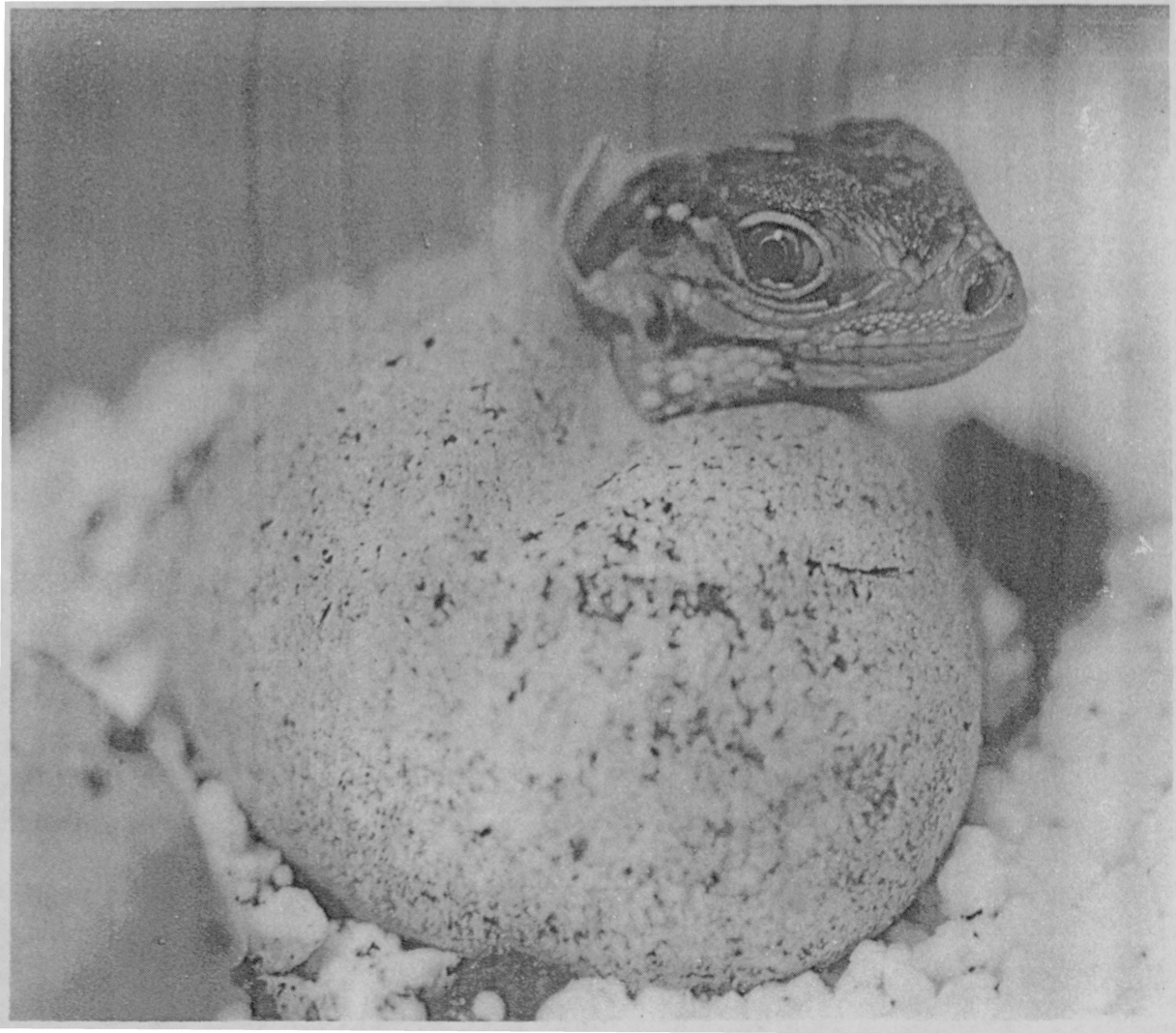


# IGUANA TIMES

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Hatchling Cuban Rock Iguana, *Cyclura nubila*

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**NEWSLETTER OF THE INTERNATIONAL IGUANA SOCIETY INC.**

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## THE CAYMAN ISLAND ROCK IGUANA, *CYCLURA NUBILA CAYMANENSIS*

DAVID W. BLAIR

On a very small island in the western Caribbean lives a modern-day "dragon". It is truly a giant among lizards, reaching a length of over four feet and a weight of almost 15 pounds. This qualifies the Cayman Island Rock Iguana *Cyclura nubila caymanensis* as one of the largest lizards in the Western Hemisphere.

These rock iguanas inhabit the two smaller islands in the Cayman Island group: Little Cayman and Cayman Brac. They lie approximately eighty miles south of Cuba and a little over one hundred miles west of Jamaica. The islands in this group are formed of limestone and are generally quite flat, with the highest points only about forty feet above sea level. Cayman Brac is an exception; with a bluff rising to one-hundred and sixty feet above sea level at its north-east end.

Little Cayman is the only island that still has viable populations of rock iguanas, certainly because it is the least human-populated of the group, with fewer than forty residents. Its entire land area is about twelve square miles, much of which consists of mangrove swamp and inland lakes. Although unsuitable habitat for iguanas, these areas harbor huge nesting colonies of sea birds, including Magnificent Frigate birds and Red-footed Boobies. The rock iguanas inhabit only the more open, arid sections of the island. These are covered chiefly by xeric limestone forest.

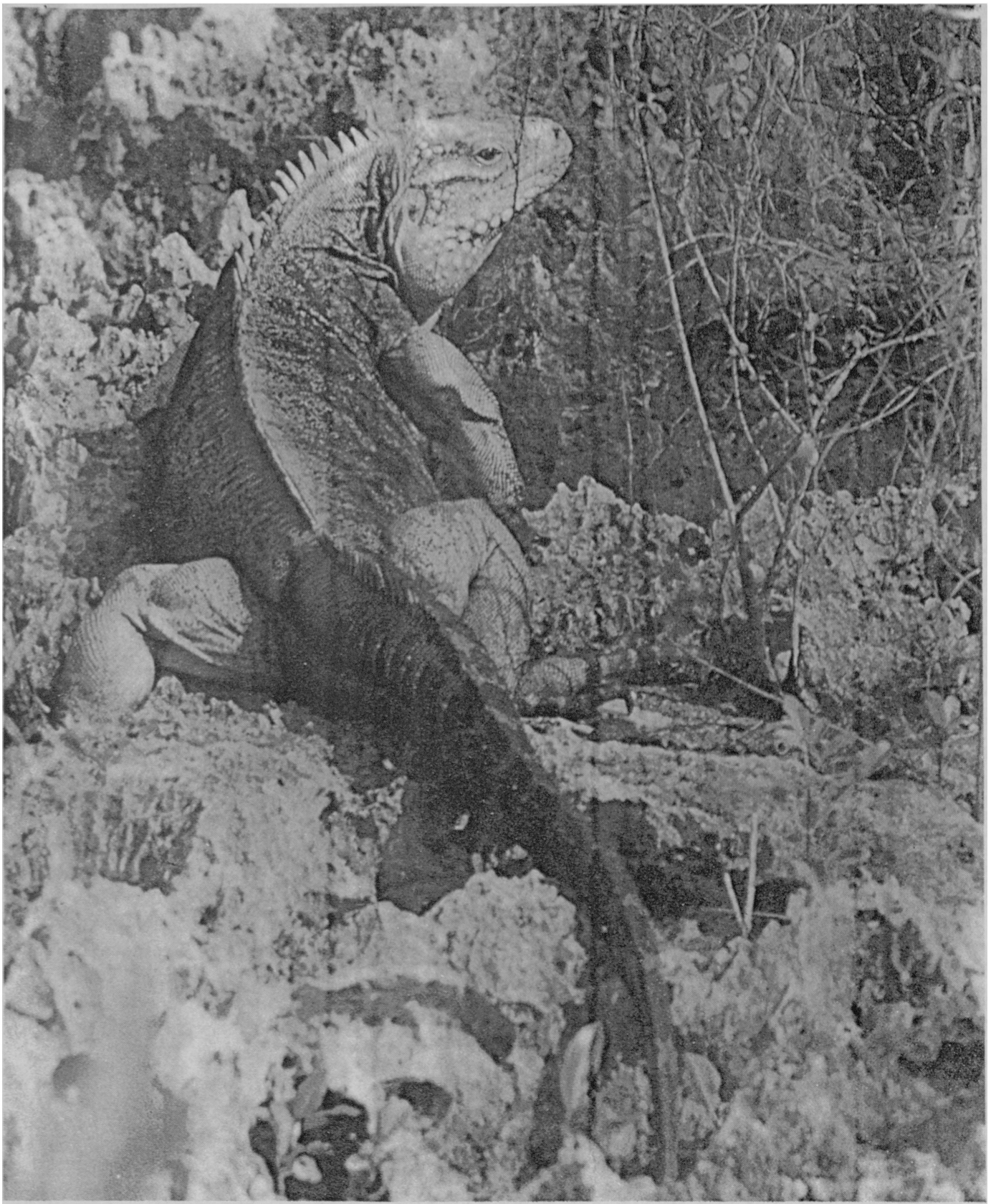
The genus to which these rock iguanas belong is *Cyclura*, a group of iguanas confined to a number of islands in the West Indies. Their closest living relative is possibly *Ctenosaura* of Mexico and Central America. From a common ancestor these rock iguanas developed into morphologically different forms on each isolated island group. Some evolved into only medium-sized lizards two to three feet in total length. Others, like the Cayman Rock Iguanas, developed into massive creatures; in fact, they are the largest surviving native land vertebrates in the Greater Antilles.

The rock iguanas flourished until men colonized the islands within the past few centuries. They hunted the lizards for food and destroyed their habitat. They brought to these islands rats, pigs, and mongoose which destroyed the iguana's eggs. Their domestic dogs and cats became feral and preyed upon young iguanas. Goats roamed many islands, decimating the vegetation that provided iguanas with cover and food. In recent years, the demand for specimens to supply collectors abroad reduced populations still further. Roads were built around the islands which effectively cut the iguanas off from their best feeding and nesting areas.

Of the seventeen morphologically different forms now recognized; one is believed extinct, several others are very much endangered, and the rest have been split into small scattered populations whose state is questionable in most cases.

The numbers of rock iguanas on Little Cayman Island have been steadily declining in recent years. The bulk of the population has retreated into the more isolated, almost inaccessible, interior of the island. Here they spend their days moving in and out of the mosaic of light and darkness, thus regulating their body temperature. The limestone comprising these islands is of a honeycombed variety known as Microkarst. Rock iguanas utilize the numerous cavities as overnight retreats, and each normally requires several different holes. They are rarely far from shelter. Rock iguanas usually emerge from these retreats on sunny days when temperatures approach 80°F. Juveniles are the first to be seen, with the adults appearing somewhat later.





Little Cayman Rock Iguana, *Cyclura nubila caymanensis* (male) on Little Cayman Island. David. W. Blair photo.

After basking in direct sunlight for up to an hour, they begin to move about and feed. Primarily herbivorous, rock iguanas also consume some animal matter. Since they are not active predators, only easily obtained items are sought, such as insect larvae, landcrabs, and carrion. Young iguanas can sometimes be induced to take food from your hand and seem especially fond of flower blossoms, including Oleander and Poinciana. Adult males by contrast are very wary and usually dash into the nearest retreat at the first sight of a human's approach. By setting up blinds in the field we were able to observe and photograph huge males at close range. The blinds appeared to be completely ignored by the iguanas after only one or two days in place.

Male rock iguanas are very powerfully built with a massive head and large jowls. The blood-red sclera of the eye gives them a somewhat vicious appearance; but in reality, they are shy, peaceful creatures. Their markings are distinctive, with alternating bands of black and yellow-brown. Females tend to be solid gray or brown with faint banding and black fore-feet in sharp contrast to the legs.

Little is known concerning the reproduction of Cayman Island Rock Iguanas in the wild. C. Bernard Lewis observed iguanas on Little Cayman for four weeks in 1938 and provides most of the information available to date. He stated that egg-laying takes place in May and June, with from 8 to 20 eggs deposited in the sand near the beach. Burrows up to four feet long and a foot deep are dug under bushes only a few yards above the high tide mark. We spoke with current long-term residents of Little Cayman and were told that they sometimes saw iguanas nesting on the south shore of the island. The eggs were often dug up and eaten by natives, as they sometimes mistook them for sea turtle eggs.

The late Ira Thompson, a native Caymanian and one of the islands' leading naturalists, raised the closely related Grand Cayman Rock Iguana (*Cyclura nubila lewisi*) in captivity for over 30 years. The information he recorded is probably indicative of the patterns shown by other members of the species. He found that mating usually takes place in March and April, with egg-laying occurring in May and June. Nine to sixteen eggs are laid after nests are dug. Nest preparation may require several days. Females normally guard the nests for up to two weeks because in the wild, prime nesting sites are at a premium, and are often disturbed by other gravid females. Hatching occurs in September after approximately 90 days incubation, and hatchlings are 10 or 11 inches in length. Rock Iguanas reach maturity at about five or six years of age. It is possible that these iguanas may live to be 50 to 80 years old.

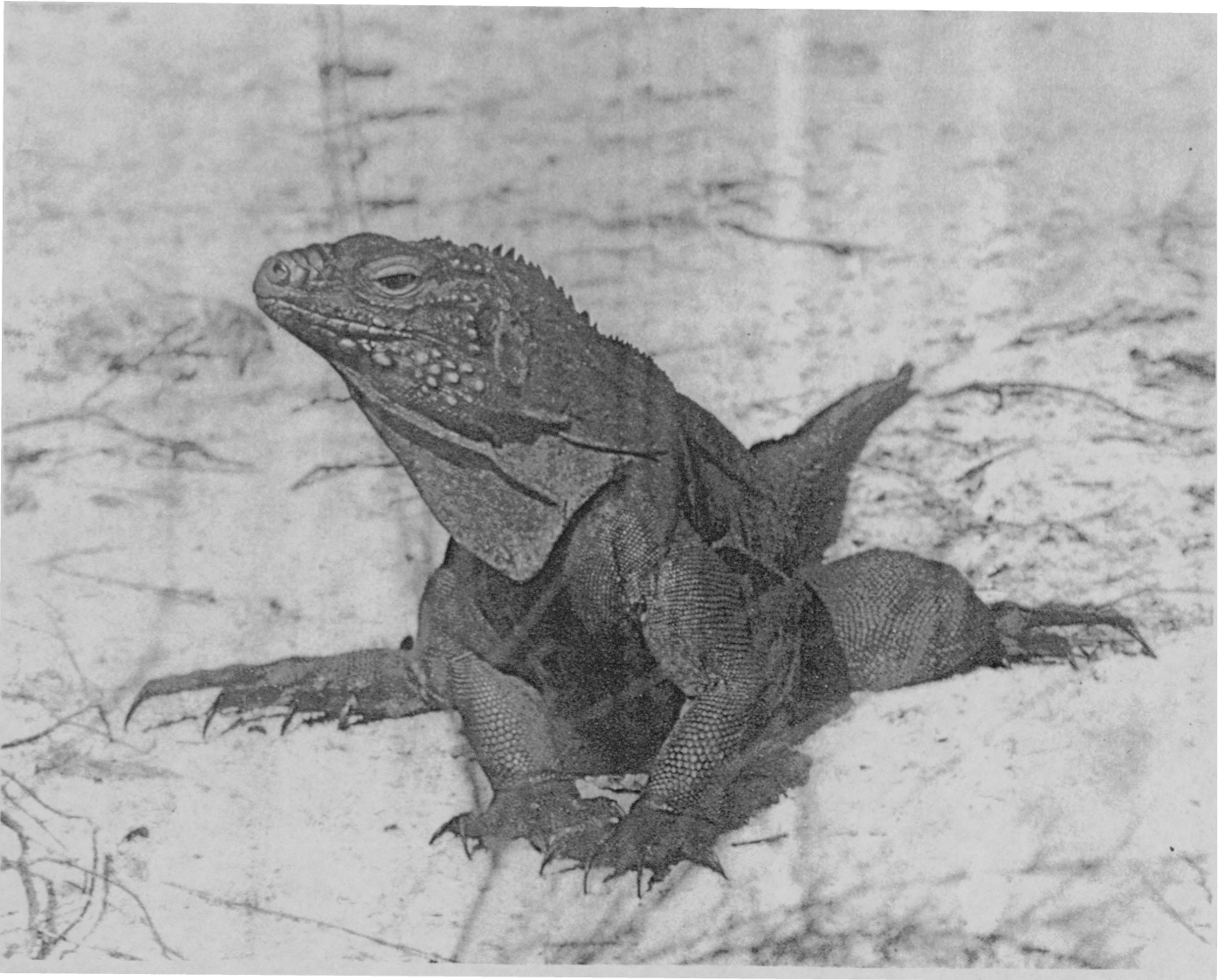
Cayman Island Rock Iguanas are still "hanging-on" in the wild, but were almost dealt a devastating blow in recent years. In 1977, an agreement was signed between the Cayman government and Cayman Energies Ltd. calling for the construction of a ten-million barrel oil transshipment terminal on tiny Little Cayman Island. Fortunately the plan has been "indefinitely postponed" for this would have meant the influx of over 600 workers for construction with 200 remaining in permanent positions. If implemented this would have had a disastrous effect on not only the iguanas, but the entire ecology of the island.

Two species of birds have already become extinct on Grand Cayman in recent years. We can only hope that the Cayman Island Rock Iguanas do not follow in their footsteps. Through intelligent management, conservation, and intensive public education we can preserve this very special island and its unique inhabitants for generations to come.

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Little Cayman Rock Iguana, *Cyclura nubila caymanensis* (female). David W. Blair photo.

# GROWTH OF THE GREEN IGUANA (*Iguana iguana*) IN THE FIRST 18 MONTHS OF LIFE IN CAPTIVITY

GUNTHER KÖHLER

## Materials and Methods

This study was based upon 20 captive-bred green iguanas. Ten of them hatched in 1987, and ten in 1988. All hatchlings were from the same pair of adults. I gave most of them to friendly private iguana keepers. Only a small number were reared by myself (five from 1987 and three from 1988).

All the iguanas were measured and weighed at monthly intervals. Conditions of husbandry (nutrition, climate in the terrarium, ultraviolet radiation, etc.) were recorded as precisely as possible. The influence of different husbandry conditions on growth and health of the iguanas will be discussed in a later article.

The following parameters were measured: Snout-vent length (SVL), total length (TL) and weight (g). For interpretation of the data the monthly mean ( $\bar{x}$ ), standard deviation (S.D.) as well as maximum (max.) and minimum (min.) values were calculated for each parameter.

## Results

At hatching, the iguanas were 55-71 mm in SVL ( $\bar{x} = 63$ ; S.D. = 0.46), 180-260 mm in TL ( $\bar{x} = 232$ ; S.D. = 17.6), and weighed 6.7-12.3 g ( $\bar{x} = 10.5$ ; S.D. = 0.96).

The increase of SVL and TL follows a linear, and the increase in weight, an exponential curve. The mean increase of the SVL was about 8 mm, and for TL about 29 mm per month. Both SVL and TL doubled at an average age of 6.5 months, and tripled at 14.5 months and 15.5 months respectively. A ten-fold increase in hatchling weight was achieved at an average age of 8.5 months, while a twenty-fold increase was reached at 13.5 months.

At 18 months of age, the iguanas were on the average 197 mm in SVL (313% increase; S.D. = 33), 745 mm in TL (321% increase; S.D. = 120) with a weight of 305 g (2905% increase; S.D. = 171). The maximum SVL at this age was 240 mm (381% increase), 906 mm in TL (390% increase) with a weight of 740 g (7048 % increase). The smallest iguana achieved only the following measurements: SVL 140 mm (222% increase), TL 500 mm (216% increase) and a weight of 110 g (1100% increase).

At the time of hatching, these captive-bred iguanas showed an average SVL to TL ratio of 1 : 2.73 (min. 1 : 2.27, max. 1 : 3.29). During growth, this ratio changed slightly in favor of tail-length, resulting in a ratio of 1 : 2.85 (min. 1 : 2.62, max. 1 : 3.2) at an age of 18 months. Therefore, body growth on the average was moderately negatively allometric during the first 18 months of life.

## Discussion

Growth data for *Iguana iguana* recorded in the field showed considerable variation depending on the population, climate, and available food. Müller (1968), Henderson (1974), Troyer (1982) and Van Devender (1982) reported an increase of 6.3 to 8.1 mm SVL per month, while Harris (1982), and Burghardt and Rand (1985) found higher growth rates, namely 11.4 mm, and 8.4 to 14.4 mm per month, respectively. The mean monthly rate of increase in SVL for captive green iguanas in my study was 8 mm. This is similar



to the data recorded for wild iguanas.

Since all my iguanas were the offspring of the same pair of adults, they were genetically quite similar. Of course, there are many other factors which influence growth rate and health of reptiles in captivity. These captive-bred iguanas were given to about ten amateur herpetologists for rearing. One must guess that each person provided slightly different rearing conditions for the animals. Therefore, these data should represent, more or less, the average growth rate for the green iguana in captivity.

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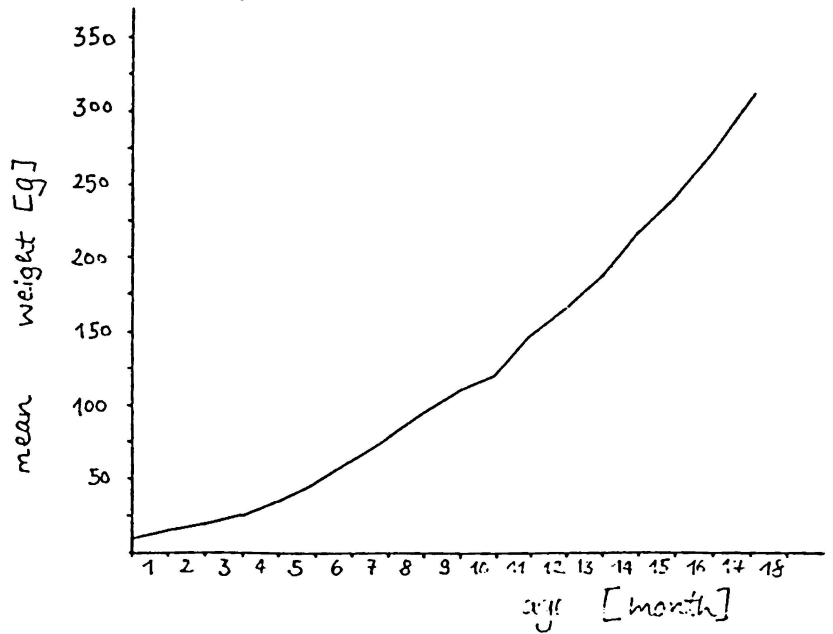
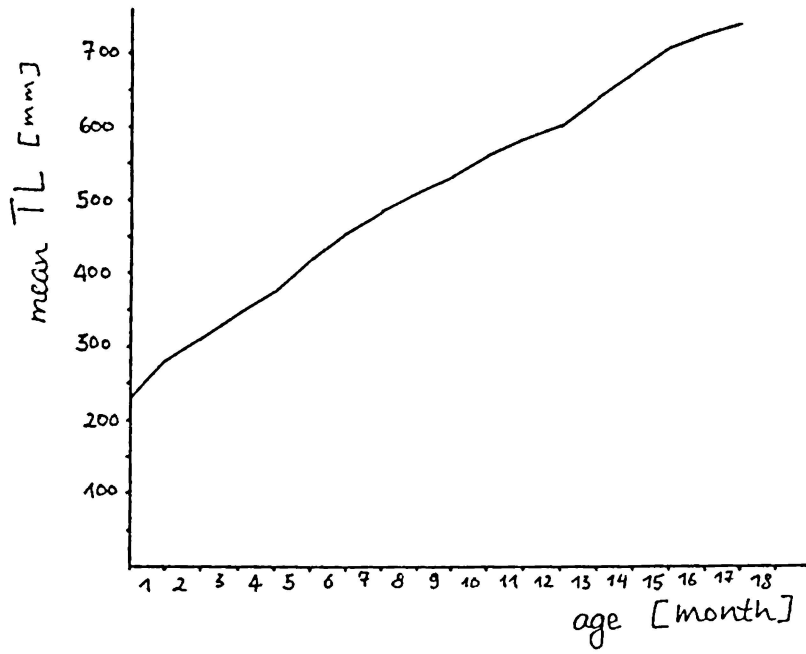
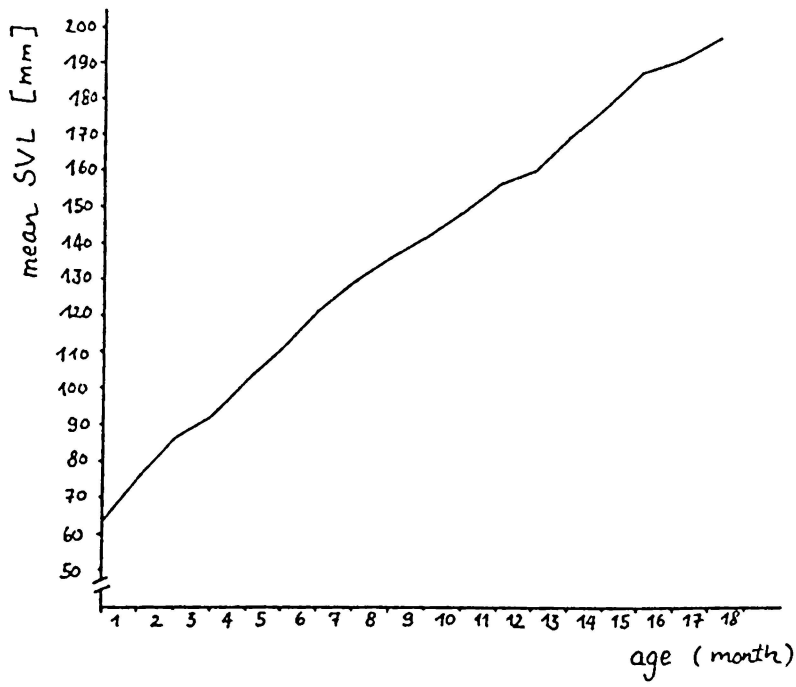
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## A VISIT WITH IGUANAS OF THE GALAPAGOS ISLANDS

MARY LANG EDWARDS

Rough black bodies sprawled lazily across the basalt lava, absorbing warming rays from the equatorial sun. With arms and legs draped haphazardly across the backs of neighboring companions, there was hardly a vacant spot on the rocks for the lava lizards scurrying among their larger reptilian relatives. Dorsal crests marched characteristically from the head to the tail of the slumbering giants. Muscular arms and legs, bigger around than the oars of the dinghy I had just left behind, emerged from robust bodies with dagger-like claws curving from elongated toes. As I stood admiring for the first time the marine iguanas (*Amblyrhynchus cristatus*) of South Plaza island of the Galapagos, I recalled Charles Darwin's description of these improbable lizards 150 years ago: "It is a hideous-looking creature, of a dirty black color, stupid, and sluggish in its movements." In a strange twist of circumstances, I viewed the same creatures as marvelous animals, engineered in time by environmental forces which have modified their gene pool, a real testimony to the validity of Darwin's treatise on natural selection.

Now, as I approached a colony of iguanas, I learned that they would tolerate my presence to about a meter in distance; any closer and I was startled with a threatening blast of a "sneeze". Apparently, marine iguanas make use of the sneeze, a natural method for expelling excess salt from their nasal salt glands, to warn or intimidate a perceived threat. I learned during the next eight days of exploring the Galapagos Islands that marine iguanas, although appearing to be unaware of their surroundings as they bask, actually remain alert to the slightest movement. A number of times, I attempted to slowly sneak up to a "sleeping" iguana only to have it "sneeze" or edge away as I unobtrusively approached (I thought), even from the rear. Perhaps living in colonies provides added protection from predators; if the intended victim does not see an advancing threat, surely a neighbor lying at even a slightly different angle will.

Land iguanas (*Conolophus subcristatus*) were abundant on South Plaza, basking on lava rocks just behind sandy beaches and even peering out from crevices between rocks further inland. Sometimes surprisingly similar in appearance to marine iguanas, they can be distinguished by a more pointed snout (the face of the marine iguana is more rounded or blunt) and they usually have some yellow on the face or legs. Otherwise, both species are similar in size, with blotched skin hanging in folds and the tail as long as the body. Our guide, Dr. Etienne de Backer, described three hybrids on South Plaza: two look like marine iguanas but act like land iguanas and one looks like a land iguana but swims and acts like a marine iguana. I do not know whether their hybrid state is speculation or documented. On several occasions I watched land iguanas bite off chunks of cactus without apparent concern for spines. Yellow flowers were often abundant on the various islands and prompted me to wonder whether these iguanas feast upon them.

Colorful, agile larva lizards (*Tropidurus albemarlensis*) scurried around and over marine iguanas as if they were as inanimate as the lava rocks on which they basked. Several times I observed lava lizards on the back or head of an iguana, feeding on insects. Various species live on the islands of the archipelago and differ in color and pattern. Adult females often have blotches of red on the face or neck. The variation from island to island demonstrates the uniqueness of each gene pool and studies show significant differences in the behavior of these lizards. I found these lizards to be as attractive and interesting as any lizards I have ever seen.

The following day, while motoring around the towering cliffs of Espanola Island in a rubber dinghy, we spotted a small dark lava heron perched inconspicuously in a cave-like depression in the rocks. Numerous swallow tail gulls and masked boobies circled overhead or clung to the edge of cliffs far above the surface of the water. Disembarking on the white sandy beach, we were greeted by the low guttural grunts of sea lions encountered everywhere in the Galapagos. Nearby lay a mass of seven marine iguanas, their mouths drawn in the perpetual smile so characteristic of the species. The dull black color of the males was dramatically enlivened with deep red splotches that gave the appearance of severe sunburns to these lizards. Head bobbing, a characteristic threat display, was readily observed in the larger group of iguanas lying prostrate on the black lava rocks further down the beach. It soon became apparent that marine iguanas usually assume one of two positions. Lying flat on the substrate while basking allows iguanas to maximally absorb heat, and therefore, is most useful when the animals attempt to raise body temperature. The other position, elevated basking, consists of sitting up so that the head and chest do not touch the substrate, or readily absorb its heat. Perhaps this position allows the iguanas to maintain a steady body temperature, or even to cool off.

Moving inland, we found blue footed boobies engaged in their ritual dance: resplendent high-stepping blue feet, wings spread apart, ending with the traditional sky pointing. Male hisses were answered with resounding female honks. So many birds nested on the ground that my constant attention was required to avoid stepping on them. Further inland, we encountered an open expanse that served as an albatross courting ground. As the honking calls of the albatrosses reverberated over the island, I was mesmerized by the scene unfolding before me! Many albatross pairs stood facing each other, beaks clanging in mock sword fights, followed by sky pointing and a preening finale, only to be repeated over and over again.

Marine iguanas are found in large numbers on sandy beaches or lava rocks throughout the Galapagos Islands. When not lazily soaking up heat on land, they can be found in ocean water, heads bobbing in the swells or waves crashing against boulders edging the shoreline. In shallow water, iguanas often graze on green algae which seems so sparse that it is surprising that it meets their dietary needs. Brisk and agile swimmers in deep water, they suddenly appear from the depths below and swim back to land, crawling up steep faces of rocks before nudging their way into the usual mass of basking iguanas. On Santiago Island we were once fascinated by the playful antics of a young sea lion as it grabbed the tail of a marine iguana in its mouth, holding on tightly as the iguana struggled to get to shore. After towing the iguana around in a small lagoon, the sea lion finally released its increasingly frustrated "toy" who then made its way to land.

One of the most interesting observations of marine iguanas was made during our frequent snorkeling expeditions. Concealed from the observer on land are enormous boulders of pillow lava, spewed out from ancient volcanic eruptions and now lying on the ocean floor surrounding many of the islands. These boulders create unique habitats for many sea creatures and provide substrate for green algae. As I swam after leopard rays and green sea turtles or played with sea lions, I sometimes spotted marine iguanas heading out into the ocean to graze or returning to land from a recent meal of green algae. The lumbering iguana on land is transformed into a graceful and competent swimmer in water. At first from the water's surface, I watched them clinging to rocks under water at depths up to 5 or 6 meters as they grazed on the algae covered lava. But then curiosity compelled me to dive down for a closer look. Oblivious to my presence (no more "sneezes"), they continued to eat even when I approached to within a foot. Usually they remained under water for 10 or 15 minutes before surfacing and heading back to land.

The Galapagos Islands are protected by the Galapagos National Park Service (GNPS) which was founded by the Ecuadorean government in 1959. The Charles Darwin Foundation for the Galapagos Isles and the Charles Darwin Research Station located at Puerto Ayora, Academy Bay, Santa Cruz Island were created soon after. These organizations work together to ensure the conservation of the unique ecosystems of the islands and to promote scientific studies, most of which are directed toward conservation. One of the most challenging programs has been to eradicate introduced species which are destructive to native flora and fauna. Another project has been the reintroduction of native species to various islands. These on-going plans to return the islands to their natural state have led to breeding programs for Galapagos tortoises and some subspecies of iguanas at the research station, and to releasing young animals on their original islands. The GNPS provides a rigorous training program for the guides who must accompany all tourists. In addition to escorting tourists from island to island, guides are knowledgeable about island ecology, and oceanography, and are excellent instructors. They must ensure that the islands are protected, and they are trained to report back to the Research Station certain data they observe as they explore the islands. The successes in the conservation of the spectacular ecosystems of the Galapagos Islands is a tribute to the concerted and on-going efforts of these organizations.

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#### I.I.S. Bookstore

As a service to our membership, a limited number of publications will be distributed through the I.I.S. Bookstore. We believe this will become a valuable source of information. The following publications are now available:

- No. 01      **The General Care and Maintenance of the Green Iguana**, by Philippe de Vosjoli. 1990. \$4.40 (including postage); \$5.50 (non-members).
  
- No. 02      **Guide to the Identification of the Amphibians and Reptiles of the West Indies (Exclusive of Hispaniola)**, by Albert Schwartz and Robert Henderson. 1985. \$19.00 (including postage); \$27.00 (non-members).

Data from sea floor could resolve a long-standing controversy.

from Herald Wire Services

Scientists have discovered evidence that could resolve a long-simmering feud that has grown out of Charles Darwin's historic study of the evolution of species on the Galápagos Islands.

The islands are only about three million years old, and some biologists have argued that that is not enough time for the wide diversity of wildlife to have evolved there, as Darwin's work suggested.

But geologists aboard the Thomas Washington, a Scripps Institution of Oceanography research vessel, have found something that Darwin could not possibly have known: There were other, much older islands in the region that have long since slipped beneath the ocean, and some of the creatures on Galápagos that needed more time to evolve may have begun their ancestral journey on islands that are no longer there.

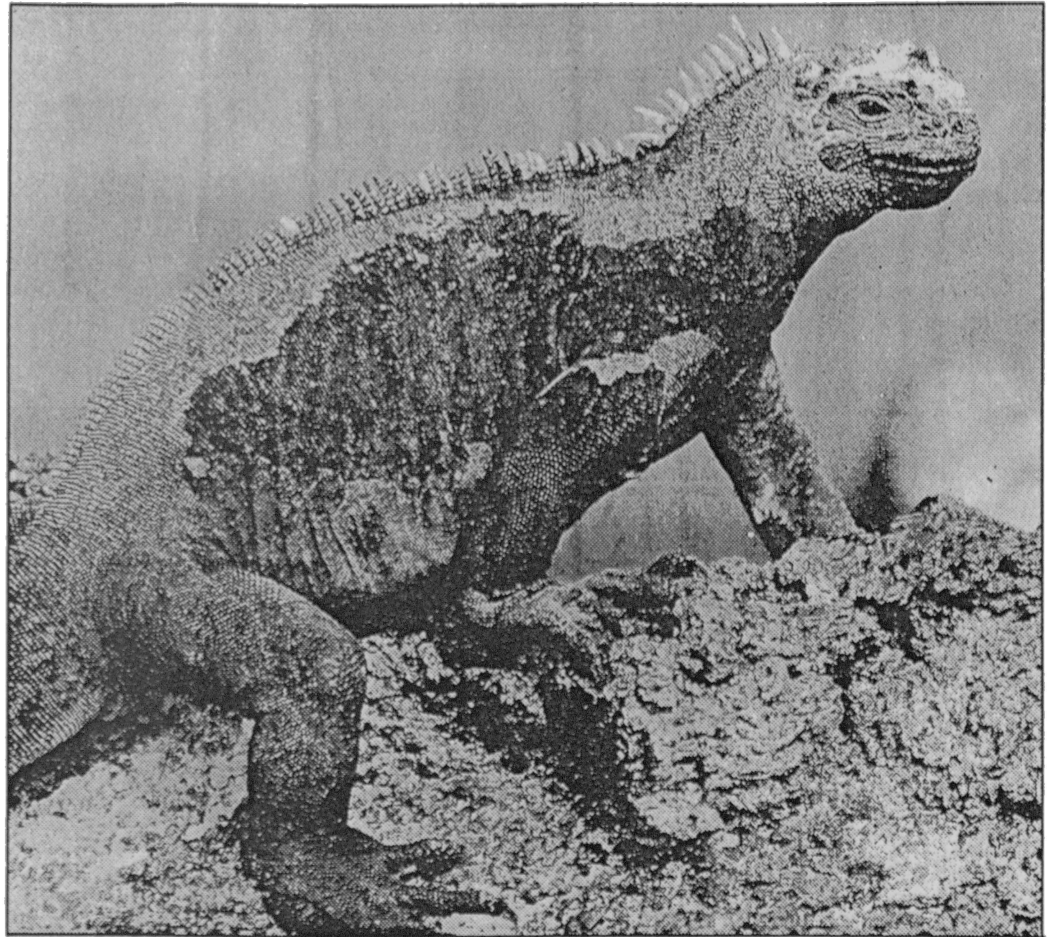
Some of the hidden islands are at least nine million years old. Some may be 90 million years old.

The finding does not prove Darwin's theory of evolution, but it does make the theory compatible with the current understanding of genetics and how long it would have taken for some species to diverge into separate groups.

It also confirms a controversial hypothesis by two molecular biologists, Dr. Vincent M. Sarich and Dr. Jeffrey S. Wiles of the University of California at Berkeley. In 1983, they predicted that such "drowned" islands would be found. They reasoned that only the existence of long-vanished islands could account for the extensive evolutionary changes undergone by Galápagos species in the period since their ancestors arrived on the islands, which were originally lifeless.

"The controversy may disappear," Hampton L. Carson of the Department of Genetics and Molecular Biology at the University of Hawaii wrote in an analysis of the search, published recently in the

## A PUZZLE SOLVED?



**ON GALAPAGOS ISLANDS:** The marine iguana, above, and land iguana are believed to be descended from a common ancestor many millions of years ago.



DAVID LE BATARD / Miami Herald Staff

*The existence of an island chain at least 6 million years older than the present Galápagos Islands would account for the state of evolution of some animals — such as the marine iguana, above — seen on the islands today, biologists say.*

journal Nature.

### Darwin's voyage

Darwin was only 22 when he began an expedition aboard the

H.M.S. Beagle in 1831 that was to revolutionize human thinking. Biologists thought then that species either had continued unchanged since their creation, or acquired

characteristics that could simply be inherited by their offspring. But the young naturalist found evidence to conclude that all plant and animal species change over time to meet



# Galápagos animals may be older

## than their islands

environmental demands.

On the Galápagos Islands, Darwin studied birds that were distinct from those found on the mainland. Some were also different from others found on the 10 widely separated islands. Darwin concluded that the birds had evolved through natural selection, or "survival of the fittest," and the evidence from the islands formed a key part of his seminal research published a quarter of a century later.

As other experts studied the research many years later, they found no proof that the birds Darwin studied could not have evolved during the three million-year history of the present islands. But there were other creatures on the islands, including iguanas, whose "genetic time clocks" would have required much longer for them to evolve, Carson said.

When David M. Christie, a geologist at Oregon State University in Corvallis, and several colleagues returned to the Galápagos aboard the Scripps vessel in the summer of 1990, they found the evidence that could explain how the critters found time to evolve.

### How islands were created

The Galápagos Islands were created in much the same way as the Hawaiian Islands. In both cases, a "hot spot" deep inside Earth sends plumes of hot mantle boiling toward the surface, where it burns through the crust and forms volcanoes. Each "hot spot" remains in a fixed position relative to Earth, but the huge tectonic plates that make up the crust are constantly moving.

As a result, the hot spot constantly produces new volcanoes as the crust passes over. The youngest volcanoes are directly over the hot spot, and older islands are left behind as the plate moves on.

Scientists have long understood that process, largely because of extensive research on the Hawaiian islands and a series of subsurface hills — called seamounts — that stretch northwestward across the Pacific. Similar evidence has been found near the Galápagos, but it was not clear whether the small seamounts found there had ever been tall enough to reach above the Pacific and become islands.

Christie said images created with sonar equipment aboard the Scripps vessel reveal that some of the old seamounts have terraces that look as though they were cut by waves, suggesting that the mounts once existed as islands. But that was not

the most conclusive evidence. The vessel also has dredging equipment that allowed the scientists to retrieve rocks from the slopes of the seamounts.

"The real clincher is we found lots of beautiful rounded pebbles like you would find on an Oregon Beach," he said. "You can't make those in the deep ocean."

The submerged seamount of the Galápagos chain lying closest to the present-day coastline of South America is about 370 miles west of Ecuador, something less than half the distance from Ecuador to the existing islands. The age of this seamount, whose summit is now about 6,500 feet below the surface of the waves, is about nine million years, the scientists determined.

The existence of an island chain that old would be long enough to account for the state of evolution of the Galápagos animals seen today, biologists say.

### Evolutionary clock ticks

Sarich and other molecular biologists have demonstrated a chemical basis for the ticking of an evolutionary clock at a more or less constant rate. Essentially, each tick occurs when one amino acid in the backbone chain of a particular protein molecule is switched for another. The protein Sarich uses for his clock is albumin, and he reckons that in a typical species, between 2.5 and 3 of these substitutions occur in the course of a million years.

Sarich also studied the protein chemistry of several Galápagos species, particularly that of the marine and land iguanas. These two species, Sarich said, clearly descended from a common ancestor, a sea-faring pioneer who floated from the South American coast aboard some kind of natural raft.

The marine and land iguanas of the Galápagos are more closely related to each other than either is to mainland relatives. However, Sarich said, they have evolved in very different ways. The units of difference in the amino acids of their respective albumins suggest that these two species must have diverged from their common ancestor many millions of years ago, and this finding led Sarich and a co-author to publish a paper in 1983 entitled "Are the Galápagos iguanas older than the Galápagos?"

"So you can see why," he said, "that we were pretty sure these sunken islands would eventually turn up. I'm not at all surprised by Dr. Christie's discovery."

## IGUANA NEWSBRIEFS

### West Coast Animal Exhibits

The I.I.S. was represented at two herpetological exhibits recently. Over 2,000 people attended the 10th Annual Live Amphibian and Reptile Exhibit sponsored by the Southwestern Herpetologists Society at Weddington Park North in North Hollywood, CA, on October 26-27, 1991. About 150 I.I.S. applications were distributed and several new members were signed up at the show. Dan Byrd and David Blair manned the I.I.S. table at this event.

Also, the San Diego Herpetological Society had its Fourth Annual Amphibian and Reptile Exhibition and Sale on November 9-10, 1991, at the Del Mar Fair Grounds in Del Mar, CA. Almost 4,000 people attended and over 200 I.I.S. applications were distributed. David Blair manned the I.I.S. table at this event.

### Programs on *Cyclura*

David Blair, I.I.S. Vice President, presented a talk to the San Diego Herpetological Society on the Cayman Island iguanas at the Fall 1991 meeting of the society. A second, expanded talk on the entire genus *Cyclura* was given on January 22, 1992, to the same group. Both talks were attended by about 100 members of SDHS. A display and/or applications for I.I.S. were present at each meeting.

### Jamaican Update

It was reported last issue that the Jamaican Iguana Research Group, under the direction of Dr. Peter Vogel of the University of West Indies, Kingston, had removed a clutch of sixteen eggs from a nesting site in the Hellshire Hills. Eleven hatchlings from this clutch are now being reared at the Hope Zoo in Mona Heights, Kingston. An additional nineteen hatchlings, collected as they were emerging from two other nests, are also being reared at the facility. If rearing efforts are successful, these thirty *Cyclura collei* will substantially increase the total population of this highly endangered species (see *Iguana Times* Vol. 1, no. 1).

### Salmonella Warnings

The Centers for Disease Control (CDC) in Atlanta, GA, is advising people to wash their hands after handling pet iguanas. The CDC said that the bacterial infections in two human infants were traced back to pet iguanas kept by the families. "Persons in contact with iguanas should practice strict hand-washing . . . particularly in households with infants or elderly persons who may be highly susceptible to infection," the CDC said.

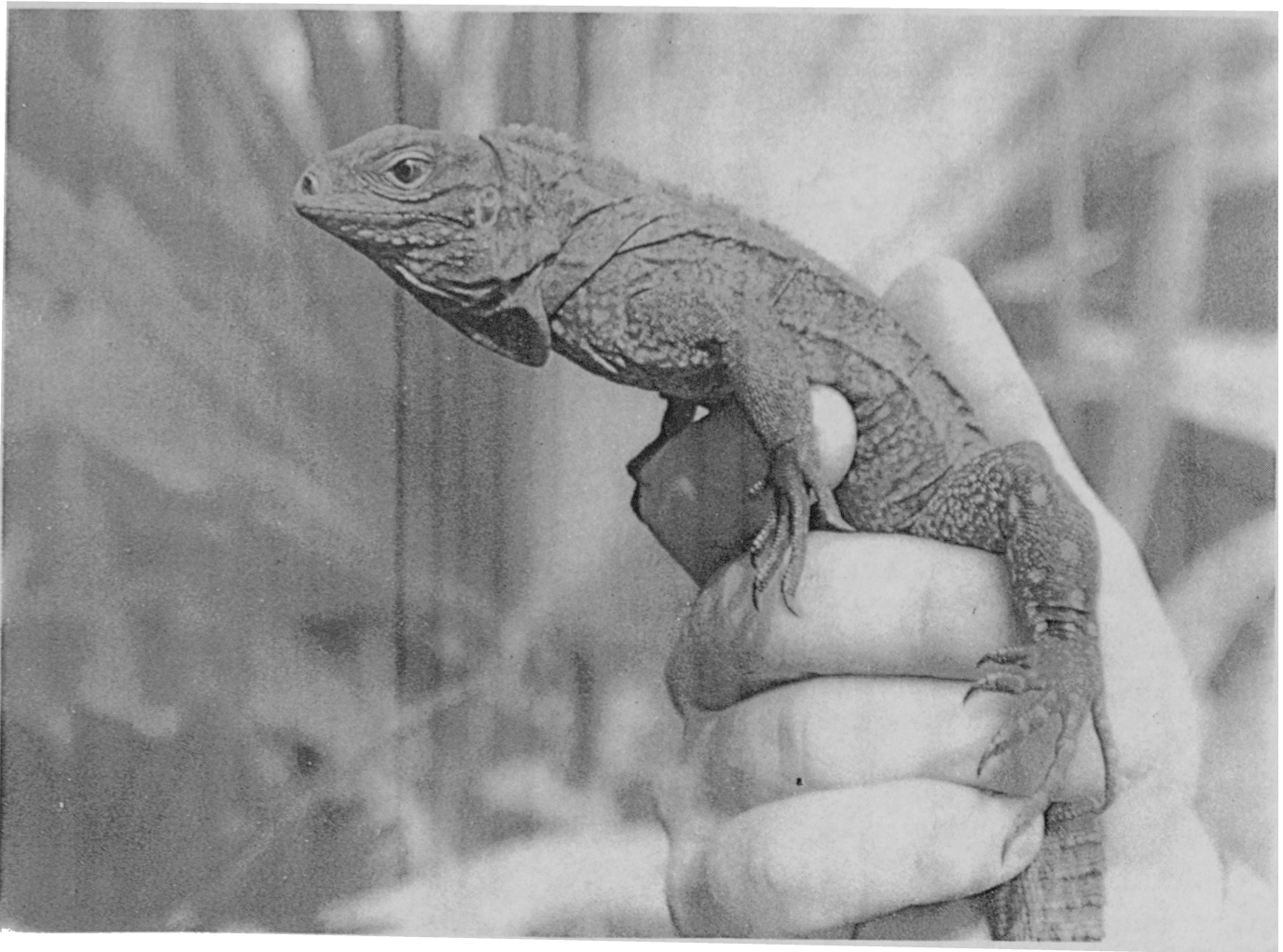
*Salmonella* thrives in an aquatic environment, but the bacteria can survive for a considerable period outside the host or in relatively dry conditions. Several hundred serotypes of *Salmonella* are known, and these bacteria have been isolated from a wide variety of reptile hosts including snakes, lizards, turtles, tortoises, and crocodilians. *Salmonella* from reptiles (compared with strains from birds) produces a more virulent infection in humans and it is difficult to treat. Careful hygiene is the best defense against the risk of infection.

Cover Photo: *Cyclura nubila* hatchling in 1992 Ron Harrod photo.

Title Graphics: Paul Mirocha, Purple Street Design, Tucson, AZ.

The International Iguana Society Inc. wishes to thank the following organizations and individuals for their support:

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Cuban Rock Iguana, *Cyclura nubila*, at 15 months of age. Ron Harrod photo.

## A NOTE ON CAPTIVE MAINTENANCE OF *CYCLURA NUBILA*

G. L. BARBARO AND R. T. HENRY

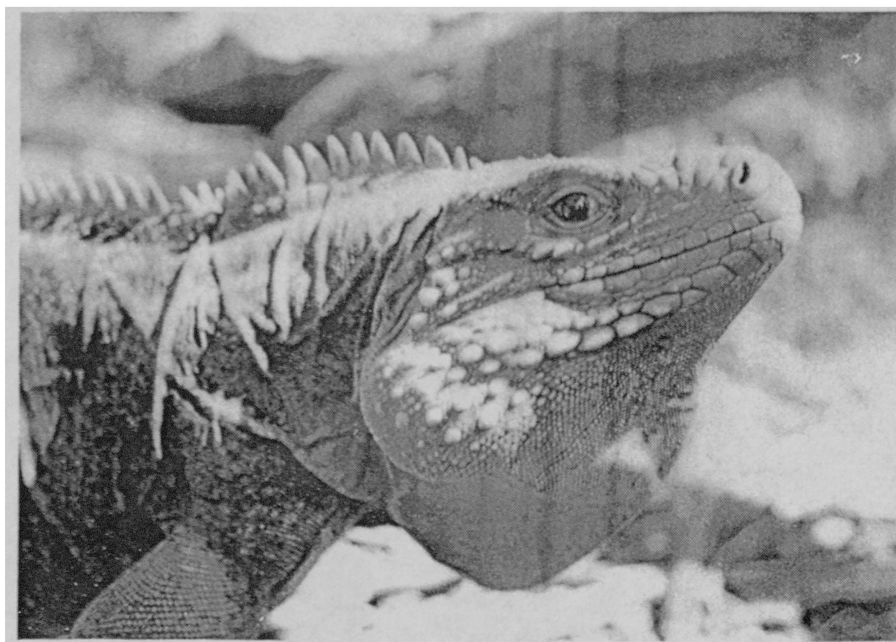
A yearling pair of *Cyclura nubila ssp.* was purchased in September 1990 and subsequently shipped to Ohio. Breeding attempts between the pair had been observed during May and June. On July 30, 1991, the female laid two eggs measuring 2.25" x 1". At the time of laying, the female measured 18 inches and weighed 350 gms. One egg was extremely flaccid, while the other egg was firm. Both eggs were incubated at  $84 \pm 2^\circ\text{F}$ . By three weeks of incubation, both eggs had collapsed and become moldy.

All of our *Cyclura* have been fed a diet consisting of 50% Zupreem primate chow (Hills Pet Products) moistened with water, 50% fruit and vegetable mixture. Supplements used are: Superpreen (an avian vitamin/mineral supplement) and Solotron (a cherry-flavored liquid vitamin/mineral supplement, General Nutrition Corporation). Occasionally, newborn rats are fed as treats.

Our *Cyclura* are housed in a 34' x 23' building, with each pair placed in 8' x 11' enclosures. Each enclosure is equipped with an overhead ultraviolet/fluorescent light, an overhead infrared heat lamp elevated 4 feet from the basking area, several large stumps for basking, and large pine bark mulch as bedding. A sand box is made available for potential egg-laying females. Outdoor enclosures are not complete at this time; therefore, the iguanas are housed indoors year-round.

The ambient air temperature of the room during the winter is kept at  $83 \pm 5^\circ\text{F}$  during the day, dropping to  $70 \pm 5^\circ\text{F}$  at night. During the summer, it is common for the room to reach into the upper 90's with high humidity. Automatic timers allow a light cycle between 7:00 a.m. and 9:00 p.m. in the summer, with a shortened light cycle during the winter.

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Male *Cyclura nubila*. Robert Ehrig photo.

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THE CAPTIVE HUSBANDRY AND PROPAGATION OF  
THE CUBAN ROCK IGUANA, *CYCLURA NUBILA*  
PART 2. CAPTIVE ENVIRONMENT IN A  
TEMPERATE CLIMATE

ROBERT W. EHRIG

In temperate climates, the Cuban Rock Iguana, *Cyclura nubila*, may be housed in an iguana room. The iguana room may be a well sealed and insulated green house or atrium, a spare room, or a section of a room partitioned in a manner so that the warmest or sunniest section is available to the lizard.

As stated in Part I (*Iguana Times*, Vol. 1, no. 3), a pair of mature iguanas are comfortably housed in an enclosure 8 ft. x 8 ft. (2.43 x 2.43 m). The room should have a southern or southeastern exposure. Windows are desirable. They allow some light to the animals and stimulate seasonal changes that are triggered by the shortening and lengthening of daylight hours. Windows must be well sealed and weather stripped to prevent iguanas from being exposed to cold drafts. A sturdy, heavy screen can replace the glass during the warm months allowing iguanas direct access to sunshine and thereby providing ultraviolet light they need.

Several hours or more of direct sunlight daily during three to four months, of the year are very beneficial to captive iguanas in temperate climates. This allows the iguana to store vitamin D<sub>3</sub> within its tissues which in turn allows proper calcium absorption. Ultraviolet light promotes vitamin D<sub>3</sub> formation which permits calcium and other nutrients to be extracted from the iguanas vegetable diet. Absorption of these elements enables the iguana to grow properly, have good bone development, and thrive.

Full-spectrum indoor lights, such as Vita-Lite<sup>TM</sup> are necessary for Cuban iguanas to meet their ultraviolet light requirements when direct sunlight is not available. Incandescent lights may be used in conjunction with ultraviolet lights to provide a "hot spot." This will attract lizards to an area where basking will allow maximum ultraviolet absorption. A large rock carefully placed under lights provides a natural platform for sunning. Lights should always be mounted in such a manner that animals will not be burned while basking.

Living plants are also desirable in the indoor iguana habitat. They may help freshen air in the captive environment. Large plants in 10 gallon or larger containers are suggested. Plants should be washed thoroughly and heavily watered prior to placement within the iguana room. This will leach any pesticide residue that may be present.

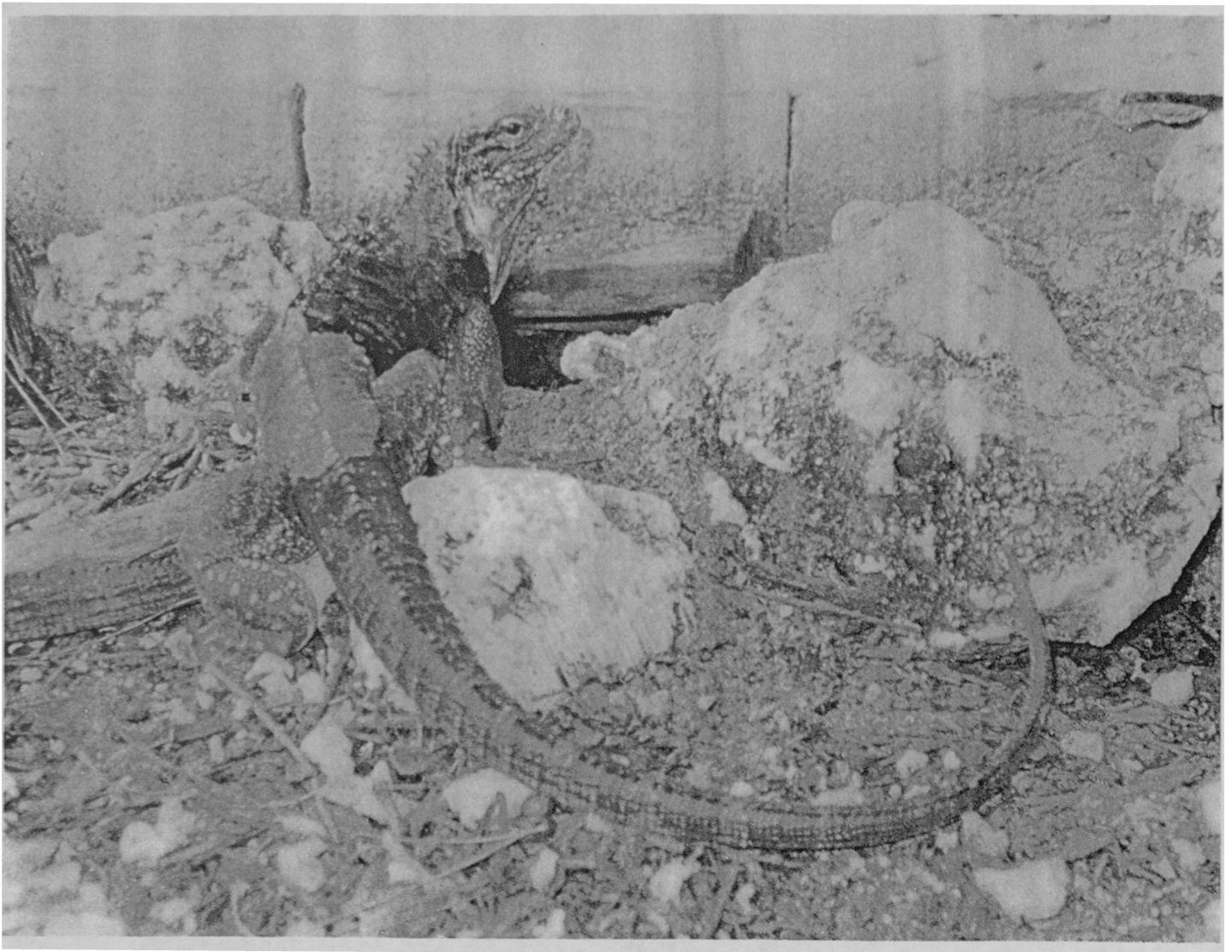
Fresh water should be available to the animals. Wooden boxes, large enough for iguanas to hide in, should be placed on the floor to the rear of the enclosure. This allows animals a refuge from any social pressure or perceived threats. Iguanas can be very individualistic in their behavior patterns. What affects one will sometimes elicit no reaction from another.

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CONTINUED IN NEXT ISSUE

## Allan's Cay Signs

As reported in the last issue of the *Iguana Times* (Vol. 1, no. 3) I.I.S. has embarked on a conservation project on behalf of the Allan's Cay (pronounced key) iguana, *Cyclura cyclura inornata*. The informational signs were transported to Ft. Lauderdale from Big Pine Key by Capt. Ron Harrod. There, they were loaded aboard the diving boat, "The Sea Dragon" (an appropriate name) for the long trip to the Exumas. Recent reports of iguanas being swung by their tail by mischievous visitors to the cays make the installations of these signs all the more urgent.



Cuban Rock Iguana, *Cyclura nubila* female and den. Ron Harrod photo.

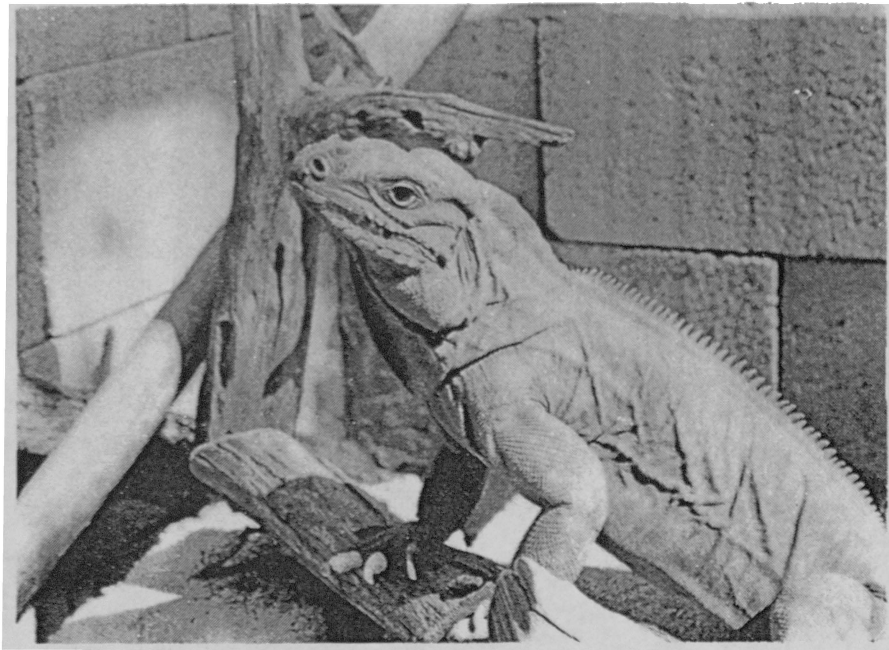
## Letter from the Editor

With this issue of the *Iguana Times*, I am relinquishing my post as Editor. An excessively heavy work schedule prevents me from continuing on with this duty. I have enjoyed working with Bob Ehrig, who is remarkable for his contagious enthusiasm, and I thank him for his continual support and encouragement. Since the inception of the newsletter, my role has been to solicit, review, and edit material for publication. Linda Atkins, of my department, receives my heartfelt thanks for the long hours she has spent at the word processor, preparing finished drafts of all material for the newsletter. Finally, all should know that Bob Ehrig deserves special credit for the production of the *Iguana Times*. He alone has worked closely with the printer; the layout and much of the artwork come from his creative abilities.

Very Sincerely,  
Richard R. Montanucci

The International Iguana Society, Inc. is a non-profit, international organizational dedicated to the preservation of the biological diversity of the iguanas through habitat preservation, active conservation, research, captive breeding and the dissemination of information. *Iguana Times*, the newsletter of the society, is distributed quarterly to members and member organizations. Additional copies are available at a cost of \$4.00 including postage. Annual dues for I.I.S. are \$25.00 individual and \$30.00 for organizations which receive double copies of the magazine.

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Female *Cyclura cornuta*. Robert Ehrig photo.