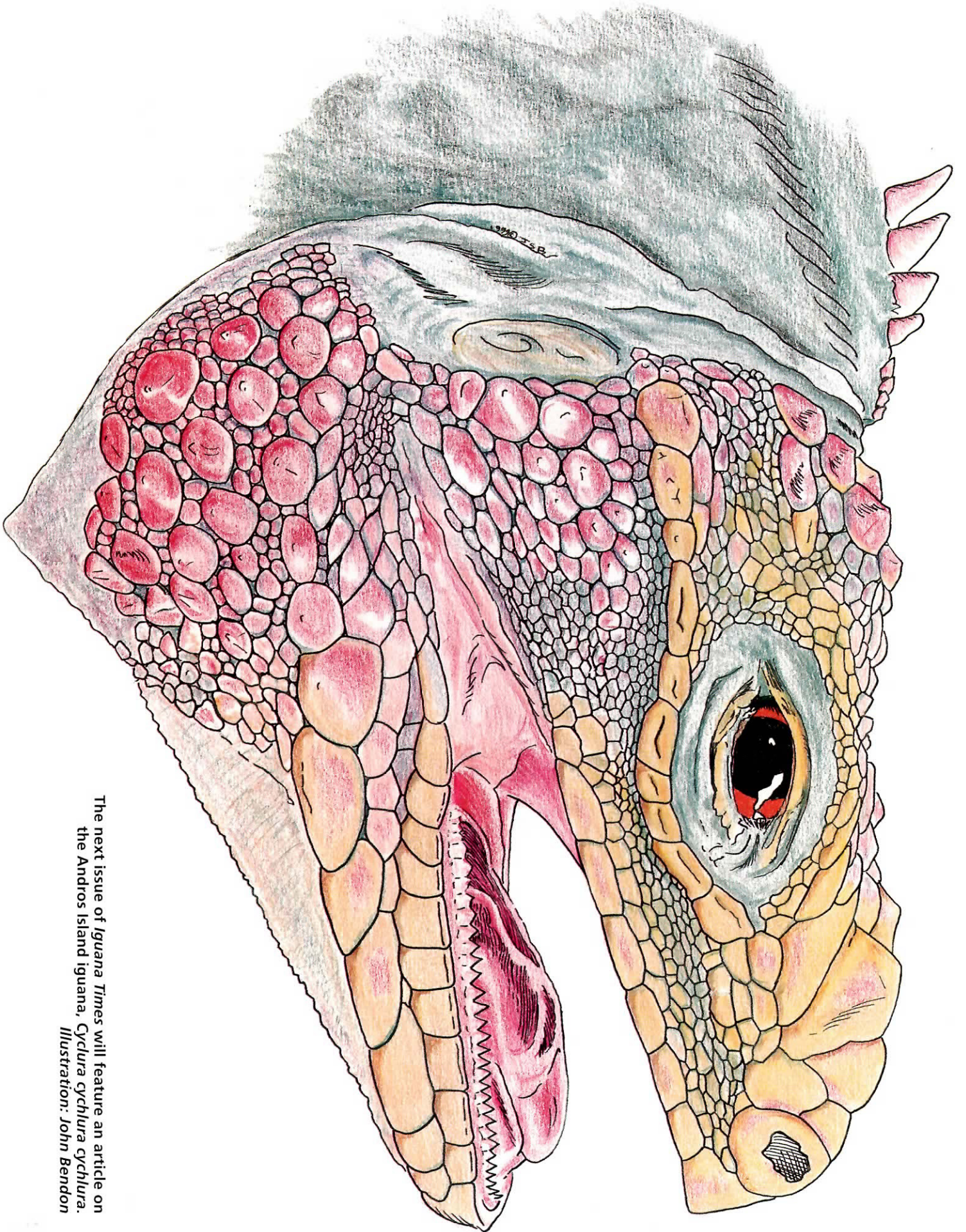
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The next issue of *Iguana Times* will feature an article on the Andros Island iguana, *Cyclura cyclura cyclura*.
Illustration: John Bendon