



# A CHARRED, JUICY, MEATY BURGER, MADE OF PLANTS

BY CHELSEA LEU · ILLUSTRATION BY KELSEY DAKE



## AS OF AUGUST, YOU CAN

walk into any Burger King in the United States and order an "Impossible Whopper." It has the same toppings as a regular Whopper, and the same meaty taste, chewy texture and crispy brown exterior. The only difference?

The Impossible Whopper, whose patty is made by a company called Impossible Foods, doesn't actually have any meat in it. It's part of a new wave of plant-based burgers, sausages, chicken and even seafood that have been engineered to so closely resemble the real thing that you might not even be able to tell the difference.

One big reason for the trend toward meat alternatives is that eating less meat is better for the planet. Globally, raising animals like cows and pigs for food leads to pollution and deforestation, and it produces nearly 15 percent of the world's emissions of greenhouse gases, which contribute to climate change. "We're seeing how much animal products contribute to environmental destruction," says Isha Datar, the executive director of New Harvest, a nonprofit that funds research into alternatives to animal products. "It makes a lot of sense for us to be exploring alternatives." The new crop of fake

meats is meant to appeal to anyone who wants to cut down on how much meat they eat: Meat eaters made up 95 percent of the people who ordered plant-based sandwiches from fast-food restaurants in the last year, according to market researchers.

How do you get a carnivore to eat a meatless burger? "People often don't choose to eat plant-based food, because it's not as delicious as eating animals," says Chris Davis, head of research and development at Impossible Foods. So his team of scientists asked themselves what made meat delicious. They identified hundreds of flavor-giving chemical compounds and paid attention to things like the texture, smell and color meat takes on as it cooks. Then they set out to mimic as many of those qualities as they could with plant ingredients.

But even as convincing plant-based meats are hitting the market, scientists are exploring the next frontier: lab-grown meat. Researchers start out by collecting cells (usually muscle cells) from an animal, without injuring it. Then those cells are bathed in liquid "food" containing proteins, fats, sugars, salts, vitamins and amino acids and held in warm containers designed to mimic growth conditions inside a body. The result is animal meat, grown outside the actual animal.

None of these meat alternatives are perfect. Lab-meat technology is still in the early stages, and it's worth noting that products like the Impossible Whopper aren't actually vegetarian (as they're cooked on the same grills that cook beef patties) and that just because they're made out of plants doesn't mean they're health foods. But they're definitely healthier for the planet — and the cows probably aren't complaining, either.

### HOW THE IMPOSSIBLE BURGER MAKES A PLANT TASTE LIKE A COW

**MEATINESS** Meat gets its color and metallic, bloody flavor from a red, iron-containing molecule called heme. Impossible Foods also uses heme to make its burger, but it comes from the roots of soy plants.

**FATTY FLAVOR** Fat is what makes burgers sizzle when you lay them on a grill, and it gives meat its savory, greasy taste. In the Impossible Burger, coconut oil mimics this flavor.

**TEXTURE** Methyl cellulose, a molecule that gives plants their structure, keeps the Impossible Burger from falling apart and helps it change from soft to firm as it cooks. ♦

## HOW I BECAME A

# PRIMATOLOGIST



BY RUSSELL MITTERMEIER

MY MOTHER REALLY liked animals. In another era, she might have become a biodiversity specialist. But in the 1950s, the best she could do was take me to the Bronx Zoo or the Central Park Zoo and to the American Museum of Natural History. I decided at 5 or 6 that I wanted to be Tarzan. Nothing has really changed.

At Dartmouth College in the 1960s, I became an anthropology major, just as biological anthropologists were looking at primates as models for human evolution. I went on a foreign-studies program in Europe — in every country, I gravitated toward the zoos, and I decided to be a primatologist. In my senior year, I studied howler monkeys at the Smithsonian Tropical Research Institute, and I wrote a compendium of everything known about New World monkeys. I did my Ph.D. work at Harvard and wrote my thesis after researching eight species of monkeys in Suriname. I looked at their ecology, how people interacted with them and the mythology around them.

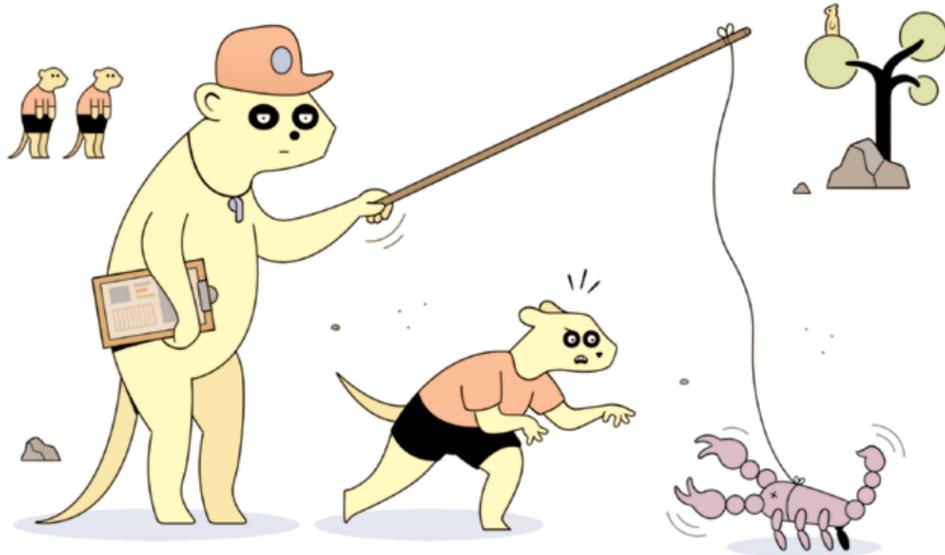
After I finished, I worked on a global study about primate conservation — identifying and making a plan for species at greatest risk of extinction. I was also appointed the chairman of a primate specialists' group, which let me develop conservation action plans. I've worked for the Bronx Zoo, the World Wildlife Fund and Global Wildlife Conservation, where I'm currently the chief conservation officer. With my colleagues, I've published 40 books, and I've had eight species named after me (three frogs, one lizard, two lemurs, a saki monkey and an ant).

The great part of my job is the variety. One day I'll be out in the forest stomping through the mud, looking at amazing animals, and the next day I might be on a plane to meet with a head of state. Then I work on publications and take my kids with me on trips. When I'm not around anymore, they'll continue the work. As told to *Elise Craig*

## ANIMALS THAT

# GO TO SCHOOL

BY JASON G. GOLDMAN · ILLUSTRATION BY GIACOMO GAMBINERI



**SCIENTISTS USED** to think that humans were the only species that taught its young. But as it turns out, some animals make good teachers, too. While some critters have survival skills right after birth — a blue wildebeest, for example, can outrun a hungry hyena within a day of being born — others need the help of a teacher to learn to get by. Teaching occurs when "a knowledgeable individual makes an investment in helping a naïve individual" to learn, says Alex Thornton, a biologist from the University of Exeter, in Britain, who discovered in the mid-2000s that meerkats go to school. Observing animals has expanded our understanding of teaching: There are a lot of different ways to teach and to learn. Here are a few.

**MEERKATS** These small mongooses found in the deserts of southern Africa learn how to find food 30 days after birth. But meerkats love to snack on scorpions, whose painful stingers could make a tasty meal deadly. To prevent this, older meerkats begin their lessons by letting

pups interact first with dead scorpions, and then with living scorpions whose stingers have been removed. By three months of age, young meerkats have mastered the ability to safely handle live scorpions and kill prey on their own.

**ANTS** The rock ant, a small insect found in rocky areas throughout Europe, teaches its students to find food by leading them toward a source. After an ant finds food, it returns to the nest with some bounty. When it leaves again to bring back some more, it takes a student along. The expert ant can travel four times faster alone, but it slows down in order to give the inexperienced ant a chance to memorize the route — and will only continue on the trail when it feels the student's antennae tapping its legs.

**PIED BABBLERS** A few days before chicks are ready to leave the nest, pied babblers, birds found in southern African savannas, give a "purr call" during feeding time. This conditions the chicks to associate that sound with meals. Later, parents can use the same call to summon their offspring

— because they've found a good source of food or to keep them away from predators.

**CHEETAHS** When cheetah cubs are two and a half months old, their mothers begin teaching them to hunt. The mother cheetah stalks and chases down prey, usually a gazelle, and releases it alive for the cubs to practice chasing it and knocking it over. By four and a half months, the cubs can kill prey themselves, and by 10 months, they can get more than half their food on their own by killing antelopes, hares and other animals.

**SUPERB FAIRY-WRENS** Cuckoos sometimes hide their eggs in the nests of superb fairy-wrens. That makes it difficult for the fairy-wren mothers to tell their own offspring apart from the impostors and know whom to care for. Luckily the superb fairy-wrens, common in southeastern Australia, have a trick: When their babies are still in their eggs, the mothers teach them a tune that includes a special note. After they hatch, the chicks use the same sound — like a secret password — to ask for food. ♦

## A DEADLY DISEASE LINKED TO VAPING

BY DENISE GRADY

**EARLIER THIS YEAR**, a strange lung illness started popping up around the country. It looked like pneumonia, but it wasn't: Tests couldn't find any of the usual causes, like viruses, bacteria or other germs. Whatever this was, it was serious. People were coming to emergency rooms unable to breathe. Oddly, many were teenagers and young men who were previously healthy — the last people you'd expect to suddenly come down with a severe lung disease.

But in August, the same month the first death from the disease was reported, doctors realized that these very sick people had one thing in common: vaping. They were using e-cigarettes or other vaping devices to inhale either nicotine or THC or both. (Nicotine is an addictive chemical found in tobacco, and THC is the component of marijuana that makes people high.) Last month, doctors from the Mayo Clinic, in Minnesota, who examined samples of lung tissue from some of the patients said their lungs had injuries that looked like chemical burns — the same kind of damage that occurs in people who breathe toxic chemical fumes in industrial accidents. "I can't stress enough the seriousness of these lung injuries," says Dr. Anne Schuchat, principal deputy director of the Centers for Disease Control and Prevention, which is investigating the outbreak.

As of Nov. 13, there were 2,172 cases in the United States, with patients as young as 13, and 42 deaths, including a 17-year-old boy from the Bronx.

Even though doctors have linked the disease to vaping, they still aren't sure what exactly is making people sick. In mid-November, researchers at the C.D.C. made a breakthrough when they found a substance called vitamin E acetate in samples of lung fluid taken from patients. The vitamin compound is sometimes added to THC to dilute it so sellers can stretch their supply and make more money. Dr. Schuchat called it a "very strong culprit," but she warned that other additives might also be contributing to the illness. Although most patients who got sick vaped THC, some patients say that they only ever vaped nicotine. Researchers say one or more additives in nicotine could also be involved, or even something toxic emitted from vaping devices themselves. So the case isn't closed.

As health experts try to nail down the cause of the disease, which has been named EVALI (which stands for "e-cigarette, or vaping, product use associated lung injury"), more people are getting sick every week. Even though many people vape and only some have become sick, health experts say there is no way to tell if any product is safe. For now, the only advice they can give is: Don't vape. ♦

## TINY STORY

# 2

The number of fangs in a silver-backed chevrotain's mouth. This tiny hoofed mammal (about the size of a rabbit) was rediscovered earlier this month in Vietnam. Researchers hadn't seen it since 1990 and thought it might have been extinct.