

Survival Skills: Memos From Incredible Animals

This book does not have a full English translation.

小怪獸備忘錄：你不知道的動物生存技

Author: Po-Yen Tseng **Illustrator:** Wei-Chun Hsu **Scientific Consultant:** Tseng Wen-Hsuan, Da-Li Lin

Publisher: Mandarin Daily News **Date:** 12/2023

Rights contact: bft.children.comics@moc.gov.tw

208 pages | 17 x 23 cm **Volume:** 1

BFT2.0 Translator: Michelle Kuo

African wild dogs use sneezes to communicate their willingness to join a hunt. Woodpeckers rely on their extraordinary tongues—nearly half the length of their bodies—to help prevent concussions. Meanwhile, young ravens, facing food theft from older birds, band together to resist bullying.

In the stories of the 60 unique creatures featured in this book, you'll uncover the hidden secrets of the natural world. These animals showcase an array of quirky adaptations and fascinating behaviors. Whether by acquiring new skills, collaborating with others, or devising competitive tactics, each behavior demonstrates how these creatures succeed in their habitats. This collection highlights land, sea, and air animals whose behaviors go beyond imagination. Through humorous writing and detailed, realistic illustrations, the book reveals the mysterious and captivating sides of the animal kingdom.



Author **Po-Yen Tseng**

Po-Yen Tseng pursued a degree in Life Sciences at National Taiwan University, driven by a passion for biology, and later earned a master's degree in the field. He enjoys spending time reading news, researching academic papers, and writing popular science articles—even during his military leave, which his comrades found far from relaxing. He hopes to introduce readers to a wide variety of organisms and inspire them to embrace the idea that “being different is normal.”



Illustrator **Wei-Chun Hsu**

Wei-Chun Hsu, a Zhongli resident, has a love for unsweetened, ice-free tea and a deep passion for the ocean. A lifelong admirer of zoos and drawing, he has enjoyed sketching animals since childhood. Typically lively and talkative, he becomes focused and quiet when in “drawing mode.” Hsu graduated from the Graduate Institute of Ecology and Evolutionary Biology at National Taiwan University. While continuing his research, he explored various artistic media, including watercolor, oil painting, and ink painting, under the guidance of mentors. His artwork often centers on his favorite subject—marine creatures—with the aim of using art to invite others into the fascinating world of the ocean.

The Endless Fascinating Secrets of Nature

by Wenxuan Zeng

The evolutionary biologist Charles Darwin once wrote in *On the Origin of Species*: “From so simple a beginning, endless forms most beautiful and most wonderful have been, and are being, evolved.” As you follow the stories of the 60 little creatures in this book, you’ll discover that, throughout the natural world, there are always secrets waiting to be unearthed.

The creatures in this book showcase all sorts of quirky structures, curious skills, and interesting behaviors. Whether it’s adding new skills, cooperating with peers, or establishing competitive strategies, each behavior unveils how they adapt to and survive in their environments.

The natural world, as described here, is breathtakingly beautiful; yet, at the same time, it often defies expectations and brings laughter. For example, the Chinese softshell turtle can urinate through its mouth, while herring schools communicate through fart sounds—the former adapts to high

salinity environments, while the latter can avoid predators that cannot hear these sounds. These creatures stop at nothing to adapt to their surroundings.

Through the lighthearted text in *Memos From Incredible Animals*, we can deeply appreciate animals’ astonishing abilities to survive in adversity. And amid the laughter, we are reminded of our sensory limitations and knowledge boundaries, showing that what we see and know is only a small part of nature. The world is vast and filled with wonders; every corner is a stage for evolution. Although these creatures may be small, their brilliant performances are worth a lifetime of exploration.

This foreword has been edited for the purposes of this booklet.

Wenxuan Zeng holds a Master’s Degree in Ecological Evolution at the National Taiwan Normal University.

Getting to Know Little Monsters and Ourselves

by Da-Li Lin

Memos From Incredible Animals introduces the characteristics, behaviors, and habits of 60 different creatures, as well as the roles they play in human culture and their environments. While we may marvel at their appearances and unique abilities, for these creatures, such traits are simply part of daily life. This reminds us that the reason we find them “strange” or label them “monsters” lies in our limited understanding of nature.

Humans are just one part of biodiversity; each species’ form and behavior contribute to its survival and enable it to thrive in places humans find difficult to reach—like the skies, mountains, deserts, polar regions, and deep seas. Biodiversity not only reveals the complexity and wonders of life but also serves as a reminder that humans are part of this diversity, not above it. You’ll realize that in the wild, without oil and electricity, the human pursuit of fame and fortune becomes meaningless. What’s left is a body that runs neither fast nor jumps high, cannot climb trees, swims poorly, and is generally weak.

Undeniably, human capabilities and cognition are limited. Advances in science and technology have taken us to the moon and allowed us to dive deep into the sea, but every life faces death, and every species has an endpoint. Evolution is the mechanism by which life finds a way, leading to both the extinction of species and the birth of new ones. Homo sapiens, as a species guided by intelligence, should recognize its place in the world of life and coexist with all other beings on Earth.

Our capabilities and cognition, though remarkable, are undeniably limited. While science and technology have taken us to the moon and the depths of the ocean, every life faces death, and every species has an endpoint. Evolution drives life forward, resulting in both the extinction of species and the emergence of new ones. As a species guided by intelligence, Homo sapiens must recognize their place in the web of life and coexist with all other beings on Earth.

Da-Li Lin is a deputy researcher at the Biodiversity Research Institute

No. 1
Incredible
Animal

**With My Iron Teeth,
Who Can Compare to Me!**



The All-Powerful "Iron Teeth"

北美河狸 The North American Beaver

In cartoons, you often see a brown animal wearing a yellow safety helmet, chopping down trees everywhere. This creature isn't fictional—it actually exists! It's the largest rodent in North America: the beaver. Beavers have a paddle-shaped, scaly tail that functions like a fin for swimming. Their eyes also feature a third eyelid called a nictitating membrane, which can close while they dive. It's like having natural swimming goggles, allowing them to move effortlessly in the water. What's even more amazing is that the cartoon beaver is often seen quickly cutting down trees. But can it actually do that in real life?

Relying on "Iron Teeth" for Logging

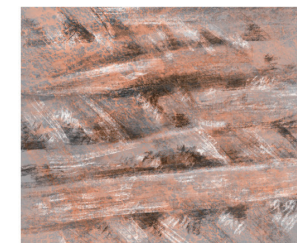
In the real world, a beaver's speed isn't as fast as the cartoons depict it. Still, this expert in civil engineering knows how to make use of one of nature's hardest materials—its teeth—to gnaw through wood. While both humans and beavers have teeth, why can our teeth crack just from chewing sugarcane, while beavers seem unaffected? The secret lies in their orange enamel.

Enamel is the outermost structure of teeth, primarily composed of hydroxyapatite, a calcium-rich compound. On a tooth, it forms layers of thin rod-shaped crystals that are stacked and intertwined.

Typically, the enamel of animals' teeth is white. However, if you closely examine a beaver's incisors, you'll notice they are orange. This is because their orange teeth contain an element that human teeth lack—iron.

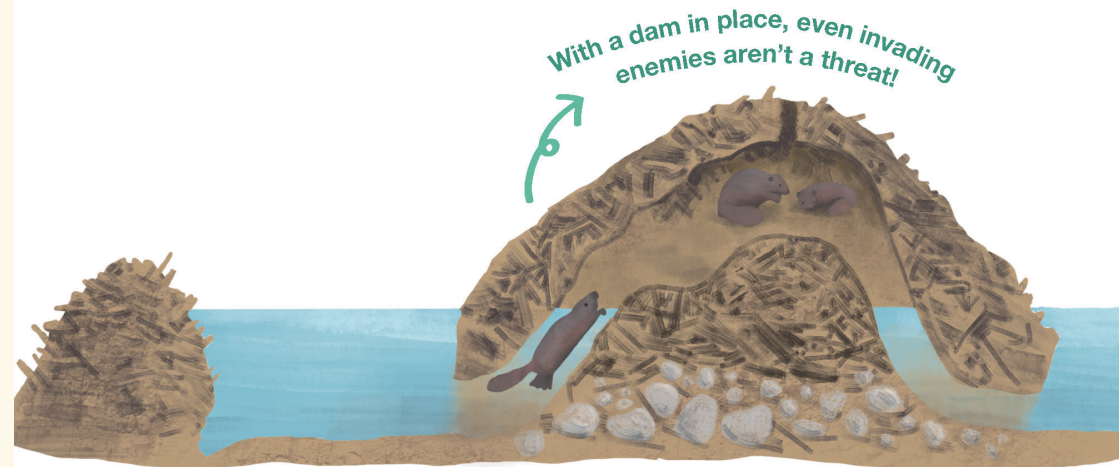
Scientists have discovered that, structurally, beaver enamel isn't much different from ours. However, the material between the rods and enamel, known as the interprismatic substance, has some calcium replaced with iron. This significantly enhances the beaver's teeth, making them more resistant to acid and wear.

A Secret of the Incisors



Zooming in, you'll find that the beaver's teeth are made up of intricately layered and interwoven structures.

Note : Most rodents' incisors contain iron, which gives them an orange-yellow hue. White teeth also contain magnesium, resulting in a white appearance. The orange teeth of species like beavers and porcupines are particularly "vivid" due to their thick composition.



Building Fortresses and Moats

Beavers' teeth grow continuously, making them virtually inexhaustible and limitless. If the teeth are not regularly worn down, they can grow so long that the beaver's mouth won't be able to close properly!

Thanks to their sturdy incisors, beavers can cut down trees along streams, break them into smaller pieces, and mix them with mud and stones scooped from the streambed to build fortress-like homes.

Once their fortresses are complete, the work isn't over. Beavers continue to use wood to construct dams around the area, blocking the flow of water. The dammed water has nowhere to go and gradually pools up. As the water level rises and seeps around the entrances of their fortress, it forms a protective moat. With this moat in place, predators like wolves, cougars, or foxes that dislike water are left helpless against the beavers!

Scientific Name : *Castor canadensis*

Classification : Order Rodentia, Family Castoridae

Habitat : North America

Diet : Bark, leaves, roots, and stems of aquatic plants.

Special Skill : Their flat, wide tails are packed with fat reserves to help them survive the winter!

Height Reveal
I'm about as tall as a human's knees!



No.2 Incredible Animal

Great Spotted Woodpecker

大斑啄木鳥

When I stick out my
tongue, I can scare
you to death!

The Forest Rapper

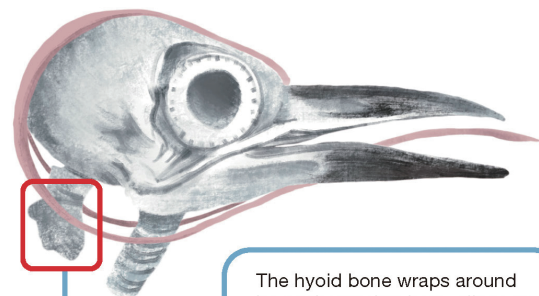
When we feel unwell, we go to a doctor to check for issues. In the world of incredible animals, there's a famous tree doctor: the woodpecker. A woodpecker's X-shaped claws help it grip tree trunks securely and climb both up and down. Its fused tailbone (Pygostyle), along with strong muscles and stiff tail feathers, acts like a "third leg." This provides stability as it clings to trees while pecking and hammering with its beak. However, the force of a woodpecker's relentless pecking is like repeatedly ramming a bicycle into a wall. Can you imagine doing that 10,000 times a day? So why doesn't the woodpecker get a concussion?

● Using the Tongue as a Seatbelt

The woodpecker's skull is filled with many gaps, resembling a sponge-like structure that absorbs shocks. Also, the woodpecker has a little-known secret weapon—its tongue—which helps prevent concussions during pecking.

The woodpecker's tongue is nearly half the length of its body, with barbs at the tip that allow it to probe tree holes and extract insects. However, its beak can't accommodate such a long tongue when retracted, so the tongue folds back and stores in its skull.

The woodpecker's tongue is supported by a hyoid bone. In most animals, the hyoid bone serves as an attachment point for tongue muscles. However, in woodpeckers, the hyoid bone extends along the back of the body, splitting into two branches. These branches loop around either side of the neck, tightly hook around the back of the skull, travel over the top of the head and the forehead, pass between the eyes, and finally merge to form the super-long tongue.



The hyoid bone wraps around the neck vertebra here, clings to the back of the skull, and extends along the top of the head and forehead, encircling the entire head.

This long tongue not only provides extra length around the neck vertebrae to search for insects hidden in tree crevices but also functions as a "seatbelt" by cushioning vibrations and reducing shaking. This ensures the woodpecker's brain remains safe during high-speed impacts.

● Taking Breaks to Cool Down

By the way, baby woodpeckers have short tongues, which gradually extend to the skull as they grow older. Since their parents feed them, they don't need to peck trees at all.



Additionally, if you ever have the chance to observe a woodpecker, you'll notice that it pauses to rest after pecking for a while. This is because the high-intensity impact and friction cause its beak to heat up. Taking a break lets the bird catch its breath and cool its beak—otherwise, its brain couldn't handle the heat!

Scientific Name: *Dendrocopos major*

Classification: Order Piciformes,
Family Picidae

Habitat: Forests across Eurasia.

Diet: Insects, fruits, buds, carrion.

Special Skill: Who needs helmets? We're born with built-in protection!

I'm about the same size as a human palm.

