

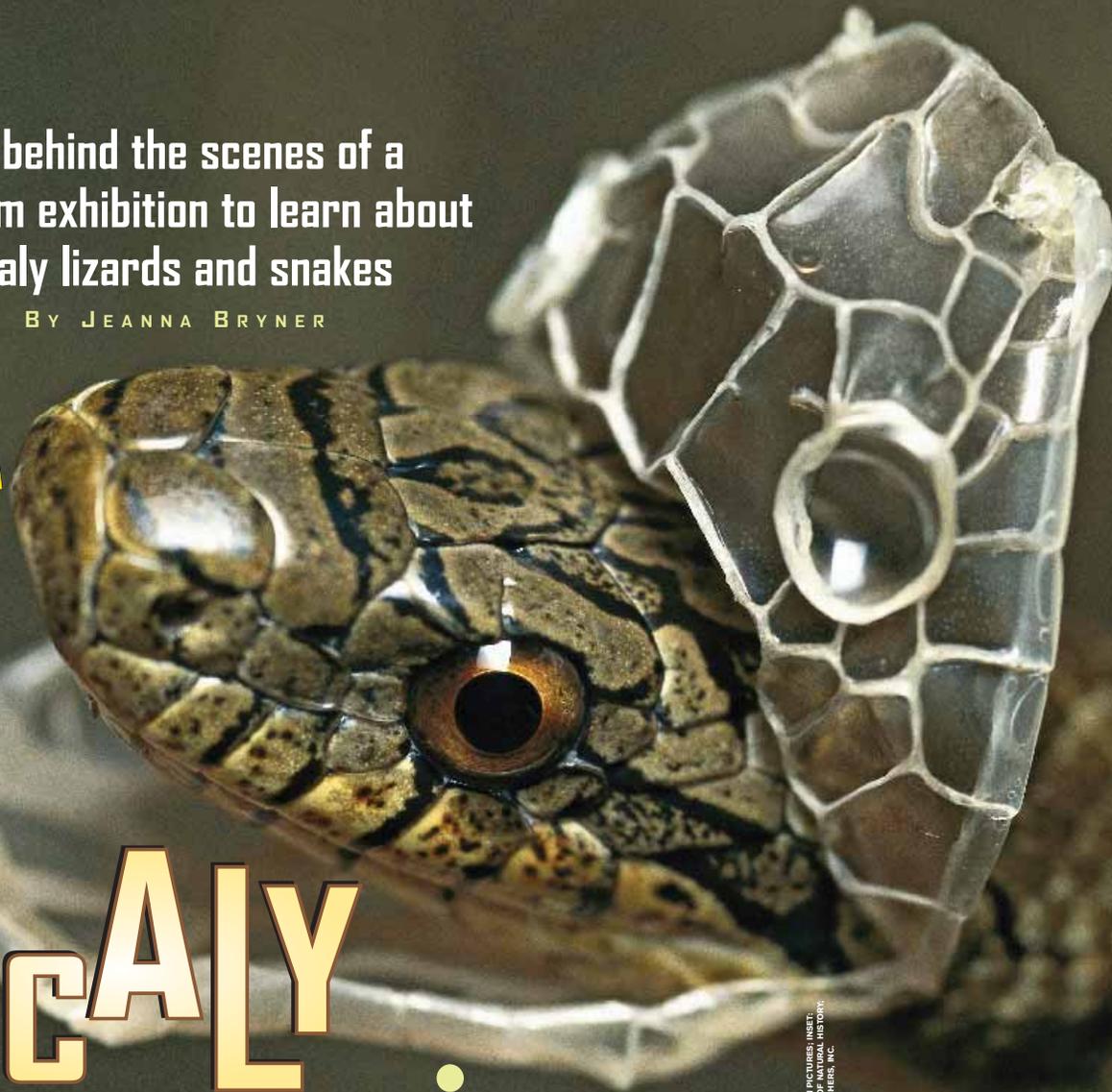
Go behind the scenes of a museum exhibition to learn about scaly lizards and snakes

BY JEANNA BRYNER



Scaly Surprises

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LEFT: HEDD HANS-JÜRGEN KOCH/MINDEN PICTURES; INSET: AMERICAN MUSEUM OF NATURAL HISTORY; RIGHT: JAMY SAUWAGE/PHOTO RESEARCHER, INC.

HEADS UP: This Rat Snake is beginning to shed its outermost layer of skin.

Darrel Frost has an animal-friendly office at the American Museum of Natural History in New York. In one section of his office, the walls are lined with *terraria* holding lizards and snakes.

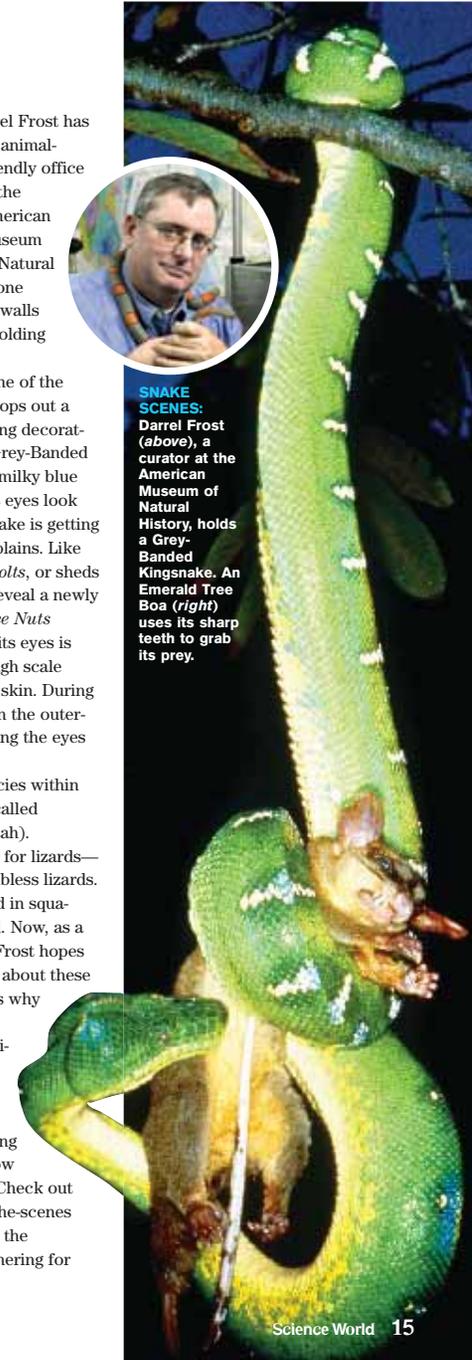
Frost walks over to one of the glass enclosures and scoops out a snake with orange banding decorating its body. When this Grey-Banded Kingsnake lifts its head, milky blue eyes come into view. "Its eyes look that way because this snake is getting ready to shed," Frost explains. Like other snakes, this one *molts*, or sheds its skin periodically, to reveal a newly formed layer beneath (see *Nuts & Bolts*, p. 17). Each of its eyes is covered with a see-through scale that's part of the snake's skin. During the molting process, even the outermost layer of skin covering the eyes will peel off.

This snake is one species within the group of organisms called Squamata (skwah-MAH-tah). "Squamates" is the name for lizards—including snakes and limbless lizards. Frost has been interested in squamates since he was a kid. Now, as a curator at the museum, Frost hopes to better educate people about these diverse organisms. That's why he's so excited about the museum's upcoming exhibition that stars lizards.

From projectile tongues to heat-sensing vision, squamates' amazing abilities are bound to wow visitors to the museum. Check out *Science World's* behind-the-scenes tour to learn more about the animals that Frost is gathering for the exhibition.



SNAKE SCENES: Darrel Frost (above), a curator at the American Museum of Natural History, holds a Grey-Banded Kingsnake. An Emerald Tree Boa (right) uses its sharp teeth to grab its prey.



Science World 15

SPEEDY: A Basilisk Lizard can run across water at speeds of 11 kilometers (7 miles) an hour.



Check it Out:

More than 60 colorful live lizards, including snakes, will captivate visitors in a new exhibition opening in summer 2006 at the American Museum of Natural History in New York. The exhibition explores these creatures' remarkable adaptations, including projectile tongues, deadly venom, and sometimes surprising modes of movement. The Museum has been researching and celebrating the natural world for more than 135 years and has more than 30 million objects in its extensive research collection. The Museum's 200 scientists travel around the world on 100 field expeditions each year, studying everything from lizards to leeches to the universe.

To learn more, ask your teacher, or visit www.amnh.org.

LEFT: STEPHEN DALTON/ANIMALS; RIGHT: ALLEN BLAKE SHELTON/ANIMALS. BOTTOM: BOB ELSNALE/GETTY IMAGES

What are some characteristics of squamates?

Squamates are *vertebrates* (organisms with a backbone) that don't have bodily processes for controlling their internal temperature. Instead, these *ectotherms* keep a healthy body temperature by moving between colder and warmer areas. For instance, a lizard might seek out the cool shade of a tree or the warmth of a sun-drenched log. Also, squamates have scaly skin. When these animals molt, they shed the outermost layer of this skin at one time.

WEB EXTRA

To explore an interactive slideshow, create your own lizard exhibit, and participate in a live chat with herpetologist Darrel Frost, visit the Science Explorations Web site: www.scholastic.com/lizards

As a curator at the American Museum of Natural History, what are your days like?

Part of my time is spent looking for new species of lizards and snakes in regions of Africa, Asia, and the Americas. I also oversee the museum's *herpetology* collections, which include amphibians and reptiles, such as squamates. And I have the opportunity to educate the public about these creatures through exhibitions, like the upcoming show on lizards.

How did you become interested in squamates?

I grew up in southern Arizona, where there are many kinds of snakes and other lizards. So I've always been

curious about them. All through my teenage years I read everything I could on these creatures. At the time, I never thought studying these amazing animals could become my job. Finally, it did—at a museum.

What makes this exhibition so interesting?

The exhibition will highlight the diversity of the world's nearly 8,000 species of squamates. For instance, the smallest squamate—a dwarf gecko—can fit all four of its feet onto a dime. And the largest squamate—an anaconda snake—can grow to a length of more than 10 meters (33 feet).

To show this diversity, the exhibition will include fossils and life-size models of squamates, as well as live animals.

How did you decide which animals to put in the exhibition?

The animals will be on exhibit for several months. So we could exhibit only animals that are hardy in captivity. Among these, I selected a range of different animals—I assembled a variety that would give visitors a sense of how squamates have

evolved and become more diverse.

Many of the *adaptations* that squamates have developed are associated with feeding behaviors. When visitors walk through the exhibition hall, they will notice two distinct feeding behaviors: One group of squamates—called “sight hounds”—hunt by sight. Another group—called “nose hounds”—hunt through other sensory mechanisms.

Would you give an example of a sight hound and a nose hound?

One sight hound, the chameleon, uses its excellent vision to spot prey. Then, like other sight hounds, the chameleon grabs the prey with its tongue. The tip of the chameleon's tongue is extremely pliable and is covered with fluid. So when it projects its tongue—which can extend the length of its body—the tip sticks to its prey. When the chameleon pulls its tongue back in, the prey comes with it.

In contrast, snakes and monitor lizards have hard and deeply forked tongues, which are used to “sniff out” chemicals left by other animals. When you see a snake flicking its tongue out of its mouth, the snake is collecting scent particles from the environment. When the snake brings its tongue back into its mouth, these particles get transferred to two pits called *olfactory* (related to smell) organs, which are located at the roof of the mouth. These pits can tell whether the scent particles are from prey, an enemy, or other object. Once the snake has zeroed in on its prey, it lunges forward and grabs the prey with its sharp teeth.

What are some other adaptations of squamates?

Squamates use many strategies to avoid being eaten. For instance, most

lizards are colored to match their environment. This helps to hide them from hungry predators.

Many other squamates, including several in the exhibition, simply flee as quickly as they can from predators. For example, the Basilisk Lizard is famous for its *bipedal* (two-footed) flight across water, which is made possible in part by fringes on the hind toes.



HISS: This tree boa shows its forked tongue.

The flying gecko has webbed feet and flaps of skin that extend along its body. When this gecko spreads the flaps open like a parachute, it can glide in the air from tree to tree—and escape enemies.

What are some live animals that will be on exhibit?

We will have many live snakes, including vipers and tree boas. Tree boas are interesting because they possess heat-sensing pits in their lips. The pits let the snakes “see” the heat around potential prey. This allows them to more accurately direct strikes, even in the dark.

What part of the exhibition brings out the “kid” in you?

I'm excited to see a lot of really cool-looking squamates gathered in one place. For example, there's going to be a Veiled Chameleon on exhibit. Its bright-green color and the helmet-like ridge on its head will definitely draw a crowd. Visitors will also get to see a 14-kilogram (30-pound) monitor lizard. The exhibition gives me the same sense of wonder as when I was a kid, looking at rattlesnakes in southern Arizona.

GOING UP: Veiled Chameleons have grasping feet that help them climb trees.



Nuts & Bolts

Unlike humans, who constantly shed worn-out skin as tiny flakes, snakes and lizards periodically *molt*, or shed the outermost layer of their scaly skin all at once. Scientists have many unanswered questions about the molting process. But they do know that as a snake prepares to molt,

its head first fills with blood. When the animal's head is swollen with blood, it scrapes its lips against a hard surface. As the animal scratches itself against the surface, the soft layer of skin folds back over its head. The snake crawls forward, leaving behind a tube of dead skin.