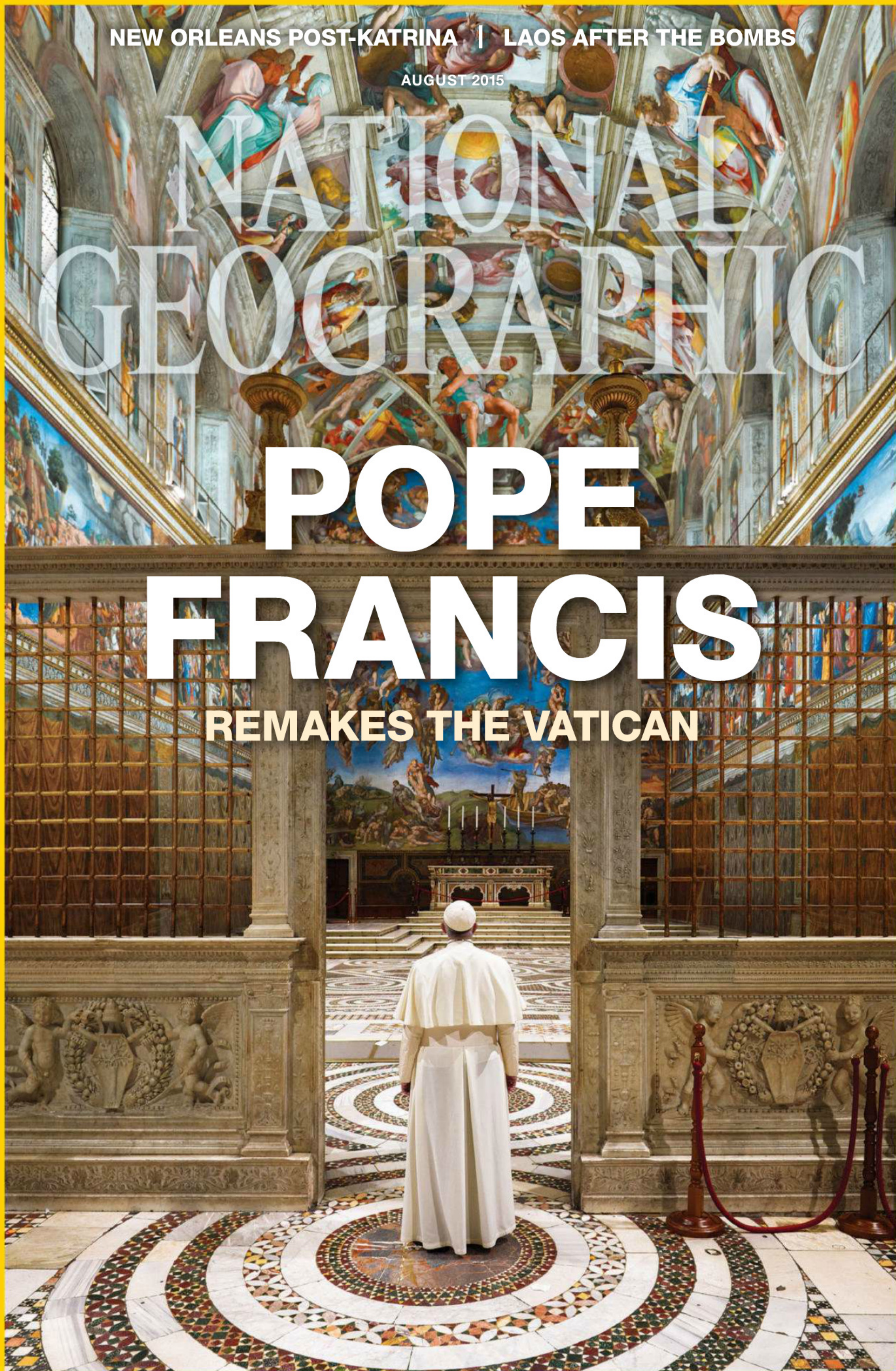
NEW ORLEANS POST-KATRINA | LAOS AFTER THE BOMBS
AUGUST 2015
NATIONAL GEOGRAPHIC
POPE FRANCIS
REMAKES THE VATICAN

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AUGUST 2015 • VOL. 228 • NO. 2

Gatherings such as this wedding celebration are important ceremonial occasions for tribespeople living around Lake Turkana.

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Projects upstream from Kenya's Lake Turkana threaten to turn the world's largest permanent desert lake into a dust bowl disaster. *By Neil Shea Photographs by Randy Olson*

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Or will the Vatican change Pope Francis, who has focused on serving the poor and reforming the church?
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On the ten-year anniversary of the devastating U.S. Gulf Coast hurricane, photographers share scenes of both destruction and resurrection.

On the Cover After his Christmas 2014 speech to throngs in St. Peter's Square, Pope Francis made an unexpected visit to the Sistine Chapel—the kind of spontaneous act he's known for. *Photo by Dave Yoder*

Corrections and Clarifications Go to *ngm.com/more.*

Getting Close to the Pope

His car is not a limo but a Ford Focus. His home is not the Apostolic Palace but a modest apartment. His shoes are orthopedic, his waistline growing, his humor frequent, his off-the-cuff remarks often jaw-dropping. ("If a person is gay and seeks God and has goodwill, who am I to judge?")

For the two and a half years of his papacy, Pope Francis has delighted and discomfited a worldwide audience. For the most part, that audience has been able to glimpse Francis only from afar. Outside of the Vatican's own photographer, other news photographers are nearly always kept a good distance from the man himself.

Pope Francis meets the faithful in St. Peter's Square.

With one exception. Enter *National Geographic* photographer Dave Yoder, who for six months on and off last year was allowed unprecedented access to the pontiff.

"I was so close, I was worried about tripping over him sometimes, or him tripping over me," says Yoder, a Rome-based Indiana native. That unique access inspired the story in this issue as well as a forthcoming National Geographic book, *Pope Francis and the New Vatican.* Both were photographed by Yoder and written by Robert Draper.

Yoder emerged with some 67,000 photos and plenty of stories. Take the time the six-foot-five Yoder found himself pinned to a wall in St. Peter's Basilica, wedged in among Michelangelo's "Pietà," a group of bishops, and the pope, who was trying to talk with them.

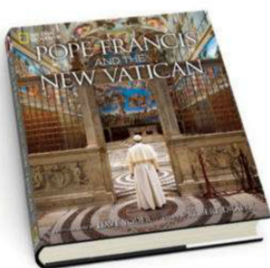
Francis "came right up to me and extended his hand and just waited. He looked me in the eye with an expression like, Are you not going to greet me?" That was one of the three times the pope and Yoder spoke.

Yoder was struck by Francis's enthusiasm for interacting with ordinary people. "When he was surrounded by aides, he would be checking his watch. But when he was surrounded by people, the watch checking stopped and he gave them all the time they needed."

Photographing the pope was a singular adventure. "Every now and then it would strike me that it was exceedingly odd I was standing right next to Pope Francis," Yoder says. "It was one of those things where you are like, This is never going to happen again."

We hope you enjoy our exclusive look at Pope Francis, up close and personal.

Susan Goldberg, *Editor in Chief*



Pope Francis and the New Vatican is available at *shopng.com/PopeFrancis* and wherever books are sold. National Geographic will host a live panel discussion on the impact of Pope Francis at its Washington, D.C., headquarters on September 16. For more information, please go to *events.nationalgeographic.com.*

PHOTO: DAVE YODER

Giant Manta Ray *(Manta birostris)*
Size: Disc width, up to 7.1 m (23.3 feet) **Weight:** Up to 1,350 kg (3,000 lb) **Habitat:** Tropical and temperate waters of the Atlantic, Pacific and Indian Oceans **Surviving number:** Unknown; population declining

Photographed by Vincent Truchet

WILDLIFE AS CANON SEES IT

Behemoth of the deep. The giant manta ray is the largest ray in existence, so large that adults have no natural predators except the most fearsome of sharks. This huge ray preys on small zooplankton, diving deeper than 3,000 feet and migrating as far as 650 miles to reach the best feeding areas. Periodically, it visits shallow reefs and allows cleaner fish to remove parasites and aid in healing wounds. But there is nothing the giant manta ray can do to overcome its biggest threats: targeted fishing, bycatch and habitat degradation.

As Canon sees it, images have the power to raise awareness of the threats facing endangered species and the natural environment, helping us make the world a better place.

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Not all sunglasses are created equal. Protecting your eyes is serious business. With all the fancy fashion frames out there it can be easy to overlook what really matters—the lenses. So we did our research and looked to the very best in optic innovation and technology.

Sometimes it does take a rocket scientist. A NASA rocket scientist. Some ordinary sunglasses can obscure your vision by exposing your eyes to harmful UV rays, blue light, and reflective glare. They can also darken useful vision-enhancing light. But now, independent research conducted by scientists from NASA's Jet Propulsion Laboratory has brought forth ground-breaking technology to help protect human eyesight from the harmful effects of solar radiation light.

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How Your Backyard Can Save Butterflies

Dan Ashe is director of the United States Fish and Wildlife Service. A fan of the outdoors since childhood, Ashe, 59, has devoted his career to conservation. He's currently focused on saving the monarch butterfly—an effort that can take flight with help from a little strategic gardening. (To help, visit *www.fws.gov/savethemonarch.)*

Orange-and-black monarch butterflies are highly recognizable, but there are fewer of them to spot now than ever before. Why?
As recently as the mid-1990s, population peaked at an estimated one billion butterflies. Now that number is less than 50 million, a tremendous decline. The principal factor seems to be the loss of habitat, specifically the loss of milkweed, which is where the butterflies lay their eggs. Herbicides are very effective for food production, but the casualty has been milkweed. It's catastrophic for an insect like the monarch; the good news is we can rebuild that habitat, even in our own backyards.

Is planting milkweed really that simple?
Our challenge is to make sure local seed varieties are readily available to people. If they are, then yes, it's as easy as planting some plants. They will grow, and the monarchs will just show up. That's kind of a miracle. The scale can be a backyard, a schoolyard, a state park, a national park. It's a matter of everybody doing what they can do, and it all makes a difference.

If things don't turn around, how much longer does the monarch have to live?
It's hard to tell. Species are resilient, but there can be a tipping point, and we don't know where that is with monarchs. Most scientists believe we could push up the population by creating habitat. Given the butterfly's migration routes from Mexico to Canada, though, that habitat has to be widespread. It has to be 48 states and three nations working together.

PHOTO: REBECCA HALE, NGM STAFF

PETS CHANGE LIVES

How Shelter Pets Are Transforming Education

"We were hearing reports of kids feeling stress, resulting in classroom behavioral problems," said John Stevenson, President of North Shore Animal League America (NSALA). "And it's been clinically proven that dogs make people feel good." This simple premise—that pets improve the lives of humans—led him and the NSALA team to develop the Mutt-i-grees® Curriculum in collaboration with Yale University's School of the 21st Century, where his wife, Dr. Matia Finn-Stevenson, is a child development expert.

Launched in 2010, the pre-K to grade 12 social and emotional learning curriculum builds on children's affinity for animals while highlighting the unique characteristics of "Mutt-i-grees®," a term NSALA coined for rescue dogs. In a series of lessons about shelter pets, **children develop critical skills related to self-awareness, empathy, cooperation, and decision-making.**

Today, the program is in 3,000 schools across the country and reaches 2 million students. At Stephen Gaynor School, an independent New York City special education pioneer for children with learning differences, the Mutt-i-grees® Curriculum goes hand in paw with their YAP (Youth Animal Protectors) Club, founded by counselor and humane educator Dr. Kimberly Spanjol. "This unique, comprehensive curriculum engages kids who might not otherwise be motivated," she said.

"The Mutt-i-grees® Curriculum also teaches critical thinking skills as students try to solve the problems faced by shelter pets," said Dr. Spanjol. And the kids in the YAP Club have been "empowered to help further the mission" by organizing local fundraisers and community adoption events. Change can come at home, too. "One student's parents were in the market for a dog." His Mutt-i-grees® training kicked in. "He educated his family about what he learned from the curriculum and made such a strong case that his parents agreed to adopt a shelter dog!"

Joanne Yohannan, Senior Vice President of Operations, NSALA, said "One of the keys to driving adoption is showing the world the difference shelter pets can make in their lives. Purina ONE gets this, and has been a long-standing supportive partner of our major programs—and nearly 18,000 animals have gone home with Purina ONE food to help support whole body health." NSALA hopes that number will continue to rise—because of kids being transformed by the Mutt-i-grees® Curriculum.

Created with Purina ONE by

Purina ONE supports a network of shelter partners by providing complete, balanced nutrition to help promote rescue pets' whole body health for today and tomorrow—as well as helping to spread the word. To learn more, visit purinaone.com.

#ONEdifference

EXPLORE

Planet Earth

Flower Power

Locals are farming sustainably, jobs are on the rise—and the landscape is blanketed with fields of white blossoms. This isn't some bucolic dream world. This is Rwanda, the central African country long wracked by civil conflicts, where a 1994 genocide claimed up to a million lives. Now the nation is recovering, thanks in part to those fields of lovely—and lucrative—flowers.

Although *Chrysanthemum cinerariifolium* is generally a finicky plant, it thrives in Rwanda's hills, where the soil is volcanic and the rainfall ample. Chrysanthemums contain pyrethrins, a sought-after natural insecticide. In the 1970s processing and selling the extract called pyrethrum to pest control companies abroad was a big business in Rwanda. That slowed as violence surged, but today the industry is rebounding. Pyrethrum has become the

PHOTOS: PAUL ELLEDGE

country's third largest export after coffee and tea, and more than 30,000 farmers now cultivate chrysanthemums.

In the past, although they exported pyrethrum, Rwandans generally treated their own crops with cheaper, imported synthetic pesticides that had sometimes been banned in developed countries. That may be changing. The UN's Food and Agriculture Organization has sponsored training on sustainability and pesticide use, and the firm Agropharm Africa is developing more pyrethrum-based products that Rwandan farmers can use locally as well as market globally. "Not only is this use more sustainable for the country," says Agropharm Africa's general manager, Therese Karitanyi, "it is simply better for our health and for our environment." —*Catherine Zuckerman*

Pyrethrum is a natural insecticide derived from certain types of chrysanthemums. Above, villagers tend the crop in northern Rwanda.

WHERE DO FOODS COME FROM?

AVOCADO
The fruit originated in Mexico and Central America. Today three types grow, each in different conditions.

SUNFLOWER
This plant is one of North America's few native crops, its seeds often harvested for oil.

GRAPE
Wild grapes were domesticated only once, in the South Caucasus. Cultivars traveled around the world.

APPLE
Originally from Central Asia, the fruit is thought to have first spread along the Silk Road.

CITRUS FRUIT
Today's oranges and tangerines evolved from primitive mandarins and pomelos in East Asia.

STRAWBERRY
The modern berry is a hybrid of two varieties, one from each of the Americas.

PINEAPPLE
The fruit originated in the Amazon. European explorers are thought to have carried samples east.

COFFEE
Ethiopia grew the crop first. It traveled to Asia, Europe, then South America—where most is now grown.

EGGPLANT
Two varieties were domesticated in India and southern China. One spread east, the other west.

BANANA
New Guinea had the first bananas. The primary modern variety is a clone from Southeast Asia.

Where Crops Grew First

Today's fruits and vegetables are the result of millennia of trial and error in cultivation and selection. Early wild varieties of the world's top crops evolved in geographic isolation, then spread via wind or floods or in the droppings of animals. Over time humans developed specific preferences, saved seeds, and experimented with growing conditions for desired foods. Geneticists call that process domestication. Farmers call it agriculture.

Most modern food crops don't resemble their more primitive, less refined ancestors. Early strawberries weren't as big and sweet as current varieties. Supermarket apples, which are clones, would be difficult to produce without grafting.

Finding a food's origin is the work of sleuthing scientists. Using genomes and cultural records, they can trace a crop's meanderings. "The evolution of a plant usually shifted once humans touched it," says Paul Gepts, a University of California, Davis, plant scientist who studies the origin and evolution of beans and other crops. Using what they know of a food's history, scientists can make what's served on tomorrow's plates even better. —*Daniel Stone*

ART: EMILY M. ENG, NGM STAFF. SOURCE: PAUL GEPTS

what do wild strawberries look like

More images for wild strawberries

Rescuing an Icon

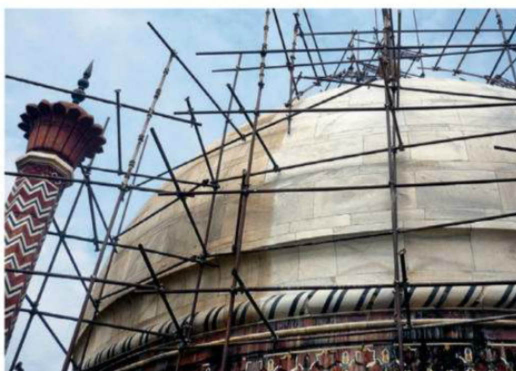
Once a shining vision in white, the world-famous Taj Mahal has lost some luster over the past few decades. As the population of the surrounding city of Agra, India, swelled and air pollution worsened, the marble of the 17th-century monumental tomb began to turn brownish yellow.

No one knew the exact cause of the discoloration, though. Was it manufacturing? Transportation? Construction? Or some other activity in the burgeoning industrial hub?

Now a study carried out by scientists from the United States and India has identified the culprits: dust, likely stirred up by the traffic on unpaved roads; and soot produced by burning trash, agricultural refuse, fossil fuels, and the dung and wood that locals use in fires for cooking and warmth.

The official response was swift. "Our paper came out, and within two weeks it was being discussed in the Indian Parliament," says environmental engineer Mike Bergin. Authorities in Agra then adopted plans to improve air quality, which include giving people propane to cook with and switching several thousand trucks from diesel to natural gas. —*A. R. Williams*

In 1983, when the photo above was taken, the Taj Mahal's marble was dazzling. Since then, polluted air has covered the stone with dark particles that even the monsoon rains can't wash off. To restore the original color, a mud pack is applied periodically, followed by a distilled water rinse. A cleaning in progress is shown at right, behind the workers' scaffolding.



PHOTOS: STEVE McCURRY (TOP); MIKE BERGIN

how old is the Taj Mahal

367 years (c. 1648)

Taj Mahal, Age

More about Taj Mahal

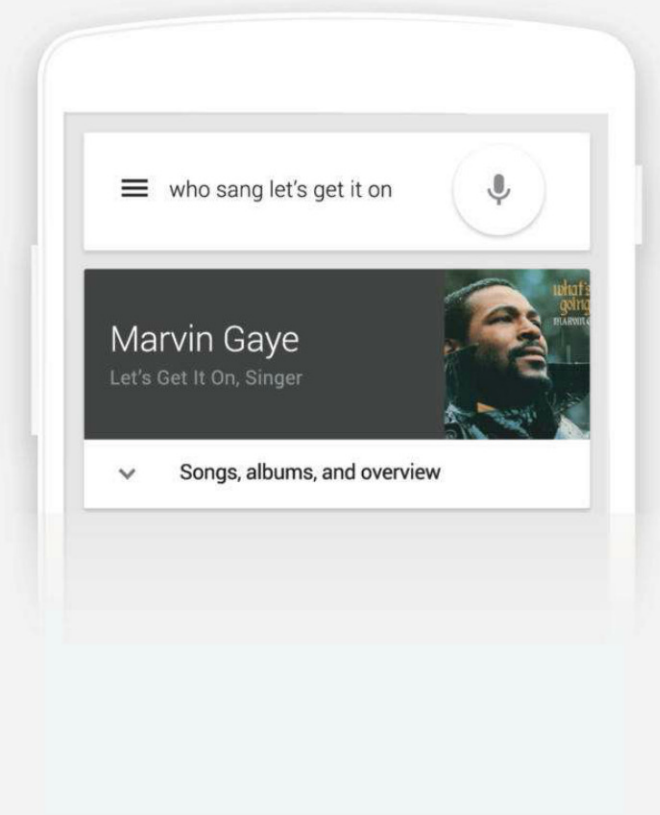
Sex and the Persimmon Tree

Gardeners have long known that persimmon sex is complicated: Female trees bear fruit, males don't, and some trees (the species that produce the fruit we eat) are both male and female. But until recently, scientists have not known how sex is determined for dioecious plants such as sex-splitting persimmons.

Scientists working with a family of 150 Caucasian persimmon trees cultivated in Japan have now isolated a crucial gene on the Y chromosome. Dubbed OGI after the Japanese word for male tree, the gene restricts the expression of a "feminizing gene"—MeGI, Japanese for female tree—which limits pollen production. "OGI is the magic bullet that the Y chromosome uses to suppress the MeGI gene," says geneticist Luca Comai.

About 5 percent of plant species are dioecious, including such important crops as spinach, pistachios, and even marijuana. They evolved independently and may not decide sex the same way that the persimmon tree does. "As a scientist," says Comai, "it will be truly exciting to see how each [plant species] has invented its own solution to the problem" of reproduction. —*Rachel Hartigan Shea*

PHOTO: TAL SHOCHAT, ANDREA MEISLIN GALLERY


who sang let's get it on
Marvin Gaye
Let's Get It On, Singer
Songs, albums, and overview

A World of Fast Food

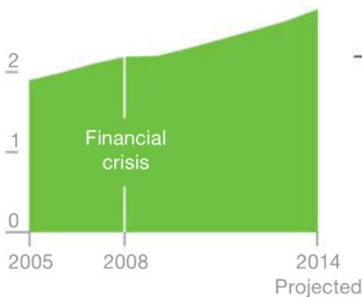
More and more people around the globe are dining out, largely because incomes are rising in developing countries. For many, fast-food restaurants are an increasingly popular choice, especially those offering ethnic dishes that cater to local tastes.

Fine dining took a big hit following the 2008 financial crisis. "Recessions make consumers willing to try less expensive, experimental food," says Michael Schaefer of Euromonitor International. Consumers now want high-quality, authentic cuisine in informal settings. —*Kelsey Nowakowski*

A BIG MARKET

SHARE OF GLOBAL GDP GENERATED BY FOOD SERVICES

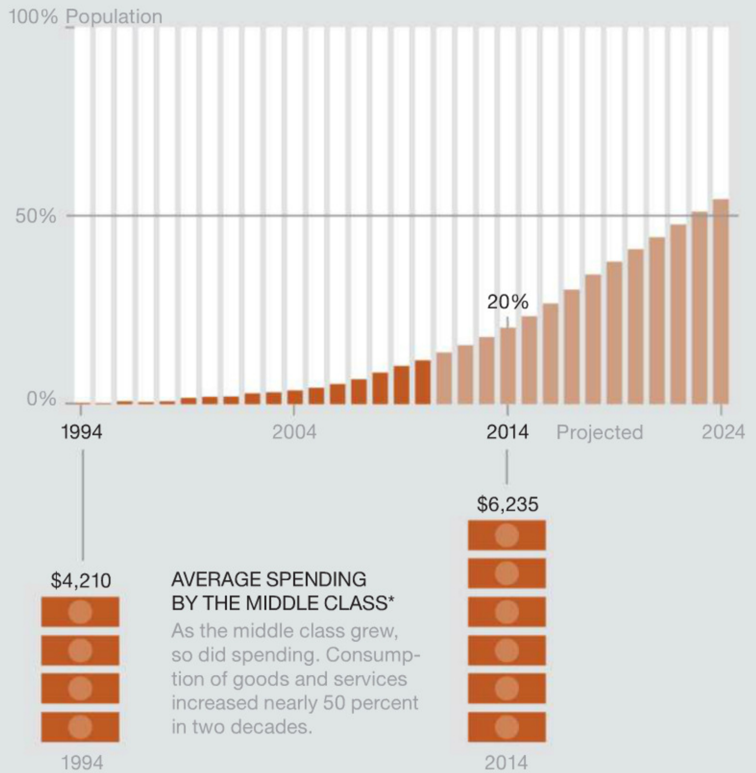
GLOBAL FOOD-SERVICE SALES



CHINA'S FAST-FOOD MARKET

China accounts for one-quarter of all money spent worldwide on eating out. This spending is driven by its growing middle class—more than 300 million strong. China has 57 percent of Asia's food outlets, giving the middle class a variety of options.

RISE OF THE MIDDLE CLASS, CHINA



The Chinese middle class has more money but less time. As work hours and commutes in cities increase, people are opting to eat out more.

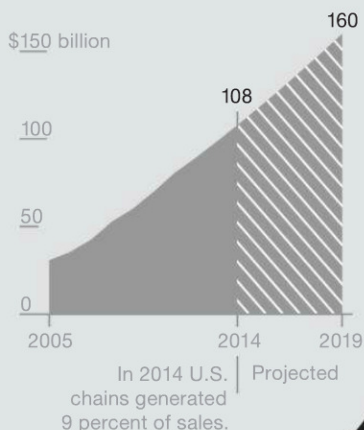
Since 2013 China has topped the U.S. in food-service sales. Brazil ranks fourth; other Latin American countries are among the fastest growing markets.

*IN 2005 U.S. DOLLARS AT PURCHASING-POWER-PARITY RATES

A TASTE FOR FAST FOOD

Lifestyle changes and population growth have caused fast-food sales to increase 250 percent in less than ten years.

CHINESE FAST-FOOD SALES



In 2014 U.S. chains generated 9 percent of sales. | Projected

ONE IN EVERY FIVE DOLLARS SPENT WORLDWIDE ON FAST FOOD IS SPENT IN CHINA.

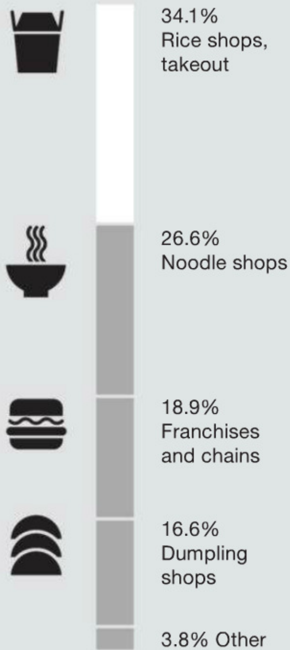
63%

OF CUSTOMERS ARE FAMILIES.

On the weekend many families frequent malls where they both shop and eat fast food.

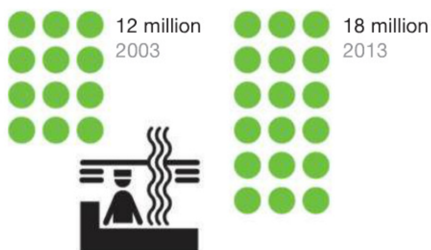
FAST-FOOD OUTLETS

Share of sales



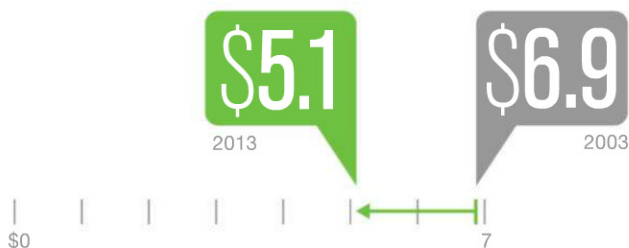
MORE OPTIONS…

Number of food outlets worldwide



AND LESS EXPENSIVE MEALS

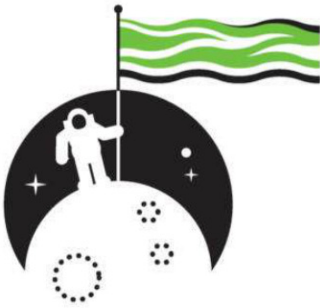
Average price paid per meal, in 2013 dollars



Consumers have more eateries to choose from but are spending less when they eat out.

GRAPHIC: ÁLVARO VALIÑO. SOURCES: EUROMONITOR INTERNATIONAL; IBISWORLD; BROOKINGS INSTITUTION

Hungry for information? Make a selection from our menu of food facts—and taste more at *natgeofood.com.*



SPACE HOG

Bacon was part of the first meal eaten on the moon.

A SLIGHT BUZZ

Decaffeinated coffee is not caffeine free.

CHEWING TREE GUM

American colonists chewed gum made of spruce tree resin.

HOT HOT CHOCOLATE

The Maya drank hot chocolate—but it was not sweet and was sometimes flavored with hot peppers.

ROYAL FINGERS

Queen Elizabeth I generally ate with her fingers. She considered the use of forks crude.

EAT IT ALL

The rind of Brie cheese is edible.

ANIMAL LAND

The livestock sector is the largest land-use system on Earth, occupying 30 percent of ice-free land.

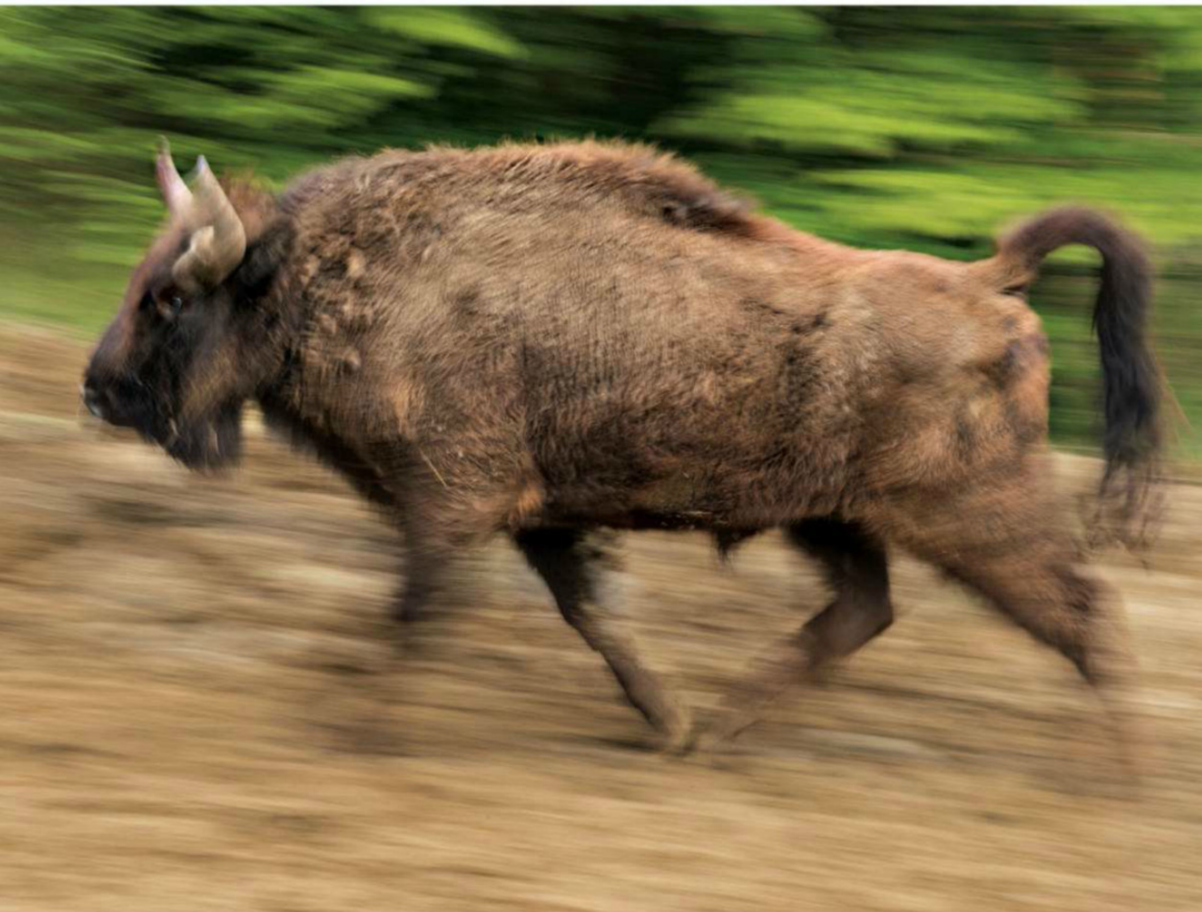
PHOTO: REBECCA HALE, NGM STAFF. ART: ÁLVARO VALIÑO

what do astronauts eat

"To make most freeze-dried foods, **astronauts** squeeze water into the food packages and then **eat** the food after it absorbs the water. **Astronauts** can use hot water to make hot meals that are tasty and nutritious. Some freeze-dried foods, like fruit, can be **eaten** dry."

What Do Astronauts Eat In Space? | Wonderopolis
wonderopolis.org › wonder › what-do-as...

Feedback



About two-thirds of the world's 5,000 *Bison bonasus,* Europe's largest mammal, roam wild in eastern Europe.

Bringing Back Europe's Bison

Approximate European bison range, 5000 B.C.
Reintroduced wild herd

They'd been raised in zoos and breeding centers. Still, when the European bison were put in a fenced tract in Romania's Transylvanian Alps in May 2014, most took well to their surroundings. This June, 14 of them were set free—the latest step in an ongoing effort to reintroduce *Bison bonasus* in Europe.

Bison first roamed the continent about 10,000 years ago. By the eighth century hunting and habitat destruction had reduced their range and pushed them eastward. Later, kings shot them on royal hunting grounds, and then wartime carnage thinned the remaining herds, until the last wild bison succumbed in 1927. From just 12 bison surviving in zoos, the next generation was bred. Reintroductions began into eastern Europe in the 1950s.

Once the 14 bison were freed to roam, more were to be moved to the fenced tract. Rewilding Europe and WWF are coordinating the effort with locals, with an eye to tourism. Future releases should bring the population in Romania to at least 300 by 2025.

Unlike its American cousin, *Bison bison, Bison bonasus* is not a cultural icon. "The biggest problem in European bison conservation is that the animal is unknown," says Joep van de Vlasakker, an adviser to the project. "Because it's unknown, it is unloved. And because it is unloved, there is not enough support for its conservation." *—Alison Fromme*

PHOTO: STAFFAN WIDSTRAND. MAP: JAMIE HAWK. SOURCES: TOBIAS KUEMMERLE, HUMBOLDT-UNIVERSITY BERLIN, GERMANY; MAŁGORZATA BOŁBOT, EUROPEAN BISON PEDIGREE BOOK

what do the
Transylvanian Alps
look like

More images for the Transylvanian Alps

Living Small

Not all dinosaurs went extinct. Their descendants live on in the Avialae group, aka birds. Hoping to learn how this group thrived when others didn't, scientists measured hundreds of dinosaur femur bones to determine each creature's mass. The survivors' continual evolution and ecological diversity helped them fit into shifting niches, the researchers found. For avians, survival hinged on shrinking in size.

—Lindsay N. Smith

TO LIVING BIRDS

Avialae

Maniraptora

Theropoda

Sauropodomorpha

Ornithischia

Qiliania
0.03 lbs

Archaeopteryx
2.2 lbs

Velociraptor
33 lbs

Tyrannosaurus
8 tons

Spinosaurus
7 tons

Argentinosaurus
100 tons

Apatosaurus
44 tons

Shantungosaurus
19 tons

Iguanodon
9 tons

Triceratops
15 tons

Stegosaurus
8 tons

Fruitadens
1.6 lbs

Common dinosaur ancestor
25–75 lbs

TRIASSIC
250–200 million years ago

JURASSIC
200–145 mya

CRETACEOUS
145–66 mya

OPPORTUNITIES FOR CHANGE
Small mass often coincides with frequent reproduction, allowing for more variation.

RAPID DEVELOPMENT
Maniraptoran theropods evolved quickly and often. But apart from Avialans, no species from the lineage survive today.

LAYING THE FOUNDATION
Theropods, primarily bipedal carnivores, shared traits with modern birds, including hollow bones and sometimes feathers.

BIGGEST DINOSAURS
The *Argentinosaurus* was more than six million times the size of the smallest Mesozoic bird, *Qiliania graffini.*

STALLED EVOLUTION
Lineages whose size evolved rapidly during early development but then halted were at a disadvantage when change was crucial for survival.

Dinosaurs not drawn to scale

GRAPHIC: MATTHEW TWOMBLY, NGM STAFF. SOURCE: ROGER BENSON

Ask the Google app.

So, Who's Your Hot Friend?

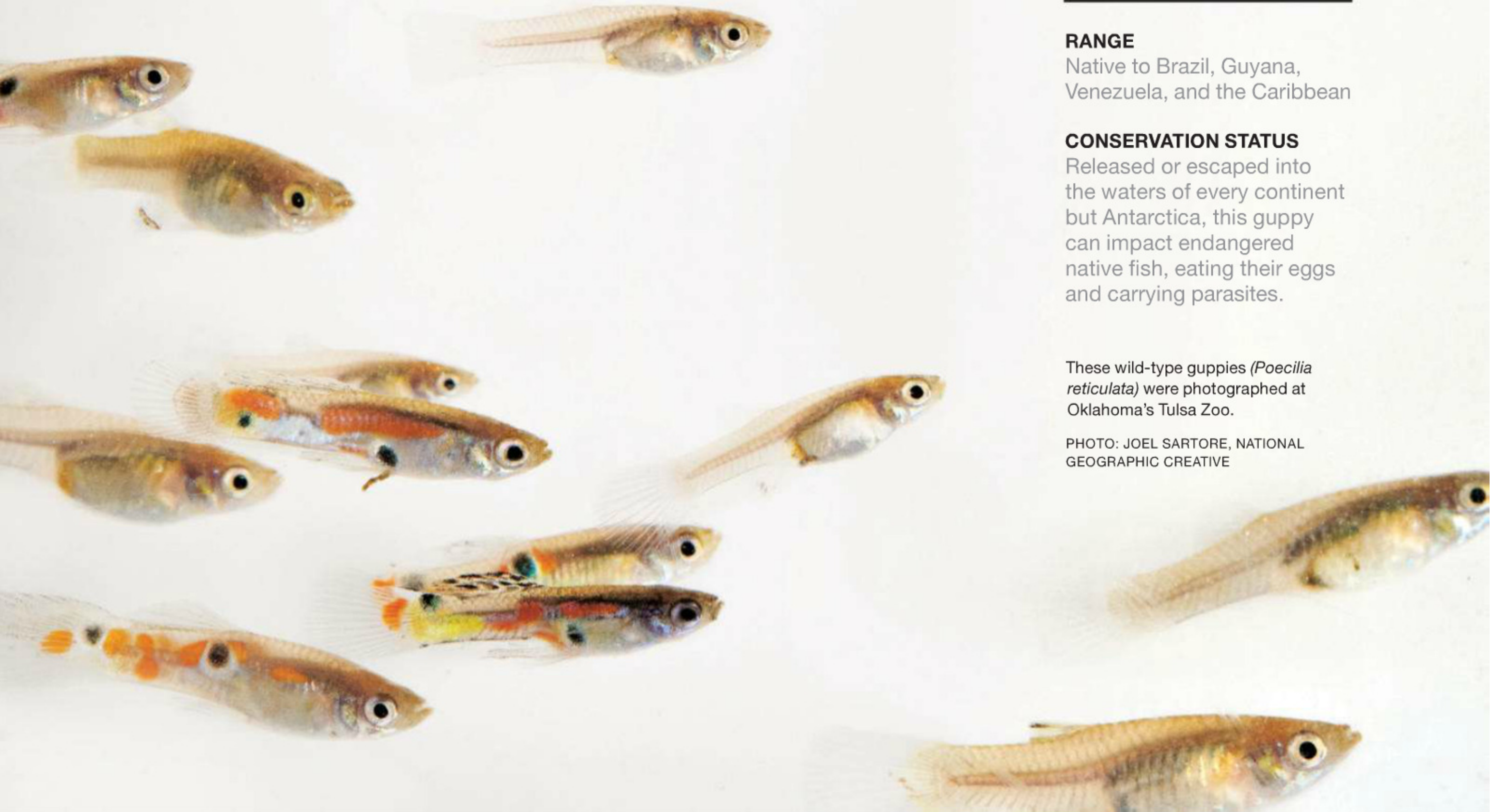
Female guppies avoid unwanted advances by schooling with their sexier sisters.

In the human social order a male may pursue a female with the help of a "wingman." In the social order of the Trinidadian guppy *(Poecilia reticulata)* the female thwarts pursuers with her own sidekick strategy.

The female of this small, freshwater fish is receptive to male courtship and mating attempts only at certain times, and gives off a chemical cue when she is. The male, on the other hand, is perpetually randy, and if he encounters a female that's not giving off the chemical "yes," he may still attempt copulation. Rather than waste energy fending off these advances, females "would benefit from being able to actively reduce the amount of harassment that they receive," researcher Safi Darden wrote in a study published in the *Proceedings of the Royal Society B.*

So the females deploy a gal-pal strategy. Those that aren't looking for sex school around with those that are exuding the eau de yes chemical. "Associating with females more sexually attractive than themselves" helps nonreceptive females dodge unwanted overtures, Darden says.

How strong was the uninterested females' instinct for taking cover behind their sexier sisters? So strong, Darden reports, that during tests in laboratory tanks, the nonreceptive females swam to one part of the tank even though it held no other guppies—because the water there had been laced with the eau de yes scent. *—Patricia Edmonds*



RANGE
Native to Brazil, Guyana, Venezuela, and the Caribbean

CONSERVATION STATUS
Released or escaped into the waters of every continent but Antarctica, this guppy can impact endangered native fish, eating their eggs and carrying parasites.

These wild-type guppies *(Poecilia reticulata)* were photographed at Oklahoma's Tulsa Zoo.

PHOTO: JOEL SARTORE, NATIONAL GEOGRAPHIC CREATIVE

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*Individual results may vary.

Prescription LYRICA is not for everyone. Tell your doctor right away about any serious allergic reaction that causes swelling of the face, mouth, lips, gums, tongue, throat, or neck or any trouble breathing, rash, hives or blisters. LYRICA may cause suicidal thoughts or actions in a very small number of people. Patients, family members or caregivers should call the doctor right away if they notice suicidal thoughts or actions, thoughts of self harm, or any unusual changes in mood or behavior. These changes may include new or worsening depression, anxiety, restlessness, trouble sleeping, panic attacks, anger, irritability, agitation, aggression, dangerous impulses or violence, or extreme increases in activity or talking. If you have suicidal thoughts or actions, do not stop LYRICA without first talking to your doctor. LYRICA may cause swelling of your hands, legs and feet. Some of the most common side effects of LYRICA are dizziness and sleepiness. Do not drive or work with machines until you know how LYRICA affects you. Other common side effects are blurry vision, weight gain, trouble concentrating, dry mouth, and feeling "high." Also, tell your doctor right away about muscle pain along with feeling sick and feverish, or any changes in your eyesight including blurry vision or any skin sores if you have diabetes. You may have a higher chance of swelling, hives or gaining weight if you are also taking certain diabetes or high blood pressure medicines. Do not drink alcohol while taking LYRICA. You may have more dizziness and sleepiness if you take LYRICA with alcohol, narcotic pain medicines, or medicines for anxiety. If you have had a drug or alcohol problem, you may be more likely to misuse LYRICA. Tell your doctor if you are planning to father a child. Talk with your doctor before you stop taking LYRICA or any other prescription medication.

Please see Important Risk Information for LYRICA on the following page.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.FDA.gov/medwatch or call 1-800-FDA-1088.

Ask your doctor about LYRICA and visit **LYRICA.com** or call **1-888-9-LYRICA (1-888-959-7422).**

IT'S SPECIFIC TREATMENT FOR DIABETIC NERVE PAIN

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IMPORTANT FACTS

(**LEER**-i-kah)

IMPORTANT SAFETY INFORMATION ABOUT LYRICA

LYRICA may cause serious, even life threatening, allergic reactions.
Stop taking LYRICA and call your doctor right away if you have any signs of a serious allergic reaction:
- Swelling of your face, mouth, lips, gums, tongue, throat or neck
- Have any trouble breathing
- Rash, hives (raised bumps) or blisters

Like other antiepileptic drugs, LYRICA may cause suicidal thoughts or actions in a very small number of people, about 1 in 500.
Call your doctor right away if you have any symptoms, especially if they are new, worse or worry you, including:
- suicidal thoughts or actions
- new or worse depression
- new or worse anxiety
- feeling agitated or restless
- panic attacks
- trouble sleeping
- new or worse irritability
- acting aggressive, being angry, or violent
- acting on dangerous impulses
- an extreme increase in activity and talking
- other unusual changes in behavior or mood

If you have suicidal thoughts or actions, do not stop LYRICA without first talking to your doctor.

LYRICA may cause swelling of your hands, legs and feet.
This swelling can be a serious problem with people with heart problems.

LYRICA may cause dizziness or sleepiness.
Do not drive a car, work with machines, or do other dangerous things until you know how LYRICA affects you. Ask your doctor when it is okay to do these things.

ABOUT LYRICA

LYRICA is a prescription medicine used in adults 18 years and older to treat:
- Pain from damaged nerves that happens with diabetes or that follows healing of shingles, or spinal cord injury
- Partial seizures when taken together with other seizure medicines
- Fibromyalgia (pain all over your body)

Who should NOT take LYRICA:
- Anyone who is allergic to anything in LYRICA

BEFORE STARTING LYRICA

Tell your doctor about all your medical conditions, including if you:
- Have had depression, mood problems or suicidal thoughts or behavior
- Have or had kidney problems or dialysis
- Have heart problems, including heart failure
- Have a bleeding problem or a low blood platelet count
- Have abused prescription medicines, street drugs or alcohol in the past
- Have ever had swelling of your face, mouth, tongue, lips, gums, neck, or throat (angioedema)
- Plan to father a child. It is not known if problems seen in animal studies can happen in humans.
- Are pregnant, plan to become pregnant or are breastfeeding. It is not known if LYRICA will harm your unborn baby. You and your doctor should decide whether you should take LYRICA or breast-feed, but you should not do both.

Tell your doctor about all your medicines. Include over-the-counter medicines, vitamins, and herbal supplements. LYRICA and other medicines may affect each other causing side effects. Especially tell your doctor if you take:

BEFORE STARTING LYRICA, continued

- Angiotensin converting enzyme (ACE) inhibitors. You may have a higher chance for swelling and hives.
- Avandia® (rosiglitazone)*, Avandamet® (rosiglitazone and metformin)* or Actos® (pioglitazone)** for diabetes. You may have a higher chance of weight gain or swelling of your hands or feet.
- Narcotic pain medicines (such as oxycodone), tranquilizers or medicines for anxiety (such as lorazepam). You may have a higher chance for dizziness and sleepiness.
- Any medicines that make you sleepy.

POSSIBLE SIDE EFFECTS OF LYRICA

LYRICA may cause serious side effects, including:
- See "Important Safety Information About LYRICA."
- Muscle problems, pain, soreness or weakness along with feeling sick and fever
- Eyesight problems including blurry vision
- Weight gain. Weight gain may affect control of diabetes and can be serious for people with heart problems.
- Feeling "high"

If you have any of these symptoms, tell your doctor right away.

The most common side effects of LYRICA are:
- Dizziness
- Blurry vision
- Weight gain
- Sleepiness
- Trouble concentrating
- Swelling of hands and feet
- Dry mouth

If you have diabetes, you should pay extra attention to your skin while taking LYRICA.

HOW TO TAKE LYRICA

Do:
- Take LYRICA exactly as your doctor tells you. Your doctor will tell you how much to take and when to take it. Take LYRICA at the same times each day.
- Take LYRICA with or without food.

Don't:
- Drive a car or use machines if you feel dizzy or sleepy while taking LYRICA.
- Drink alcohol or use other medicines that make you sleepy while taking LYRICA.
- Change the dose or stop LYRICA suddenly.
  If you stop taking LYRICA suddenly, you may have headaches, nausea, diarrhea, trouble sleeping, increased sweating, or you may feel anxious. If you have epilepsy, you may have seizures more often.
- Start any new medicines without first talking to your doctor.

NEED MORE INFORMATION?

- Ask your doctor or pharmacist. This is only a brief summary of important information.
- Go to **www.lyrica.com** or call **1-866-459-7422 (1-866-4LYRICA).**

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VISIONS

Israel
Positioning themselves for a photo shoot in Haifa, two Eritrean expats and their wedding party are a vision in white. Israel is home to 34,000 asylum-seekers from Eritrea. Only four have been granted refugee status under a controversial immigration law.

PHOTO: MALIN FEZEHAI

Fiji
Off the southern coast of Viti Levu, bull sharks—some more than ten feet long—are drawn by a chum lunch dropped from above. Eight species of sharks and at least 400 other, smaller types of fish live in the Shark Reef Marine Reserve.

PHOTO: PETE OXFORD

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Peru
Masked, costumed performers parade through Puno during the annual Diablada (Dance of the Devils)—part of the multiday, centuries-old Fiesta de la Candelaria. A mix of Andean religious ceremonies, it symbolizes the struggle between good and evil.

PHOTO: JUAN MANUEL CASTRO PRIETO, AGENCE VU

As the World Turns

Assignment Transitions—between seasons, eras, places—are fleeting things to photograph. We asked to see yours.

EDITOR'S NOTE

"I knew that this assignment would be difficult, that it would tax everyone's ability to make pictures about the quality of transformation in the moment. But the rewards were stunning."

—*Jim Richardson,* National Geographic *photographer*

Matt Champlin
Skaneateles, New York

Rain followed snow one February day. Near his home, Champlin constructed a small snowman. As he prepared to take a portrait, its head rolled off and looked forlornly at the sky.

Karen Burke
Enfield, Connecticut

Burke moved in with her parents when her mother was diagnosed with dementia. After they returned from the hospital one afternoon, Burke observed a quiet moment of comfort.

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† Based on the change in gold's price from September 6, 2001 ($272/oz.) to September 6, 2011 ($1,923.70/oz.)

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First Light

Assignment We asked the Your Shot community to wake up early and show us the first two hours of the day.

EDITOR'S NOTE

"At first the light is barely noticeable. As it brightens, shadows give shape to the landscape, until it blinds you like a spotlight. First light—its beauty is fleeting, and that's what makes it so special."

—*Kurt Mutchler,* National Geographic *senior photo editor*

Christopher Lee Griffin
Charleston, South Carolina

The final step before a recruit becomes a U.S. marine is a test called the crucible, a three-day simulation of field conditions. At dawn in Parris Island, South Carolina, Griffin watched three female recruits complete an obstacle course.

Saba Khozoui
Highwood, Illinois

Khozoui's windshield was iced over one morning as she prepared to leave for work. While waiting for the ice to melt, she took several frames, then repositioned the car toward the sun for this shot.

WILL THE POPE CHANGE THE VATICAN?

Pope Francis embraces a disabled youth in front of St. Peter's Basilica. The leader of the world's 1.2 billion Catholics has become widely admired for his warmth, openness, and humility.

OR WILL THE VATICAN CHANGE THE POPE?

As Francis makes his first U.S. visit, his emphasis on serving the poor over enforcing doctrine has inspired joy and anxiety in Roman Catholics.

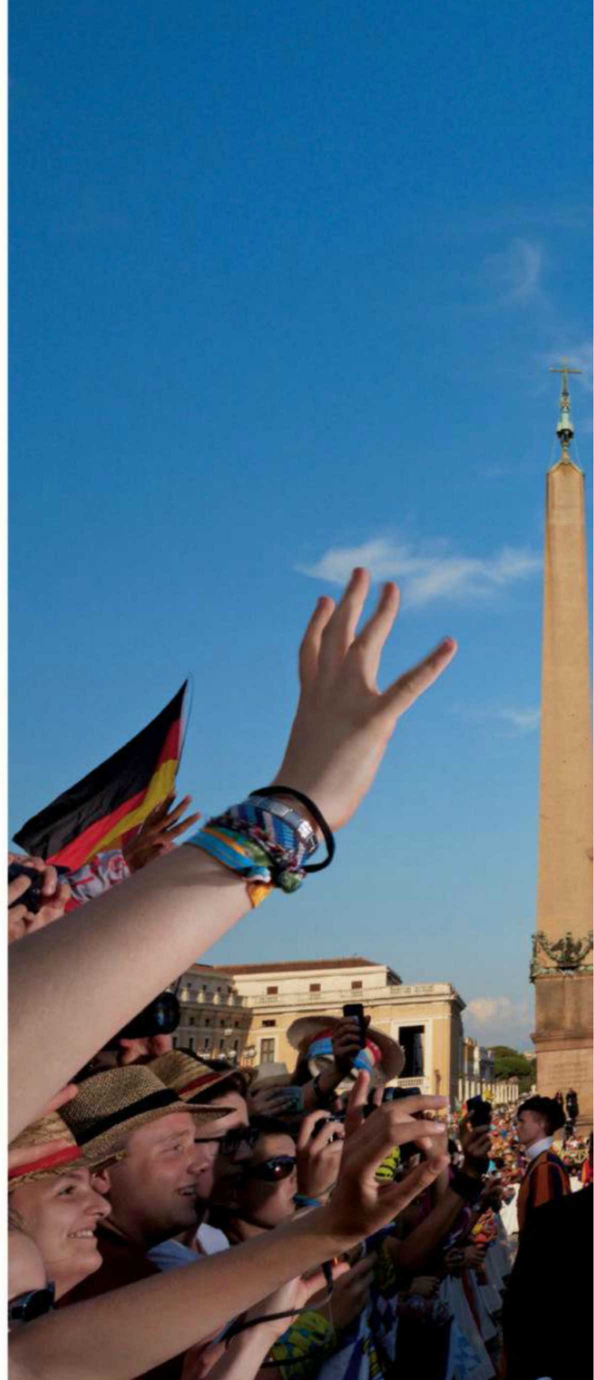
Ecstatic pilgrims, one with the flag of the pope's native Argentina, rejoice as he nears them. In 2013, the year he was elected, three times as many visitors flocked to Vatican City as in the year before.

After arriving in a simple Ford Focus, Francis enters the Apostolic Palace with Prefect of the Papal Household Georg Gänswein. Popes usually live here, but Francis chose a modest apartment nearby.

By Robert Draper
Photographs by Dave Yoder

When about 7,000 awed strangers first encounter him on the public stage, he is not yet the pope—but like a chrysalis stirring, something astounding is already present in the man. Inside Stadium Luna Park, in downtown Buenos Aires, Argentina, Roman Catholics and evangelical Christians have gathered for an ecumenical event. From the stage, a pastor calls out for the city's archbishop to come up and say a few words. The audience reacts with surprise, because the man striding to the front had been sitting in the back all this time, for hours, like no one of any importance. Though a cardinal, he is not wearing the traditional pectoral cross around his neck, just a black clerical shirt and a blazer, looking like the simple priest he was decades ago. He is gaunt and elderly with a somber countenance, and at this moment nine years ago it is hard to imagine such an unassuming, funereal Argentine being known one day, in every corner of the world, as a figure of radiance and charisma.

He speaks—quietly at first, though with steady nerves—in his native tongue, Spanish. He has no notes. The archbishop makes no mention of the days when he regarded the evangelical movement in the dismissive way many Latin American Catholic priests do, as an *escuela de samba*—an unserious happening akin to rehearsals at a samba school. Instead the most powerful Argentine in the Catholic Church, which asserts that it is the only true Christian church, says that no such distinctions matter to God. "How nice," he says, "that brothers are united, that brothers pray together. How nice to see that nobody negotiates their history on the path of faith—that we are diverse but that we want to be, and are already beginning to be, a reconciled diversity."



At a general audience in St. Peter's Square, Francis rides in a popemobile without the protection of bulletproof glass. The pontiff wandered freely when he was a cardinal in Buenos Aires but cannot do so in Rome for his own safety.

Hands outstretched, his face suddenly alive, and his voice quavering with passion, he calls out to God: "Father, we are divided. Unite us!"

Those who know the archbishop are astonished, since his implacable expression has earned him nicknames like "Mona Lisa" and "Carucha" (for his bulldog-like jowls). But what

will also be remembered about that day occurs immediately after he stops talking. He drops slowly to his knees, onstage—a plea for the attendees to pray for him. After a startled pause, they do so, led by an evangelical minister. The image of the archbishop kneeling among men of lesser status, a posture of supplication at once meek and awesome, will make the front pages in Argentina.

Among the publications that carry the photograph is *Cabildo,* a journal considered the voice of the nation's ultraconservative Catholics. Accompanying the story is a headline that features a jarring noun: *apóstata.* The cardinal as a traitor to his faith.

This is Jorge Mario Bergoglio, the future Pope Francis.

I really need to start making changes right now," Francis told a half dozen Argentine friends one morning just two months after 115 cardinals in the Vatican conclave vaulted him from relative obscurity into the papacy. To many observers—some delighted, others discomfited—the new pope already had changed seemingly everything, seemingly overnight. He was the first Latin American pope, the first Jesuit pope, the first in more than a thousand years not to have been born in Europe, and the first to take the moniker Francis, in honor of St. Francis of Assisi, champion of the poor. Shortly after his election on March 13, 2013, the new leader of the Catholic Church materialized on a balcony of St. Peter's Basilica all in white, without the traditional scarlet cape over

PHOTOS: VATICAN ACCESS COURTESY SERVIZIO FOTOGRAFICO DE *L'OSSERVATORE ROMANO*

Hailed as the "first Latino pope," Francis is the son of Italian immigrants to Argentina. As Jorge Mario Bergoglio, he had a reputation for staying close to the people in Buenos Aires, where he was born, raised, joined the Jesuits, and eventually became a cardinal. He frequently visited slums and rode the subway, as he did in this 2008 photo.

PABLO LEGUIZAMON, AP IMAGES

his shoulders or gold-embroidered red stole around his neck. He greeted the roaring masses below with electrifying plainness: "*Fratelli e sorelle, buona sera*—Brothers and sisters, good evening." And he closed with a request, what many Argentines already knew to be his signature line: "Pray for me." When he departed, he walked past the limousine that awaited him and hopped into the bus ferrying the cardinals who had just made him their superior.

The next morning the pope paid his bill at the hotel where he had been staying. Forswearing the traditional papal apartments inside the Apostolic Palace, he elected to live in a two-bedroom dwelling in Casa Santa Marta, the Vatican's guesthouse. In his first meeting with the international press he declared his primary ambition: "How I would like a church that is poor and for the poor." And instead of celebrating the evening Mass for Holy Thursday (commemorating the Last Supper) at a basilica and washing the feet of priests, as was traditional, he preached at a youth prison, where he washed the feet of a dozen inmates, including women and Muslims, a first for a pope. All this took place during his first month as bishop of Rome.

Still, the new pope's Argentine friends understood what he meant by "changes." Although even the smallest of his gestures carried considerable weight, the man they knew was not content to purvey symbols. He was a practical, streetwise *porteño*, as residents of the port city of Buenos Aires call themselves. He wanted the Catholic Church to make a lasting difference in people's lives—to be, as he often put it, a hospital on a battlefield, taking in all who were wounded, regardless of which side they fought on. In the pursuit of this objective, he could be, according to Rabbi Abraham Skorka, an Argentine friend, "a very stubborn person."

Though to the outside world Pope Francis seemed to have exploded out of the skies like a meteor shower, he was a well-known and occasionally controversial religious figure back home. The son of an accountant whose family had emigrated from the Piedmont region of northwestern Italy, Bergoglio had distinguished himself from the moment he entered the seminary in 1956, at 20, having worked as a lab technician and briefly as a bouncer at a club. Soon after, he chose the intellectually demanding Society of Jesus as his path to the priesthood. As a student at Colegio Máximo de San José in 1963, he possessed both "heightened

spiritual discernment and political skills," according to one of his professors, Father Juan Carlos Scannone, such that he quickly became a spiritual adviser to students and teachers alike. He taught unruly boys, washed the feet of prisoners, studied overseas. He became the rector of Colegio Máximo as well as a fixture in blighted shantytowns throughout Buenos Aires. And he rose in the Jesuit hierarchy even while navigating the murky politics of an era that saw the Catholic Church enter into fraught relationships first with Juan Perón and later with the military dictatorship. He fell out of favor with his Jesuit superiors, then was rescued from exile by an admiring cardinal and made bishop in 1992, archbishop in 1998, and cardinal in 2001.

Shy in disposition, Bergoglio—a self-described *callejero,* or street wanderer—preferred the company of the poor over the affluent. His own indulgences were few: literature, soccer, tango music, and gnocchi. For all his simplicity, this porteño was an urban animal, an acute social observer, and in his quiet way, a natural leader. He also knew how to seize a moment—whether in 2004, lashing out at corruption in a speech attended by the Argentine president, or at Luna Park in 2006, falling to his knees. As Father Carlos Accaputo, a close adviser since going to work for Bergoglio in 1992, says, "I think God has prepared him, throughout his entire pastoral ministry, for this moment."

Moreover, his papacy was not a fluke. As the Roman author Massimo Franco would put it, "His election arose from a trauma"—from the sudden (and for nearly six centuries, unprecedented) resignation of the sitting pope, Benedict XVI, and from the mounting sentiment among more progressive cardinals that the hoary and Eurocentric mind-set of the Holy See was rotting the Catholic Church from within.

Sitting in the living room of his apartment that morning, the pope acknowledged to his old friends the daunting challenges that awaited him. Financial disarray in the Institute for the Works of Religion (more crassly referred to as the Vatican bank). Bureaucratic avarice bedeviling the central administration, known as the Roman Curia. Continuing disclosures of pedophile priests insulated from justice by church officials. On these and other matters Francis intended to move swiftly, knowing that—as one friend who was there that morning, Pentecostal pastor and scholar Norberto Saracco, puts it—"he was going to make a lot of enemies. He's not naive, OK?"

Saracco remembers expressing concern about the pope's boldness. "Jorge, we know that you don't wear a bulletproof vest," he said. "There are many crazy people out there."

Francis replied calmly, "The Lord has put me here. He'll have to look out for me." Though he had not asked to be pope, he said the moment his name was called out in the conclave, he felt a tremendous sense of peace. And despite the animosities he was likely to incur, he assured his friends, "I still feel the same peace."

What the Vatican feels is another story.

> "GOD IS NOT AFRAID OF NEW THINGS! That is why he is continually surprising us, opening our hearts, and guiding us in unexpected ways."
>
> *—Pope Francis, homily at the beatification of Pope Paul VI, October 19, 2014*

When Federico Wals, who had spent several years as Bergoglio's press aide, traveled from Buenos Aires to Rome last year to see the pope, he first paid a visit to Father Federico Lombardi, the longtime Vatican communications official whose job essentially mirrors Wals's old one, albeit on a much larger scale. *(Continued on page 50)*

Cardinals and bishops attend a Mass to celebrate the beatification of Pope Paul VI and mark the end of a synod at which they debated such contentious issues as divorce and same-sex marriage.

The pope strolls through the Sala Regia after delivering an address. The ornate hall, decorated with murals of momentous events in church history, was built for popes to receive dignitaries.

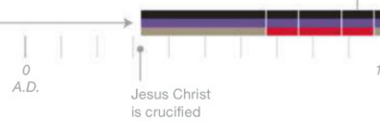
“St. Peter,” by Peter Paul Rubens

SAINTS AND SINNERS

The papal line begins with Peter, the disciple Jesus Christ chose as the “rock” on which to build his church, according to the Gospel of Matthew. The unbroken succession, which continues with Francis, includes pontiffs who are revered, such as Peter and John Paul II, and others notorious for their transgressions.

A key to the popes

Martyred/killed
Canonized/beatified
Country of origin



Bishops of Rome

Little is known about the first leaders of the church, who would come to be known as the bishops of Rome, a title still held by popes today. The earliest popes are all considered saints by the Roman Catholic Church.

0 A.D.

Jesus Christ is crucified

St. Gregory the Great

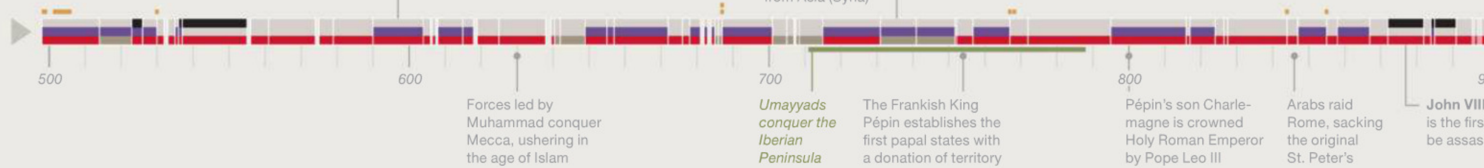
The first monk to become pope, he consolidates papal territories and helps shift the church’s focus from the fading Roman Empire toward western Europe, initiating the conversion of the British Isles to Christianity.

“St. Gregory the Great,” by Francisco de Goya

“Pope Formosus and Stephen VII,” by Jean-Paul Laurens

Saeculum Obscurum

From 872 to 1012 the papacy falls under a dark period of corruption. In the Cadaver Synod of 897, Pope Stephen VII has the corpse of his predecessor disinterred, garbed in papal robes, and put on trial.



St. Gregory III is the last pope from Asia (Syria)

Forces led by Muhammad conquer Mecca, ushering in the age of Islam

Umayyads conquer the Iberian Peninsula

The Frankish King Pépin establishes the first papal states with a donation of territory

Pépin’s son Charlemagne is crowned Holy Roman Emperor by Pope Leo III

Arabs raid Rome, sacking the original St. Peter’s

John VIII is the first

Avignon Papacy

With political instability in Italy, Clement V moves the papacy to Avignon, marking a period of French influence. He works to divert the warriors of feuding European countries into the Crusades.

Western Schism

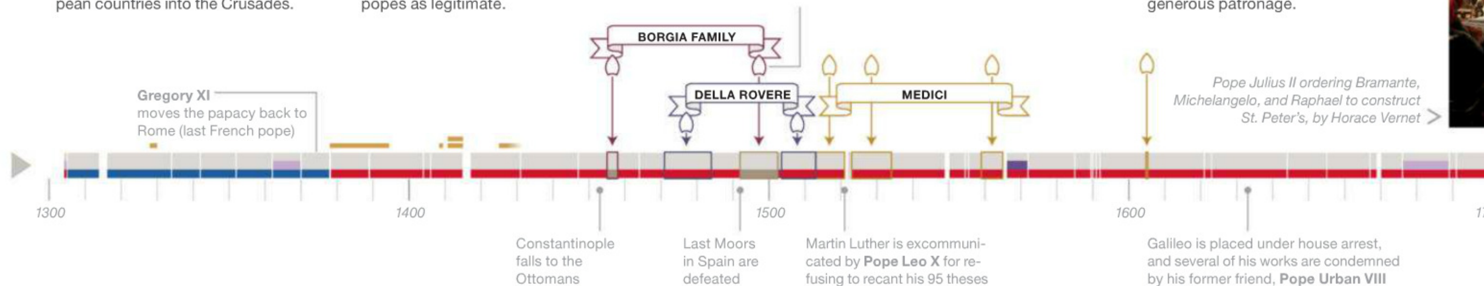
A split within the Catholic Church from 1378 to 1417 sees three rival popes vying for authority. The election of Martin V by cardinals from all three factions secures the line of Roman popes as legitimate.

Alexander VI of the Borgia family has multiple mistresses and illegitimate children. His son Cesare becomes a cardinal and the model for Machiavelli’s prince.

Renaissance Rulers

Powerful Italian families dominate the papacy during the Renaissance. Their reigns are known for decadence and nepotism but also for a flourishing of the arts under their generous patronage.

Pope Julius II ordering Bramante, Michelangelo, and Raphael to construct St. Peter’s, by Horace Vernet



Gregory XI moves the papacy back to Rome (last French pope)

Constantinople falls to the Ottomans

Last Moors in Spain are defeated

Martin Luther is excommunicated by **Pope Leo X** for refusing to recant his 95 theses

Galileo is placed under house arrest, and several of his works are condemned by his former friend, **Pope Urban VIII**

Antipopes
Disputes over papal succession at times led to the election of rival popes. Those deemed illegitimate by the church are called antipopes.

Persecution
The growing influence of the church in its first centuries is seen as a threat to Rome's rulers. Worshippers who refuse to take part in pagan sacrifices and other acts of loyalty to the state are often imprisoned or killed.

Conversion
The Roman Emperor Constantine converts to Christianity in 312 and moves the capital of his newly Christian empire to Constantinople. The empire's spiritual center, however, remains with the papacy in Rome.

< *Emperor Constantine*

St. Clement I is said to have been tied to an anchor thrown into the Black Sea

Hippolytus is the first antipope

St. Leo the Great persuades Attila the Hun not to march on Rome

St. Gelasius is the last pope to come from Africa

00 — 200 — 300 — 400 — 500

St. Pontian is the first pope to resign

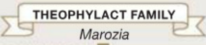
Constantine converts to Christianity

Constantine convenes the Council of Nicaea, where the church asserts the divine nature of Jesus Christ

St. Innocent I succeeds his father, **St. Anastasius I**, as pope

Last Roman emperor is deposed by Goths

Theophylact Papacy
The papacy by the tenth century becomes embroiled in Roman familial struggles for power. A key figure is a matron of the Theophylact family, Marozia. Her illegitimate son with Pope Sergius III is appointed pope (John XI), as are other descendants.



...pe Sergius III

Crusades
The papacy rallies European leaders to seize the Holy Land from its Muslim rulers. The period that follows also sees Crusades against European pagans and even other Christians.

< *Knights, from "Battle of Montgisard near Ascalon," by Charles-Philippe Larivière*

CELIBACY AND THE PAPACY
Clerics above the rank of subdeacon, including the pope, have been expected to be celibate since the early days of the Roman Catholic Church. Yet some popes kept concubines, and some were married and had children before entering the clergy.

00 — 1000 — 1100 — 1200 — 1300

...pope to ...sinated

Eastern Orthodox and Roman Catholics split in the Great Schism of 1054

A synod decrees popes must be elected by cardinals

Pope Urban II calls for Christians to deliver Jerusalem from Muslim control

Crusades against Muslims

Crusades against pagans

Crusades against Christians

Reforming Popes
Church leaders convene a council in the 1540s to reform the church. They approve new religious orders that spread the Catholic faith through worldwide missions.

Roman Question
The rise of Italian nationalism and the formation of the Kingdom of Italy cut short the political gains made by the papacy after Napoleon's defeat. Papal territories shrink to just the Vatican and its immediate surroundings.

A Modern Vatican
The borders of the modern Vatican City are set by a treaty with Mussolini's government, in exchange for papal neutrality in international affairs.

< *Mussolini and Cardinal Pietro Gasparri signing the Lateran Treaty, 1929*

Pius VI dies a prisoner of Napoleon in France

Leo XIII issues *Rerum Novarum*, a seminal work on Catholic social justice

St. John Paul II is the first non-Italian pope in 450 years

Francis is the first pope from South America

00 — 1800 — 1900 — 2000

The Catholic Church, a major landowner in France, has many of its holdings confiscated during the 1789 French Revolution

The First Vatican Council codifies the infallibility of the pontiff

The Lateran Treaty establishes Vatican City's sovereignty

The Second Vatican Council encourages ties with other religions and allows Mass to be said in languages other than Latin

JASON TREAT AND KELSEY NOWAKOWSKI, NGM STAFF; MAIA WACHTEL

SOURCES: EAMON DUFFY, *SAINTS AND SINNERS*; JAMES WEISS, BOSTON COLLEGE

IMAGES (BY ROW, FROM TOP): MUSEO NACIONAL DEL PRADO/ART RESOURCE, NY; ALBUM/ART RESOURCE, NY (TWO); RMN-GRAND PALAIS/ART RESOURCE, NY; GIANNI DAGLI ORTI, ART ARCHIVE AT ART RESOURCE, NY; ALFREDO DAGLI ORTI, ART ARCHIVE AT ART RESOURCE, NY; CULTURE CLUB/ GETTY IMAGES

In St. Peter's Basilica, Michelangelo's dome soars above Bernini's bronze baldachin. Below the altar lies what is believed to be the tomb of St. Peter, the first pope.
COMPOSITE IMAGE

NDO REFVLGET O PETRE DIXISTI

"So, Father," the Argentine asked, "how do you feel about my former boss?" Managing a smile, Lombardi replied, "Confused."

Lombardi had served as the spokesman for Benedict, formerly known as Joseph Ratzinger, a man of Germanic precision. After meeting with a world leader, the former pope would emerge and rattle off an incisive summation, Lombardi tells me, with palpable wistfulness: "It was incredible. Benedict was so clear. He would say, 'We have spoken about these things, I agree with these points, I would argue against these other points, the objective of our next meeting will be this'—two minutes and I'm totally clear about what the contents were. With Francis—'This is a wise man; he has had these interesting experiences.' "

Chuckling somewhat helplessly, Lombardi adds, "Diplomacy for Francis is not so much about strategy but instead, 'I have met this person, we now have a personal relation, let us now do good for the people and for the church.' "

The pope's spokesman elaborates on the Vatican's new ethos while sitting in a small conference room in the Vatican Radio building, a stone's throw from the Tiber River. Lombardi wears rumpled priest attire that matches his expression of weary bemusement. Just yesterday, he says, the pope hosted a gathering in Casa Santa Marta of 40 Jewish leaders—and the Vatican press office learned about it only after the fact. "No one knows all of what he's doing," Lombardi says. "His personal secretary doesn't even know. I have to call around: One person knows one part of his schedule, someone else knows another part."

The Vatican's communications chief shrugs and observes, "This is the life."

Life was altogether different under Benedict, a cerebral scholar who continued to write theological books during his eight years as pope, and under John Paul II, a theatrically trained performer and accomplished linguist whose papacy lasted almost 27 years. Both men were reliable keepers of papal orthodoxy. The spectacle of this new pope, with his plastic watch and bulky orthopedic shoes, taking his breakfast in the Vatican cafeteria, has required some getting used to. So has his sense of humor, which is distinctly informal. After being visited in Casa Santa Marta by an old friend and fellow Argentine, Archbishop Claudio Maria Celli, Francis insisted on accompanying his guest to the elevator.

"Why is this?" Celli asked. "So that you can be sure that I'm gone?"

Without missing a beat, the pope replied, "And so that I can be sure you don't take anything with you."

"DEPICTING THE POPE AS A SORT OF SUPERMAN, a star, is offensive to me. The pope is a man who laughs, cries, sleeps calmly, and has friends like everyone else."

—Pope Francis, interview with Corriere della Sera, *March 5, 2014*

In attempting to divine the 78-year-old pope's comings and goings, the closest Vatican officials have to an intermediary has been Cardinal Pietro Parolin, Francis's secretary of state, a much respected veteran diplomat—and, importantly, trusted by his boss, according to Wals, "because he's not too ambitious, and the pope knows that. That's a fundamental quality for the pope." At the same time, Francis has drastically reduced the secretary of state's powers, particularly with respect to the Vatican's finances. "The problem with this," Lombardi says, "is that the structure of the curia is no longer clear. The process is ongoing, and what will be at the end, no one knows. The secretary of state is not as centralized, and the

pope has many relations that are directed by him alone, without any mediation."

Valiantly accentuating the upside, the Vatican spokesman adds, "In a sense, this is positive, because in the past there were criticisms that someone had too much power over the pope. They cannot say this is the case now."

Like many institutions, the Vatican is unreceptive to change and suspicious of those who would bring it. Since the 14th century, the Catholic epicenter has been a 110-acre, walled city-state within Rome. Vatican City has long been a magnet for tourists, thanks to the Sistine Chapel and St. Peter's Basilica, as well as a pilgrimage destination for the planet's 1.2 billion Catholics—which is to say that the world comes to it and never the other way around. But it is also just as its designation implies: a self-contained territorial entity, with its own municipal administrators, police force, courts, fire brigade, pharmacy, postal service, grocery store, newspaper, and cricket team. Its press corps, the Vaticanisti, monitors the institution's vagaries with the gimlet-eyed skepticism of city hall reporters. Its entrenched workforce pays no sales taxes in Vatican City. Its diplomatic bureaucracy, in the familiar way of bureaucracies, rewards favored bishops with cushy postings while relegating the less favored to comparatively dismal sectors of the world. For centuries it has weathered conquests, plagues, famine, fascism, and scandals. The walls have held.

Now comes Francis, a man who despises walls and who once said to a friend as they strolled past the Casa Rosada, where Argentina's president lives: "How can they know what the common people want when they build a fence around themselves?" He has sought to be what Franco, who has written a book on Francis and the Vatican, calls an "available pope—a contradiction in terms." The very notion seems to have drained the blood from the Vatican's opaque face.

"I believe we haven't yet seen the real changes," says Ramiro de la Serna, a Franciscan priest based in Buenos Aires who has known the pope for more than 30 years. "And I also believe we haven't seen the real resistance yet either."

Vatican officials are still taking their measure of the man. It is tempting for them to view the pope's openhearted reactions as evidence that he is a creature of pure instinct. "Totally spontaneous," Lombardi says of Francis's much commented-on gestures during his trip to the Middle East—among them, his embrace of an imam, Omar Abboud, and a rabbi, his friend Skorka, after praying with them at the Western Wall. But in fact, Skorka says, "I discussed it with him before we left for the Holy Land—I told him, 'This is my dream, to embrace beside the wall you and Omar.'"

That Francis agreed in advance to fulfill the rabbi's wish makes the gesture no less sincere. Instead it suggests an awareness that his every act and syllable will be parsed for symbolic portent. Such prudence is thoroughly in keeping with the Jorge Bergoglio known by his Argentine friends, who scoff at the idea that he is guileless. They describe him as a "chess player," one whose every day is "perfectly organized," in which "each and every step has been thought out." Bergoglio himself told the journalists Francesca Ambrogetti and Sergio Rubin several years ago that he seldom heeded his impulses, since "the first answer that comes to me is usually wrong."

Even in the seemingly drastic lifestyle changes Francis has brought, he has made commonsense concessions to the realities of the Vatican. He had suggested that his Swiss Guards didn't need to follow him everywhere, but he has since become resigned to their near-constant presence. (He often asks the guards to take his photograph with visitors—another concession, since Bergoglio long recoiled from cameras.) Though he has eschewed the bulletproof-glass-enclosed popemobile frequently used since the assassination attempt on John Paul II in 1981, he recognizes that he no longer can ride the subways and mingle in the ghettos, as he was famed for doing in Buenos Aires. This led him to lament, four months after he assumed the papacy, "You know how often I've wanted to go walking through the streets of Rome—because in Buenos Aires, I liked to go for a walk in the

The pope, once known for his aversion to cameras, shows he's a good sport. An earlier photo, snapped in August 2013 by teens—and thought to be the first selfie with a pope—went viral on social media.

When Francis appears in St. Peter's Square, the cacophony of the crowd crescendos. People become frantic to get him to stop, hoisting banners, photos, rosaries, children to be blessed. Pilgrims come early to claim a prominent spot and wait for hours, though Roman summers can be brutally hot and bright, and winters cold

and wet. People often respond to Francis with the intimacy they would a beloved relative, unseen for years; men and women sometimes weep openly, overwhelmed by his presence. He will talk for several minutes with some, joke with others, and even sip maté offered by his fellow Argentines.

city. I really liked to do that. In this sense, I feel a little penned in."

Friends say that as the head of the Vatican and an Argentine, he has felt duty bound to receive his country's president, Cristina Fernández de Kirchner, even when it has been painfully evident to him that she has used these visits for her own political gain. "When Bergoglio received the president in a friendly way, it was out of pure grace," says Buenos Aires evangelical pastor Juan Pablo Bongarrá. "She didn't deserve it. But that's how God loves us, with pure grace."

To Wals, his former press aide, Bergoglio's careful entry into the papacy is completely unsurprising. Indeed, it was foreshadowed by the manner in which he vacated his previous office. Realizing there was a chance the conclave would elect him—after all, he had been the runner-up to Ratzinger after John Paul II's death in 2005—the archbishop left for Rome in March 2013, says Wals, "with all letters finished, the money in order, everything in perfect shape. And that night before he departed, he called just to go over all the office details with me, and also to give me advice about my future, like someone who knew that maybe he would be leaving for good."

Leave for good though he did, and in spite of the serenity he exhibits, Francis has nonetheless approached his new responsibilities with gravity leavened by his characteristic self-deprecation. As he said last year to a former student, Argentine writer Jorge Milia, "I kept looking in Benedict's library, but I couldn't find a user's manual. So I manage as best I can."

He is, the media would have it, a reformer. A radical. A revolutionary. And he is also none of these things. His impact thus far is as impossible to miss as it is to measure. Francis has kindled a spiritual spark among not only Catholics but also other Christians, those of other faiths, and even nonbelievers. As Skorka says, "He is changing religiosity throughout the world." The leader of the Catholic Church is widely seen as good news for an institution that for years prior to his arrival had known only bad news. "Two years ago," says Father Thomas J. Reese, a Jesuit and a senior analyst at the *National Catholic Reporter,* "if you asked anybody on the street, 'What's the Catholic Church for and against?' you would've gotten, 'It's against gay marriage, against birth control'—all this stuff. Now if you ask people, they'll say, 'Oh, the pope—he's the guy who loves the poor and doesn't live in a palace.' That's an extraordinary achievement for such an old institution. I jokingly say that Harvard Business School could use him to teach rebranding. And politicians in Washington would kill for his approval rating."

> "THE PERFECT FAMILY DOESN'T EXIST, NOR IS there a perfect husband or a perfect wife, and let's not talk about the perfect mother-in-law! It's just us sinners."
>
> *—Pope Francis, comments to engaged couples, February 14, 2014*

Of course, as is evident when speaking to Vatican officials, the spectacle of a papal personality cult—Francis as rock star—is unseemly to such a dignified institution. To some of them the pope's popularity is also threatening. It reinforces the mandate he was given by the cardinals who desired a leader who would cast aside the church's regal aloofness and expand its spiritual constituency. Recalls one, Cardinal Peter Turkson of Ghana, "Just before the conclave, when all the cardinals gathered, we shared our views. There was a certain mood: Let's get a change. That kind of mood was strong inside. No one said, 'No more Italians or no more Europeans'—but a desire for change was there.

"Cardinal Bergoglio was basically unknown

to all those gathered there," Turkson continues. "But then he gave a talk—it was kind of his own manifesto. He advised those of us gathered that we need to think about the church that goes out to the periphery—not just geographically but to the periphery of human existence. For him the Gospel invites us all to have that sort of sensitivity. That was his contribution. And it brought a sort of freshness to the exercise of pastoral care, a different experience of taking care of God's people."

For those such as Turkson who wanted change, Francis has not disappointed. Within two years he had appointed 39 cardinals, 24 of whom came from outside of Europe. Before delivering a searing speech last December in which he ticked off the "diseases" afflicting the curia (among them, "vainglory," "gossip," and "worldly profit"), the pope tasked nine cardinals—all but two of them outsiders to the curia—with reforming the institution. Calling sexual abuse in the church a "sacrilegious cult," he formed the Pontifical Commission for the Protection of Minors headed by Seán Patrick O'Malley, the archbishop of Boston. To bring transparency to the Vatican's finances, the pope brought in a tough former rugby player, Cardinal George Pell of Sydney, Australia, and named him prefect of the Secretariat for the Economy—a designation that puts Pell on a par with the secretary of state. Amid these appointments, the pope paid a notable act of deference to the old guard: He kept in place Cardinal Gerhard Müller, Benedict's hard-line appointee, as head of the Congregation for the Doctrine of the Faith, which enforces the church's beliefs.

Such moves signify much—but it is hard to say what they will lead to. The early clues have been tantalizing to reformists as well as more traditional Catholics. Even as he accepted the resignation of a U.S. bishop who was the first to be convicted of failing to report suspected child abuse, Francis also appointed as bishop a Chilean priest alleged to have covered up the sexual abuses of another cleric, sparking protests at the bishop's installation ceremony. Additionally, the preliminary Synod on the Family that Francis convened last October produced no sweeping doctrinal changes, which mollified conservative Catholics who had feared exactly that. But the actual synod this October could produce a different outcome. On the issue of lifting the ban on Communion for divorced Catholics whose marriages were not annulled, Scannone, the pope's friend and former professor, says, "He told me, 'I want to listen to everyone.' He's going to wait for the second synod, and he'll listen to everyone, but he's definitely open to a change." Similarly, Saracco, the Pentecostal pastor, discussed with the pope the possibility of removing celibacy as a requirement for priests. "If he can survive the pressures of the church today and the results of the Synod on the Family in October," he says, "I think after that he will be ready to talk about celibacy." When I ask if the pope had told him this or if he was relying on intuition, Saracco smiles slyly and says, "It's more than intuition."

Then again, the pope's words and gestures have become a Rorschach inkblot that his audience can interpret as it wishes. For a man of such simple words and habits, this seems ironic. But it is also not new.

In 2010, Yayo Grassi, a Washington, D.C.–based caterer, fired off an email to his former teacher, the archbishop of Buenos Aires. Grassi, who is gay, had read that his beloved mentor had condemned legislation that would legalize same-sex marriage. "You have been my guide, continuously moving my horizons—you have shaped the most progressive aspects of my worldview," Grassi wrote. "And to hear this from you is so disappointing."

The archbishop responded by email—though no doubt providing a handwritten draft in his tiny script to his secretary, as Pope Francis, then and now, has never been on the Internet, used a computer, or even owned a cell phone. (The Vatican press office prepares the tweets on his nine *@Pontifex* Twitter accounts—which have 20 million followers—and sends them, with the pope's approval.) He began by saying that he

had taken Grassi's words to heart. The Catholic Church's position on the subject of marriage was what it was. Still, it pained Bergoglio to know that he had upset his student. Grassi's former *maestrillo* assured him that the media had badly misconstrued his position. Above all, said the future pope in his reply, in his pastoral work, there was no place for homophobia.

The exchange offers a glimpse into what one should, and should not, expect from his papacy. In the end, Bergoglio did not disavow his stance against gay marriage, which, as he wrote in one of those letters, he views as a threat to "the identity and survival of the family: father, mother, and children." None of the dozens of friends I interviewed believed that Francis would reassess the church's stance on this matter.

What renewed Grassi's reverence for his former teacher is precisely what today rivets throngs in St. Peter's Square and is sure to do so on his September visit to the United States: the blinding whiteness of his papal attire reimagined as an accessible simplicity. It is the porteño's affinity for the street fused with the Jesuit's belief in vigorous engagement with the community—*el encuentro*, the encounter, which involves both seeking out and listening, a decidedly more arduous undertaking than the impersonal laying down of edicts. For it requires the courage of humility. It is what prompted Bergoglio to drop to his knees and ask for the prayers of thousands of evangelical Christians. It is what caused his eyes to flood with tears when he visited a Buenos Aires shantytown where a man declared

Flanked by bodyguards and trailed by aides, the pope strides through St. Peter's Square. In seeking to restore faith in the church's hierarchy, he has installed allies in key positions and made others cardinals, but he faces powerful critics inside the Vatican.

that he knew the archbishop was one of them because he'd seen him riding in the back of the bus. It is what compelled him, as pope, to refuse to have his hand kissed by an Albanian priest who had been imprisoned and tortured by his government—and instead to attempt to kiss the man's hand, and then to weep openly in his arms. And it is what staggered millions two years ago when Pope Francis, in his emblematic rhetorical moment, uttered these simple and astonishing words, coming as a gentle query in response to a question about gay priests: "Who am I to judge?"

This would appear to be the pope's mission: to ignite a revolution inside the Vatican and beyond its walls, without overturning a host of long-held precepts. "He won't change doctrine," insists de la Serna, his Argentine friend. "What he will do is return the church to its true doctrine—the one it has forgotten, the one that puts man back in the center. For too long, the church put sin in the center. By putting the suffering of man, and his relationship with God, back in the center, these harsh attitudes toward homosexuality, divorce, and other things will start to change."

Then again, the man who told his friends that he needed "to start making changes right now" does not have time on his side. His comment this spring that his papacy might last only "four or five years" did not surprise his Argentine friends, who know that he would like to live out his final days back home. But the words were surely a comfort to hard-liners inside the Vatican who will do their best to slow-walk Francis's efforts to reform the church and hope that his successor will be a less worthy adversary.

Still, this revolution, whether or not it succeeds, is unlike any other, if only for the relentless joy with which it is being waged. When the new archbishop of Buenos Aires, Cardinal Mario Poli, commented to Francis during a visit to Vatican City about how remarkable it was to see his once dour friend with an omnipresent smile, the pope considered those words carefully, as he always does.

Then Francis, no doubt smiling, said, "It's very entertaining to be pope." □

ONE MORE THING

DAVE YODER

Photographer **Dave Yoder** *(left) and writer Robert Draper also collaborated on a soon-to-be-published National Geographic book,* Pope Francis and the New Vatican. *To see more of Yoder's images—and to read some of the pope's most revealing quotes—visit* ngm.com/more.

Last Rites for

Lake Turkana sustains the tribes in Kenya's remote north, but projects upstream threaten its lifeblood.

With spear and patience, El Molo tribesmen stalk fish the old way along Turkana's eastern shore.

the Jade Sea?

Algae grow in pools at Lake Turkana's southern edge. The plant's prevalence in the lake led early explorers to dub it the Jade Sea. The surrounding harsh terrain ensured it was the last great African lake mapped by Europeans.

Waving whips, clubs, and traditional stools, Daasanach men, some plumed with ostrich feathers, dance their way into a crowd of potential wives at a pairing-off ceremony in Ileret.

By Neil Shea
Photographs by Randy Olson

On a hot spring morning, Galte Nyemeto stood by the shore of Lake Turkana scanning for crocodiles. The water was shallow, the odds of reptiles low,

but Nyemeto, a traditional healer of the Daasanach tribe, had come with a patient, and it would be very bad luck—spiritually and otherwise—for the ceremony to be interrupted.

Nearly all the larger and more dangerous hippos had been hunted out long ago, but plenty of crocs remained, especially here, below the delta where the Omo River pours from Ethiopia into Kenya. The river crocs, which sometimes follow the current south, are said to be more vicious and cunning than those hatched along the lake edge, though all are considered by the tribe to be evil incarnate, regardless of lineage. It meant Nyemeto was both watching for wildlife and gauging the spiritual trend of the day.

Here and there the brown water stirred from flat repose at the brush of a flamingo's wing or the rise of a fish. From the west came the distant whine of an outboard motor. No crocs, not even a cow or camel. Satisfied, Nyemeto led a young woman named Setiel Guokol into the water and had her sit, told her to wash. Guokol scooped water over her face and splashed it onto her back.

Nyemeto, meanwhile, dug into the rich mud, lifted dripping handfuls, and in quick strokes daubed it down the grim line of Guokol's spine.

"Badab," she said. *"Badab,"* with each coat. Commanding death away by the word and the deed. "The lake is a cleansing place," she said.

Nyemeto is known as a healer of last resort. When all else has failed—the medicines in the clinic, the white man's god in the church, the aid groups in their cement houses—people bring their ailments and fears to her. In return, and for a small fee, she offers hope.

"I am the last stop," she said.

And so to the lakeshore with Guokol. She had been sick for months and had recently worsened, growing weaker each day under the shadow of evil spirits, a condition the Daasanach call *gaatch.* By the time her relatives urged her into Nyemeto's care, there was not much left of Guokol but a whisper of what had gone: strength, beauty, health. She was perhaps 30.

At the water Nyemeto dropped the usual roughness that often had her shouting at children and hurling stones at dogs. With a mother's touch she painted Guokol with mud and rinsed her in the graceless morning heat. When they had finished, Nyemeto helped Guokol to her feet, and they returned shoreward, arm in arm.

"We won't look back," said Nyemeto, her

Few full-blooded El Molo, including this woman, remain. Most have intermarried with other Turkana tribes.

shoulders set. "We have left the spirits behind."

And Guokol, chilled to a shiver, slender as a reed, said, "I believe I will be well."

SELICHO LIES AT THE HEART of one of East Africa's remotest regions. It is about as north as you can go in Kenya, more than 200 miles from the nearest major road, a short walk from the Ethiopian border, where the dry lands roll on, sharp, hot, and loosely governed, for another hundred miles. If you're grasping after hope in this place, it isn't far to Nyemeto's door, and her turn to the lake for healing would not seem unusual. Faith and hope naturally coincide with water here, and for now Turkana offers all in abundance.

It is the world's largest permanent desert lake and has existed in this region for some four million years, expanding and contracting in a volcanic trough along the edge of the Great Rift Valley. Ancient hominins lived along its shores, and early humans hunted, gathered, and fished here as they moved north on their slow migrations out of Africa. Ten thousand years ago the lake was far larger than it is now. Seven thousand years ago the lake was shrinking. Neolithic tribes raised mysterious stone pillars at holy sites above it. And now Nyemeto continues traditions rooted in water that may be very old, though no one can say for sure where they came from or when they were born.

But Turkana, like all desert water, is vulnerable. Most of the lake's freshwater—some 90 percent—comes from the Omo River. Now the Ethiopian government's plans for extensive development along the river, including a massive hydroelectric dam and water-hungry sugarcane plantations, threaten to disrupt the Omo's eons-old flow and starve the lake. In the most dire scenarios, Turkana will over the years slowly shrivel and die, turning the local population into refugees from an African dust bowl.

Nyemeto's people are among those who stand to lose most in the face of Ethiopian ambition, and against it they have little voice. Daasanach territory spreads across the border and was split more than a century ago by surveyors shoring up British interests on one side and

the Ethiopian empire on the other. The division placed most of the Daasanach in Ethiopia; a much smaller group remained in Kenya. The tribe is one of the nation's smallest and weakest ethnic groups.

There are roughly 10,000 Kenyan Daasanach people, but only recently did they gain their first elected representative, who sits at the county level—a world away from the parliament in Nairobi and almost dead last in line for aid. Many southern Kenyans don't consider the lake, or people like Nyemeto and Guokol, to be part of their nation. There are no power lines, no high schools, no regular transport. In Nyemeto's village even the Christian missionaries have abandoned their church. The Daasanach, like their lake, are, for all practical purposes, nearly invisible.

Michael Moroto Lomalinga, chief of the Kenyan Daasanach, has known this thin existence almost since he was born here some 60 years ago. Back then, the British still ruled, and the north was considered so far beyond use and salvation that maps simply labeled it "closed."

"We are not officially counted," said Moroto, who is tall and smooth-faced and goes by just his middle name. "We are listed as 'others' in the census. You can imagine this is a problem."

Moroto lives in Ileret, a village of bleating goats and wind-whipped dust not far from Selicho on the northeastern shore of the lake. Like other tribal chiefs in Kenya, he is a government appointee. He's held his job for almost 20 years, and it's similar to a small-town mayorship. There are many grievances, much bureaucracy, the occasional rumor of corruption. But in April 2014, after a long drought, Moroto was struggling with more dangerous matters—all of them, in one way or another, over water.

To the east the Gabbra people had been pushing cattle into Daasanach territory. To the west the Turkana tribe was bothering Daasanach fishermen on the lake. Both tribes are larger, better connected politically, and better armed with illegal weapons. Turkana fishermen have overfished their own waters and now stray toward Ileret and Selicho, threatening raids, stealing nets, and sometimes killing Daasanach.

In this the Daasanach are not innocent, not without pride or guns. They have fought back violently and have often started trouble themselves. A man in the bush or on the water will always hear his own conscience loudest, no matter what Moroto says. Still, the chief must try to prevent anger from falling into age-old cycles of killing and revenge, which often last generations. There are water and fish enough for all, he keeps saying, even if he doesn't always believe it.

"We Daasanach are a marginalized people," Moroto said. "When we fight, it usually goes worse for us, and the government is not much help. They do not work on peace when there is peace. They only work on peace when there is conflict."

And conflict is coming. For beyond the routine skirmishes of desert tribes loom the dam and the sugar plantations. Elected officials in Nairobi have hardly shrugged at any of it, but Moroto knows what violence a shrinking lake could bring. For him there is dread, and perhaps a certain relief, in knowing he can do almost nothing about it.

ABDUL RAZIK LIT A CIGARETTE and set his bare foot on the small red gas tank. Beside it an enormous fish lay still on the boat's floor, eyes big as golf balls, their light newly gone. The bright green boat, freshly painted, rode high on the opaque water. The green paint, Razik explained, was camouflage—to hide his new investment against pirates from the Turkana tribe.

A May morning, and Razik had just checked his nets—thin, spidery things kept afloat with old Coke bottles. There had been only the one fish. Heading home, Razik pointed north through a maze of tall reeds toward Ethiopia. He had not seen them, but he had heard of the dam and the plantations that threatened to dry up his life.

"If they stop the river and take all the water, and the lake disappears, it's gonna hurt a lot of people," he said. "Thousands of people, tens of thousands. So many depend on this lake."

Testing a Lake's Limits

In this parched swath of Kenya's Great Rift Valley, Lake Turkana remains a vital source of food for 90,000 people. It draws 90 percent of its freshwater and nutrients from the Omo River, but upstream, Ethiopia has built one of Africa's largest dams, the Gilgel Gibe III, which, along with irrigation projects, is expected to limit inflow to the increasingly saline lake.

The Omo and its seasonal floods govern Lake Turkana's ecology and stimulate fish spawning. Two more dams planned downstream of Gibe III will further impact the lake.

Irrigation reservoir began filling spring 2012

Ethiopia is setting aside land along the lower Omo for commercial sugarcane and cotton, thirsty crops that could monopolize river flow.

A diverse mix of tribal groups and ethnicities inhabits the region. The population has quadrupled over the past 40 years, intensifying the competition for scarce resources.

Belowground, the region has oil deposits and aquifers. Aboveground, one of Africa's largest wind farms is under development, despite a challenging environment.

Land irrigated for agriculture

- Cultivated area as of April 2015
- Area allocated for sugar cultivation
- Sugar area overlapping with national park
- Designated for agricultural investment by Ethiopian government

Infrastructure

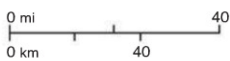
Existing Planned

Dam

Irrigation canal

Tribal group **Aquifer**

HAMAR



NGM STAFF; MEG ROOSEVELT; ANDREW UMENTUM

SOURCES: SEAN AVERY; ETHIOPIAN WILDLIFE CONSERVATION AUTHORITY; ETHNOLOGUE: LANGUAGES OF THE WORLD; HUMAN RIGHTS WATCH; IHS; INTERNATIONAL RIVERS; RADAR TECHNOLOGIES INTERNATIONAL; FRANK BROWN, UNIVERSITY OF UTAH

Herek Gurge Arabo, a Daasanach girl, shows a determined face as her mother prepares her for a pairing-off ceremony, where men make offers for future wives.

Razik is an entrepreneur, one of the few to glimpse possibility in Lake Turkana beyond hand-to-mouth survival. He lives in Selicho and married a Daasanach woman, but he is an Arab Kenyan, originally from the ocean coast. He owns four boats and sometimes brings a truck from Nairobi carrying a shipping container packed with ice. He buys the catches of his neighbors, fills his container over several days with two or three tons of fish, then returns to Nairobi, where he sells the haul.

Before coming to Lake Turkana, Razik had worked for years in a fish-processing plant in Kisumu, a city on the shore of Lake Victoria, far to the south. Victoria is Africa's largest lake, shared by Kenya, Uganda, and Tanzania. It supports a multimillion-dollar fishing industry that supplies hungry regional markets and also annually exports to Europe thousands of tons of Nile perch.

High demand has severely stressed Lake Victoria's ecology, and the industry's success has brought many boomtown problems—lakeside slums, drugs, crime, poor wages and working conditions. Eventually Razik had had enough and left. "Besides," he said, "the fishing was getting worse. The perch were disappearing."

Razik considered his options. Lake Turkana had no industrial fishing operations, none of the boomtown by-products. Living would be rougher, perhaps dangerous. But competition would be low, and the lake did have Nile perch—just like the beast that lay in a heap of scale and muscle at the bottom of his boat.

Six years he has lived among the Daasanach. His business has grown profitable, and he's come to love the tribe. It's not always easy to be a Muslim in Kenya, but the Daasanach have never cared about his religion; his wife has even converted. Beyond that, Razik said, people in Selicho are peaceful and do not overfish. He plans to stay, to raise children in the small two-room house where he sometimes repairs motorbikes in the kitchen. As long as there are peace and perch and ice for his shipping containers, a man can be happy. He can see possibilities. Until he looks north.

Armed with a homemade slingshot and mud balls, a girl guards her family's sorghum crop near the lake from hungry birds. The grain is a staple for the Daasanach, who rely on seasonal flooding of the Omo River and its fertile riverbanks for agriculture.

SOME 450 MILES up the Omo River, in Ethiopia, the hydroelectric dam called Gilgel Gibe III was completed in January. Much nearer Lake Turkana, enormous bulldozers crawl over the dry lands near the riverbanks, scraping the way for sugarcane and cotton. Soon the effects of this work will ripple down into Kenya, with potentially devastating consequences for the 90,000 tribal people who depend on the lake.

"The Omo River is the umbilical cord for Lake Turkana. That's the best way to think of the relationship," said Sean Avery, an engineering hydrologist who's spent years studying and exploring the Omo-Turkana watershed. "If you cut that cord, the lake will die."

Avery lives in Kenya and has analyzed Ethiopia's plans for the river for the African Development Bank and other clients. In 2013 the African

Few Daasanach remain—they're now one of Kenya's smallest, weakest ethnic groups.

Studies Centre at the University of Oxford published a booklet collecting Avery's work and summarizing his research on development along the Omo. His findings left him deeply depressed.

"When you take water out of the river and use it in irrigation in a climate like that, some of it will percolate back into the watershed," he said. "But most of it will disappear."

Avery and other experts say the danger begins with the dam, which is Africa's largest, an 800-foot wall of concrete. Dams inevitably harm ecosystems below them. Gibe III will cause intense, drought-like stress to the Omo and the lake during its first three years of operation, when up to 70 percent of the river's flow will pass through a reservoir.

Once the reservoir is full, the lake will slowly normalize—but then the sugar plantations come into play. Sugarcane is notoriously thirsty, and its cultivation in the dry lands of Ethiopia's lower Omo Valley would be impossible without the dam to regulate the river. Tens of thousands of acres have been officially marked off for cane and cotton in southern Ethiopia, and according to Avery, tens of thousands more are slated for future plantations. Already planting has begun, and all of the growth will be fed from a single tap: the Omo.

Suffering an unknown malady, Setiel Guokol was slathered in mud by a Daasanach healer, who said evil spirits had caused her illness and the lake was her last hope for a cure.

Nearly all of the larger hippos had been hunted out, but plenty of crocs remained.

It's difficult to know exactly how or when these threats will unfold. The dam has been delayed many times since construction began in 2006, but the reservoir started filling in January. And though plantation development has already begun, the scale of agricultural transformation is not nearly as big as it could be.

Avery and others point to the slow-motion disaster of the Aral Sea for a vision of what may come. The Aral was once the fourth largest inland body of water on Earth, gleaming between Kazakhstan and Uzbekistan. Beginning in the Soviet era, the two rivers that fed the lake were slowly siphoned off for cotton cultivation. By 2007 the Aral was nearly dead, its once rich basin a wasteland of dust, its surface scattered with rusted fishing boats and flats of corrosive salt.

An equally apocalyptic ending could befall Lake Turkana, destroying the livelihood of thousands of fishing people, turning them into desperate refugees. In the worst case, Avery said, the sugar and cotton plantations keep growing, and over many years the river diminishes, causing the lake to drop by 60 feet or more. Eventually, only two small lakes could remain. One of them would likely sit near Daasanach territory. The other would lie farther south, isolated, saline, and shallow.

A curious croc inspects a remote camera near South Island. Lake Turkana holds the world's largest crocodile colony. In the 1960s biologists estimated it had 14,000 Nile crocs alone, but little research on their numbers has been done since.

The Ethiopian government has regularly brushed off criticism of its overall plans along the Omo. Several scientists interviewed for this story said almost no information about potential impacts has been made public. What is available, Avery pointed out, shows the Ethiopians have ignored Lake Turkana. "Their studies all stop at the border," Avery said. "Why would they do that? It's impossible to argue that it's going to have no impact on the lake."

Still, actions reflect intent, and perhaps most troubling for now is the government's ongoing campaign of "village-ization" in the Omo Valley, where tribes of nomads and herders have been gathered into permanent villages. Government officials describe the campaign as voluntary, but Omo residents and several human rights groups claim traditional peoples are being forced into villages to clear the way for cane and cotton. Adding to a cloud of suspicion, the Ethiopian government routinely refuses to allow journalists and other investigators to visit the area.

In 2009 when photographer Randy Olson and I visited Gibe III, then under construction, while working on a story about the Omo, an Ethiopian official told me, "It is our destiny to develop this land. It is our duty to make the river work."

His people too had seen hope glimmering in the water.

"The Ethiopians have been pursuing development at all costs," Avery said. "In a way, you can't blame them. Any number of nations have done this sort of thing with their natural resources. But it will be very destructive."

IN KENYA POLITICIANS remain mostly silent on Ethiopia's plans, despite the troubling predictions and clamor of grassroots groups. Chief Moroto said there had been anger and small protests all along the lakeshore, even as far north as his village. But nothing had come of them. Officials I interviewed around Lake Turkana often refused to comment, saying they feared the political consequences. The truth seemed plain, though. It appeared now and then in a private complaint, an unhappy shrug, or a plea for help. Sometimes in a blunt statement.

One evening in Ileret I was talking with a policeman about security. Islamic militants from Somalia had been staging attacks across the border to the northeast. I asked if he felt safe in this part of Kenya. The policeman, a southerner, spat out a wad of khat and raised a finger. "My friend," he said, "look around you. This is not Kenya. No, no, no."

Later the old healer, Nyemeto, bounced the sentiment back. "Where is Kenya?" she asked. "I've never been there."

ON THE SAND FLATS outside Selicho, Abdul Razik found himself laboring somewhere in between these views. "This area means nothing to people in the south," he said. "They don't know about life here, and they don't care what happens to these people."

Children play atop a truckload of dried fish in the village of Selicho. The valuable fish, an important source of protein, are sold as far away as the Democratic Republic of the Congo.

A man sells mirrors in the Kakuma Refugee Camp. A hundred miles from Lake Turkana, the UN camp holds 180,000 refugees who fled conflicts in Sudan, Somalia, and other nations.

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He stood in the shade of a massive ice truck. Meltwater fell from its bed in a sparkling stream, and small children danced beneath it, naked but for a string or two of beads.

The truck belonged to Razik's friend, who was hoping to fill the hold with Nile perch. Fishermen were bringing up their catches, and some spoke hopefully of following Razik's example, making more money in one trip than their families and neighbors had ever seen. It was a dream beyond most of them.

While we talked, Daasanach fishermen gathered around beneath the sun's brutal glare, angry and questioning. They had bits of news and rumor, but they understood little of Ethiopia's plans or Kenya's silence. Razik had traveled, he spoke several languages, he knew more, and the others bellowed their concern to him.

Some asked where they would go if the lake dried up. Others said no one could ever shut off a river so grand as the Omo. A few swore to fight any man who tried. Razik translated and pondered and argued until he'd lost his calm and began stabbing the air with his cigarette and spilling hot tea on his belly.

But no fury lasts long in such heat. Nearby, men began cutting into a large perch; there was a great rip as the scales tore away. Soon hunger replaced anger, and Razik wandered over to the carcass. He knelt and slipped a hand inside, lifted out a long, slick organ. "Do you know what this is?" he asked. "I don't know the name in English, but it's very valuable. The Chinese pay a lot for it."

The swim bladder is sometimes used in traditional medicines. Razik said he could ship it to Uganda and other places where Chinese communities were growing. One more possibility on the horizon.

Students clean dorms at a government school outside Komote. Many children living around the lake now attend primary school, but the region's lack of development means few opportunities beyond herding and fishing await them.

ON THE LAST MORNING of Setiel Guokol's treatment, the wind was up, the sun blinding. Normally, Nyemeto said, they would slaughter a ram. She would lift the carcass while Guokol walked beneath its dripping blood, one more cleansing rite. But Guokol had no husband to tend sheep, and her family was too poor to buy one. So Nyemeto boiled a thin brew of water and coffee bean husks, saying it would do.

Guokol had tried other remedies. She had crossed bush and riverbed to reach the clinic

ONE MORE THING

RANDY OLSON

"I hope development doesn't hurt the people in this cradle of mankind, but I'm afraid it will," says photographer **Randy Olson.** *Find more of his Lake Turkana and Omo River coverage on Instagram:* @randyolson.

STEPHEN ALVAREZ

While writing this story, **Neil Shea** *visited Kenya's Kakuma Refugee Camp. He was so struck by the people there that he's since returned to make a film. He posts about it on Instagram:* @neilshea13.

No one could shut off a river so grand as the Omo. A few swore to fight any man who tried.

in Ileret. She was given a shot, a bottle of pills, sent home. No cure came. The Western name for her condition remained a mystery, at least to her.

She sat on an old black goatskin outside her hut, a red band of beads tight around her biceps, where the muscle had vanished. Neighbors gathered to watch. In Daasanach tradition—the tradition of many tribes here—a sick person would, if she did not recover, be carried away to a solitary camp beyond the village. This so death, if it came, would not haunt the living.

Nyemeto brought a large gourd and ladled handfuls of weak coffee onto her patient's skin. She pressed fingers into Guokol's shoulders, head, and legs, and paid special attention to her feet. "Take your evil!" she said, throwing her hands skyward. "Take your evil!"

The ceremony was brief. Guokol wobbled to her feet and wrapped herself in a red blanket, though the morning burned. "I am not afraid," she said. "This is our way." Bean husks fell from her hair.

She died that June. I heard she was buried not far from the lake. It was the season of floods along the Omo, and the brown water, rich in sediment and oxygen, would soon spill down into Kenya. Good water for perch, good fishing for men. The flamingos rising like flares in the sky. □

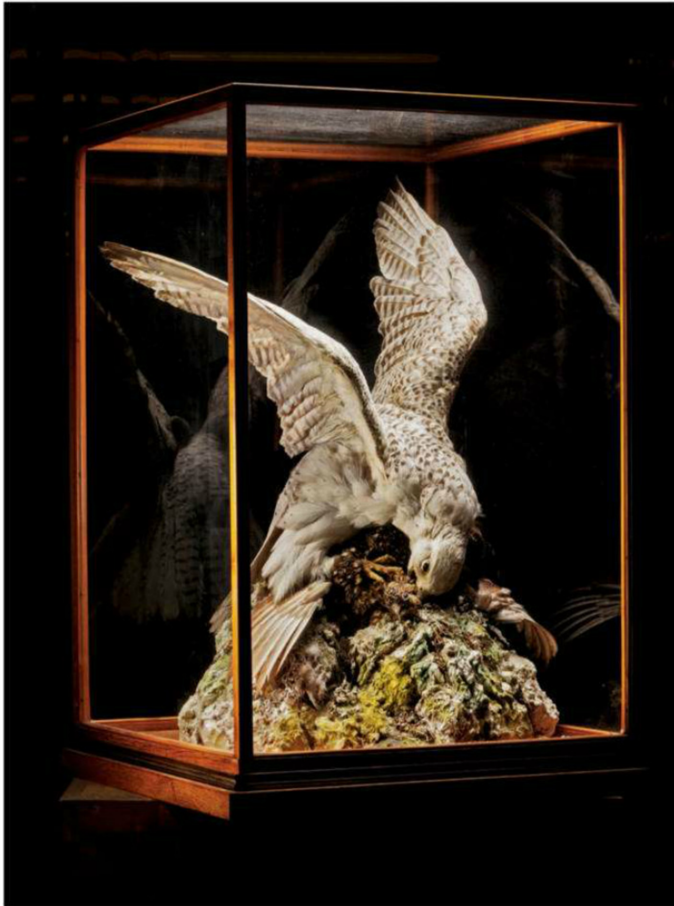
The Kenyan government supplies tents for dancers attending the Kalacha Cultural Festival, created to bring performers from Turkana tribes together as a way to help ease tensions.

Still Life

In the taxidermist's hands, even extinct animals can look alive. But preservation is one thing, and conservation's another.

At New York City's American Museum of Natural History (AMNH), taxidermist George Dante touches up a brown bear in a diorama that lets visitors see animals up close and in re-creations of natural habitat.

At the AMNH's Akeley Hall of African Mammals, "The Alarm," a work from the early 1900s, shows African elephants on alert as a bull extends his trunk to sample the air. One of the animals was collected by President Theodore Roosevelt.
COMPOSITE IMAGE



Taxidermy affords a close-range, still-life chance to appreciate creatures we might never encounter in the wild. We see them absent the bars of a zoo, arranged as they might be in nature.

Taxidermy's artistry increased in the 1800s, as shown in British naturalist John Hancock's falcon (overleaf) and the Noah's ark of mounts at Deyrolle, a Parisian gallery and science institute founded in 1831.

GREAT NORTH MUSEUM: HANCOCK, NEWCASTLE UPON TYNE, ENGLAND (OVERLEAF)

By Bryan Christy
Photographs by Robert Clark

In the cavernous convention center in St. Charles, Missouri, I make my way past a zebra tossing a lioness 15 feet into the air and a life-size great white shark chasing a baby seal. The animal world's great predators—lions, cougars, leopards, wolves—line the exhibit aisles along with a Cape buffalo, a blackbuck antelope, and a rattlesnake. As visitors arrive for the World Taxidermy Championships, they pass a giraffe whose neck and head have been mounted as if it were about to take a drink. The animal's body is gone; inside the neck is a little tableau of three miniature giraffes leisurely munching tiny treetops.

Not every feat of taxidermy qualifies as art. But as the art of taxidermy has endured and evolved, it has given form to a paradox in wildlife conservation: that men and women passionate enough to kill have sometimes been passionate enough to protect.

An adolescent taxidermy student named Theodore Roosevelt grew up to be an avid big game hunter. He also co-founded a game preservation society that laid the groundwork for U.S. wildlife conservation today. For years I've investigated international wildlife crime, exposing its carnage in articles, documentaries, and a book, but it was my time as a boy taxidermist that helped set me on that path.

Since the 1800s, when hunters took their trophy kills to upholsterers to be stuffed, taxidermy has played an important role in conservation. Done well, it affords a close-range, still-life chance to appreciate creatures we might never encounter in the wild. We see them absent the bars of a zoo, arranged as they might be in nature—and there is "something elemental about that experience," says Timothy Bovard, the taxidermist at the Natural History Museum of Los Angeles County.

Which is why, after years of writing about criminally exploited wildlife, I have come to this global gathering of champion taxidermists eager for a respite—only to hear a woman shouting at Wendy Christensen, "That's illegal!"

The incensed visitor is pointing at a mounted

A master taxidermist's work can arouse emotions as well as educate. E. A. (Billy) Hankins III cradles a baby western lowland gorilla he preserved after it died of natural causes at a California zoo.

FROM THE COLLECTION OF THE WORLD MUSEUM OF NATURAL HISTORY, LA SIERRA UNIVERSITY, CALIFORNIA

Strike a Pose

Taxidermists take precise measurements of their specimen before work begins, in order to craft a perfectly proportioned mannequin. Traditionally, wood shavings or hemp fiber helped shape an animal. Modern materials such as urethane foams now also do the trick.

Skinning
Skin is gently teased and peeled away from the flesh. The body and anything that can rot is meticulously removed.

Preserving the hide
Materials like borax, salt, and various tanning agents are applied to clean, disinfect, and preserve the skin.

lowland gorilla as taxidermist Christensen teases a few hairs around the huge primate's fingers. "I was in Rwanda," the woman shouts, "and I know gorillas are protected!"

Christensen is an imposing woman whose blond hair—it's impossible not to notice—is swept back a bit like her gorilla's. Facing her accuser, she calmly explains that for three decades, Samson the gorilla was the star attraction at the Milwaukee County Zoo. The visitor apologizes, then gapes at what Christensen says next: This animal, a vessel for Samson's story, contains no speck of real gorilla.

IN THE LATE 1800S Americans' Manifest Destiny was consuming America's boundless wildlife at a great rate. Professional market hunters killed game on an industrial scale to supply the fur, restaurant, millinery, and other trades. As if extinction were impossible, Americans killed millions of bison for profit and sport, so that by the end of the 19th century only a few hundred remained.

Passenger pigeons once were the most populous bird in America. In 1878 hunters for the restaurant trade descended on a large flock of the birds outside Petoskey, Michigan, and killed some 1 billion birds in a few weeks. By 1914 America's last passenger pigeon was dead (and mounted by a Smithsonian taxidermist).

The list of butchered species goes on, much the way the list of African and Asian species under siege grows today.

Teddy Roosevelt was both naturalist and sportsman, as were the dozen friends he called together in late 1887. The men founded the Boone and Crockett Club (named after Roosevelt's boyhood heroes) with intertwined goals: to promote federal wildlife conservation efforts and ensure themselves a huntable animal supply. The club established the New York Zoological Society, which would evolve into the Wildlife Conservation Society. John Muir modeled his Sierra Club on his friend Roosevelt's organization. Among the latter's influential members was William T. Hornaday, whose titles included director of the Bronx Zoo—and chief taxidermist for the Smithsonian.

I TOOK UP taxidermy at age 12. Like many World Taxidermy Championship competitors and the event's director, Larry Blomquist, I got my start by enrolling in the Northwestern School of Taxidermy, an Omaha, Nebraska-based correspondence school that offers easy-to-follow courses. (Lesson One: Read this entire book. Lesson Two: Get a common pigeon. Lesson Three: Acquire tools—scalpel, bone scraper, brain spoon, arsenic...)

The father of modern taxidermy, as anyone who picked up a scalpel and a squirrel soon learned, was Carl Akeley. A New York–born

Creating the mannequin
Bodies are shaped from materials such as urethane foam, papier-mâché, and clay. Every angle is finely tuned.

Mounting the skin
The word “taxidermy” comes from *taxis* (Greek for “arranges”) and derma, or skin, which is mounted and glued into place.

Setting the scene
Staging on a platform or in a diorama is designed to mimic natural habitat so the animal looks as it might have in life.

naturalist and explorer, he single-handedly elevated taxidermy from a smelly form of upholstering—skin the animal, boil its bones, wire the frame back together, stuff the framed skin sack with rags and straw—to an art form.

He sculpted animal bodies into natural positions using clay and papier-mâché to render with unprecedented anatomical exactness a specimen's muscles and veins before reapplying its skin. He then grouped his lifelike pieces in dioramas designed to re-create habitat, down to casting the individual leaves on the ground where an animal had been found.

Akeley introduced more than fresh mortuary techniques. He invented a narrative framework for us to consider dead animals, one that continues to this day. “The key to taxidermy is telling the whole story,” says Jordan Hackl, a 22-year-old novice competing at the championships. It's not about stuffing a deer, he explains. It's about telling the deer's story. Was it winter? Then you better have a buck with the right hair length. Was he in rut? Is there a doe? Then you better have the nostrils flared.

Akeley's impact can be seen everywhere that an animal is eternally still. Some of his best known creations remain on display at the Field Museum in Chicago and the American Museum of Natural History (AMNH) in New York City.

In the center of AMNH's Akeley Hall of African Mammals stands “The Alarm,” his tableau of a herd of eight elephants. A century old and still vibrant, it's considered by many to be the world's finest example of taxidermy.

Another work in the hall, though, may be Akeley's most important. It's a mountain gorilla diorama whose figures were killed by his team in the Belgian Congo in 1921. That trip changed Akeley's life: Looking down on his dead silverback, he later commented, “it took all one's scientific ardour to keep from feeling like a murderer.”

Upon his return from Africa, Akeley lobbied Belgium's King Albert I to create a sanctuary for mountain gorillas. The Parc National Albert, established in 1925, was Africa's first national park and today is called Virunga National Park. For his efforts, Akeley is recognized as a forefather of gorilla conservation.

In Akeley's view taxidermy was a valuable scientific service, a way of preserving what he feared might go extinct. He wrote of that concern in this magazine's August 1912 edition, in an article describing his hunt for the elephants used in “The Alarm.” Lamenting that the best bull he'd collected had tusks weighing only about a hundred pounds each, Akeley noted that elephants with 200-pound tusks weren't uncommon. He hoped to collect one to preserve for future generations, he wrote, predicting that soon “the remaining monster specimens will be killed for their ivory.” *(Continued on page 104)*

Game that oilman Kerry Krottinger hunted surrounds him and his wife, Libby, in their Dallas home. Kerry contends that his spending on trophy hunts helps sway African nations to conserve animals that draw visitors. U.S. policy may also encourage conservation: When Zimbabwe didn't provide adequate data on its elephant management, U.S. officials extended a ban on elephant trophies from the nation.

At a Las Vegas rodeo competition, Kylie Boyd has her photo taken with the mounted versions of Trigger the horse and Bullet the dog, once costars of the late cowboy movie star Roy Rogers.

MISS TEEN TEXAS
INTERNATIONAL 2013
PLEASE
DO NOT
TOUCH
RFD-TV

Veterinarian Sami Khader poses in a diorama at the zoo he heads in Qalqilyah, in the Palestinian territories. A self-taught taxidermist, Khader says that when zoo animals died during conflict in the area, "I didn't want to lose them." So he preserved them to exhibit.

راس ضبع
القط البري
الكركال
الأسد الأفريقي
African Lion
حمار الوحش
mmon Zebra

Today it is a rare sight to see an elephant with tusks weighing even a hundred pounds.

GEORGE DANTE opens his freezer and lifts out Lonesome George, the last Pinta Island Galápagos tortoise, which died in 2012. One of the world's most highly regarded taxidermists, Dante has been hired to preserve the famous animal.

Placing the frozen tortoise on a table, Dante says he's worried that Lonesome George is too well known to do him justice in preserved form. It's one thing to prepare a mount to represent a species, he says, and quite another if the creature has an individual, recognizable look. That's why "I won't do pets," he says. "People know their pets' faces too well, and you can't capture that."

Despite the tortoise's time in cold storage, "Lonesome George looks in good shape," says Dante, with a sigh of relief.

Samson the gorilla was another story.

A 652-pound, overfed lowland gorilla from Cameroon, Samson was famous for slamming his fists against his Plexiglas window at the Milwaukee County Zoo, delighting terrified visitors. One day in 1981, in front of his fans, Samson fell over and grabbed at his chest. Zoo vets could not resuscitate him; an autopsy revealed that he'd had five previous heart attacks.

Samson's corpse was in the zoo's freezer for years. When the Milwaukee Public Museum finally took possession, officials found the gorilla's skin too damaged to mount. The museum tried putting Samson's skeleton on display, but his bones were a weak evocation of the colorful ape. Samson wasn't just dead, he was silenced.

That troubled museum staff member Wendy Christensen, who had taken up taxidermy when she was 12. (Yes, through the Northwestern School of Taxidermy.) Christensen proposed resurrecting Samson through the taxidermy

ONE MORE THING

BRENT STIRTON

Writer **Bryan Christy** *is director of special investigations for* National Geographic *magazine and was named National Geographic Explorer of the Year in 2014. "I grew up in love with the animals of the Galápagos Islands—the marine iguanas, the frigate birds, and especially the tortoises," he says. "To be present the day Lonesome George was unpacked in New Jersey and brought back to life for the world to see and study, for generations to come, was the completion of a circle."*

Taxidermy often preserves animals in natural poses, such as the snow leopard that Canadian naturalist Ken Walker mounted and stores in a guest room, and the foxhound, Bertie, preserved by British artist Emily Mayer.

variant called a re-creation—an artificial rendering of an animal that does not use the original animal or even its species. In 2006, 25 years after Samson's death, she began fashioning the ape's synthetic doppelgänger from scratch.

Christensen molded a silicone face using Samson's plaster death mask and thousands of photographs. She ordered a replica gorilla skeleton from a vendor called Bone Clones and a mix of yak and artificial hair from National Fiber Technology, the company that supplied fur for Chewbacca, of the *Star Wars* movies. For Samson's hands she took molds of gorilla hands from the Philadelphia Zoo and reproduced them in silicone, right down to the fingerprints. Next, she rimmed his synthetic eyes with false eyelashes bought at Walmart.

Then Christensen put herself on display. She spent a year at a raised workstation in full view of museumgoers, implanting hairs in Samson's silicone face and neck, while children asked questions and parents shared fond memories of seeing the gorilla when they were young.

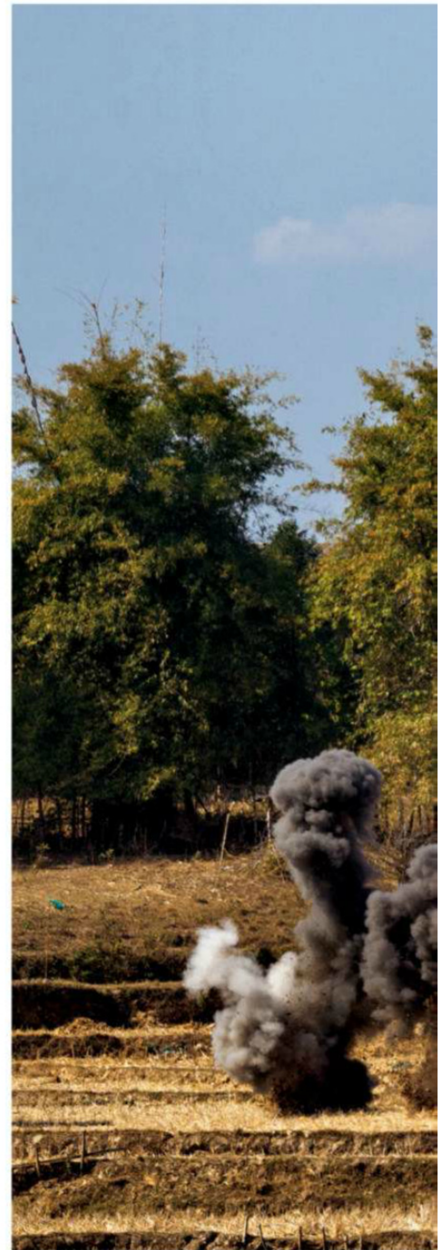
Among taxidermists, opinions are mixed on the use of synthetic versus actual animal materials. Bovard says that when he chats with visitors to his museum's animal exhibits, they often ask him "which of our animals are real and which are not, and they do react differently to the two." In an era when media and technology serve up versions of reality 24/7, Bovard says, there is still something powerful about the genuine article.

But that is only one perception. A judge at the World Taxidermy Championships wondered privately if the art form had gone too far. In the hunt for trophy-quality animals, he said, "we take the best genes out of the gene pool" to the detriment of the species.

When Christensen brought Samson to the championships, she was competing not only against other re-creations but also against the world's best real-animal taxidermy. She won the top prize in the re-creations category. She also won the Judges' Choice, Best of Show prize, beating out world masters who'd brought their finest—and real—wildlife effigies.

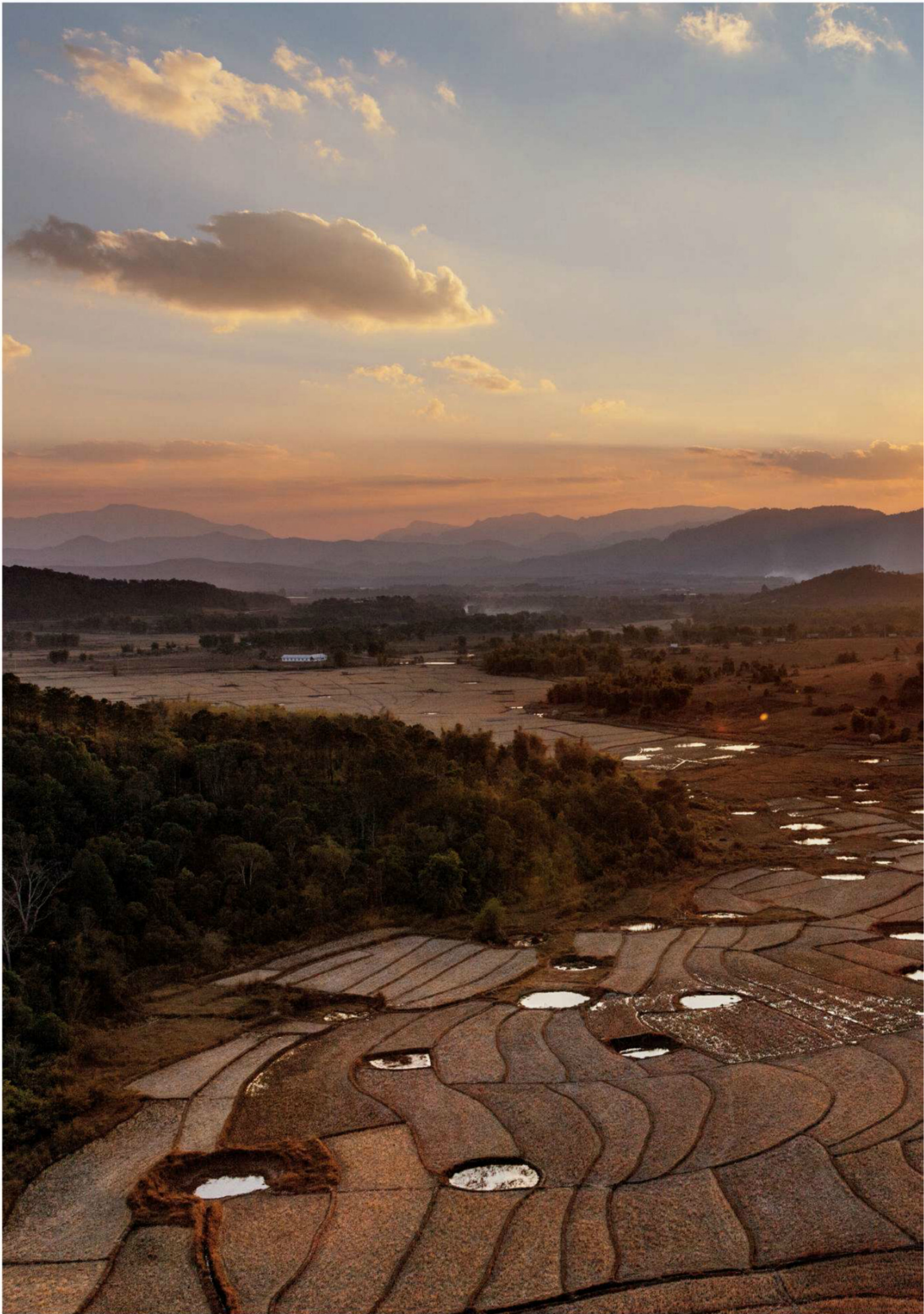
And she did it without harming a single gorilla hair. ☐

The U.S. dropped more than 2 million tons of bombs on Laos from 1964 to 1973 during the Vietnam War. That's equal to a planeload every 8 minutes for 9 years. How does a country recover?



These munitions—some of the unexploded ordnance from the war—were destroyed in 2012 to make a field safe.

Life After the Bombs



Craters from U.S. air strikes, often used as fishponds or for irrigating crops, pock rice fields in Xiang-khouang Province. Years of bombing didn't oust communist forces in Laos.

Bomb casings serve as stilts for a chicken coop in Xiangkhouang Province. They're also valued as scrap metal, but their pursuit can be risky. In 2012 live ordnance killed 15 Laotians and injured 41.

By T. D. Allman
Photographs by Stephen Wilkes

For days up there on the Plain of Jars I'd been trying to capture an image, find a metaphor, crystallize an idea

that could convey what it means for Laos to have been one of the most heavily bombed nations in history and then to have gone on and somehow found a future. Finally, right there on a busy main street of Phonsavan, the provincial capital, I found it: a giant pile of bomb casings left over from the American bombing campaign in Laos, a stupendous and futile torrent of airborne destruction. And just beyond the junk heap of weaponry, a new ATM machine. Bright blue and gleaming white, this beckoning pagoda of money dwarfed the rusting debris of a half-forgotten war. After inspecting the bomb casings, I walked over to the ATM, stuck in my debit card, and pulled out one million kip, about $120. All those 50,000-kip notes spewing out of the machine told a new story about Laos, where an age of bombs has given way to an age of money.

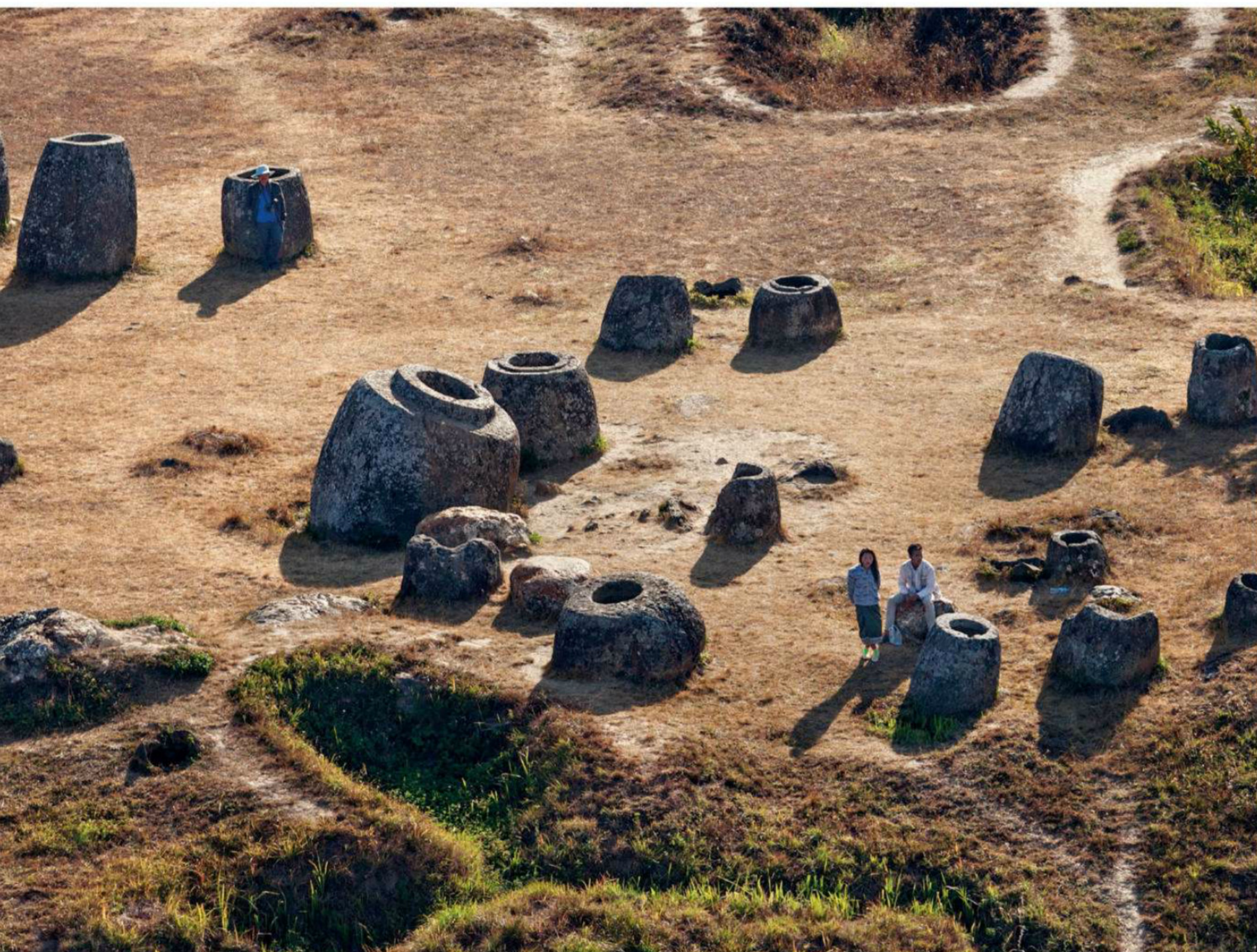
Once, here in Xiangkhouang Province, children grew up barely seeing the sun. People spent years hiding in caves and tunnels. Now Phonsavan is so busy it has traffic lights with digital displays showing how many seconds pedestrians have to cross the street—not that you need cross the street to find a bank, a restaurant, a market full of fresh fruit and vegetables, a shop selling running shoes. Along with the fabled megalithic urns on the Plain of Jars, whose purpose still mystifies archaeologists, the debris of the American air war that lasted from 1964 to 1973 has become part of a public relations campaign to attract tourists: That heap of bomb casings is displayed in front of the local tourism office.

Only a few places on the Plain of Jars have been cleared of unexploded ordnance and are safe for visitors. Some archaeologists suggest that the giant 2,000-year-old jars held burial remains.

With its undulating hills and grassy flatlands, the Plain of Jars in some places resembles a giant golf course. The sand traps here were made by falling bombs, millions of which exploded. Millions more did not, creating a permanent danger, especially to those entrepreneurial Laotians who make money salvaging valuable metal from unexploded bombs.

"Welcome to Mr. Phet Napia Making the Spoon and Bracelet," announces the ad on Phet Napia's house in the village of Ban Naphia. In his backyard foundry Phet melts aluminum from ammunition shells and locally collected metals. He then pours it into a mold to create bomb-shaped key rings as well as eating utensils. Local restaurants all seem to have forks, spoons, and chopsticks made of war-era scrap metal.

The fruits of Phet's industry are on show: a new house, a satellite TV, electric lights. Like many Laotians, Phet is an artisan with a flair for entrepreneurship, but he's still trying to get his mind around the idea that in a market economy the costs don't stop when you pay for something.



"You get 60 channels on it," he said as we admired his satellite dish, "but you must pay for the electricity." His mobile phone helps attract new business, "but even after you purchase it, you must pay to talk into it also."

LAOS, WITH A POPULATION of fewer than seven million, now has almost five million mobile phones. At Ban Pak-Ou, a northern village on the Mekong River, fishermen stand motionless in their pirogues silhouetted in the amber light, the water around them glimmering like burnished bronze. It's like peering back through the centuries, except that each man is chatting into his cell phone as he fishes.

Vientiane, the capital, once was a scruffy town. Now it's a scruffy city with 12-story buildings. Once silence prevailed, punctuated by the sounds of falling rain, babies crying, people laughing, monks chanting. Today everything happens in a soupy buzz of air conditioners clattering, generators buzzing, motorbikes whining, horns blaring.

The country's economy is growing by nearly 8 percent a year. The flag of the Lao People's Revolutionary Party, with its Soviet-style hammer and sickle, still flies alongside the national flag, but the government's leaders, whose role was once to enable the Vietnamese to pursue their Marxist-Leninist war of national unification, now play a different part: as enablers in the creation of a Southeast Asian free-market zone. Laos aims to graduate from the ranks of the least developed countries on the UN's list by 2020.

In Laos the rich are getting richer, and even in the remotest areas, among the humblest people, I encountered an access to possibilities of the outside world previously unimaginable. Near the Vietnamese border in central Laos, I saw a young man heading home on his motorbike with a satellite dish cupped under his arm. In mountain villages I saw flocks of schoolchildren in their white-and-blue uniforms. I also saw refurbished places of worship wherever I went—Buddhist temples, to be sure, but also many animist shrines and a few Christian churches.

You still see monks in their saffron robes everywhere, only now they carry computer bags.

The Mekong still flows past Vientiane broad as history, but the riverfront has been transformed. Once a series of mud banks and sandpits, it's now an inviting esplanade almost two miles long, complete with exercise machines and jogging paths—and parking spaces for all those family sedans and SUVs. Every evening brings a throng: the lovers, the jugglers, the laughing children, the break-dancers. Musicians perform, and exercise gurus offer classes, as the immense disk of the setting tropical sun turns itself into a blurry horizontal streak, and the hubbub is illuminated by the neon tubes on the vendors' pushcarts and the shifting beams of motorcycle headlamps.

Like most things in Laos, this riverside park in Vientiane tells a deeper story. A triumph of humanist city planning—which has refocused life on the river, the open space, and the sky—the esplanade is actually a massive levee protecting the city from flooding. Who built it is also revealing: It was funded largely by a loan from South Korea. The countries of Asia now provide more useful assistance than the Occidental powers ever did.

During all the time France and the United States predominated in Laos, neither country built a bridge across the Mekong. Today six great bridges span the river. One is at Thakhek, where the transit distance across Laos between the growing economies of Thailand and Vietnam is shortest, only 90 miles. In Thakhek I could see Thailand through my hotel room window while watching *Vietnam Idol* on TV.

One morning in Vientiane I found a motorcycle club had filled the lobby of my hotel. "We're on a joyride from Malaysia," one biker politely explained—a 2,600-mile round trip. Another morning, this time in Louangphabang, I awoke to find the street outside crammed with newly arrived cars. Every one had a Chinese license plate. While those affluent bikers from Kuala Lumpur were heading north, affluent Chinese from Kunming were heading south, taking a Laotian vacation too. Just as the domino theory had predicted, Laos was being invaded, though by Peugeots and Harleys, not communist tanks and armored personnel carriers.

This new era of peaceful interconnectedness has a human face everywhere you go. Its contours are also visible from the air. Flying over the Mekong from Savannakhet, you see another of those bridges conveying people and products into and out of Laos. Just upstream from it you also see skyscraper-high pylons carrying the electricity Laos exports across the river. Once when I flew out of Louangphabang, bomb craters caught my eye. Now there are other gouges—sand traps at the new golf course South Koreans have built.

DECADES AGO when I stood on the riverbank in Vientiane, I pondered a question I knew I'd never be able to answer. How could seemingly rational people—Americans like me—imagine they could win the war in Vietnam by subjecting Laos to such indiscriminate destruction? When I wrote that a secret war was being fought in Laos, it made headlines around the world. In truth the U.S. military intervention in Laos, which began in the 1950s and lasted until 1974, never had been secret. All you had to do was ask any Laotian what was happening in the country. Every lady selling lotus blossoms in the morning market, every rickshaw boy offering you every imaginable enticement, knew all about not just the Ho Chi Minh Trail but the secret CIA army and the secret U.S. bombing of civilian populations. They also knew about the secret U.S. involvement in the opium trade.

In 1968, the year of the Tet Offensive in neighboring Vietnam, I took a group taxi from the Mekong lowlands to the Bolovens Plateau. When the driver refused to go farther, I walked on. U.S. fighter bombers screeched overhead. On the horizon, along the tree line, I saw scurrying figures in camouflage. It was the only time during the war that I actually saw North Vietnamese troops—or U.S. warplanes dropping bombs. I was 23, yearning to uncover the truth.

At Pakxong, a former French outpost for coffee growers, I wandered into an abandoned bar that could have been lifted from a Foreign

A Reign of Bombs

The Vietnam War spilled into Laos with terrible force. To break enemy supply lines and maintain control of the strategic Plain of Jars—endeavors that eventually failed—the U.S. and its allies flew hundreds of thousands of bombing sorties over Laos. Between 1964 and 1973 some two million tons of ordnance were dropped on Laos—up to 2,000 pounds for every Laotian man, woman, and child.

PLAIN OF JARS
The U.S. concentrated bombing on the highland plateau during its "secret war" against North Vietnamese and Laotian communists.

HO CHI MINH TRAIL
North Vietnam's supply line to South Vietnam threaded through the rugged Laotian border.

CHINA
MYANMAR (BURMA)
VIETNAM
THAILAND
CAMBODIA
LAOS
NORTH VIETNAM (former)
SOUTH VIETNAM (former)
Gulf of Tonkin
Hanoi
Hue
Red
Ou
Mekong
Ban Pak-Ou
Ban Na Oune
Louangphabang (Luang Prabang)
Plain of Jars
Phonsavan
Ban Naphia
XIANGKHOUANG
Vangviang
Phou Bia 9,246 ft 2,818 m
Nam Ngum Reservoir
Vientiane
KHAMMOUAN
Thakhek
Savannakhet
HO CHI MINH TRAIL
Cease-fire line, July 22, 1954
Bolovens Plateau
Pakxong
Tonle Sap
100°E
105°
20°
15°N

Bombing sites, 1966-1973*
Bridge on Mekong
0 mi 50
0 km 50
PRESENT-DAY PLACE-NAMES SHOWN

*BOMBING DATA INCOMPLETE BEFORE JANUARY 1, 1966

JEROME N. COOKSON, NGM STAFF; TANYA BUCKINGHAM
SOURCES: AIR FORCE RESEARCH INSTITUTE; JENNS ROBERTSON

War didn't touch Buddha Park, a sculpture garden of concrete Buddhist and Hindu figures near Vientiane. Tourism revenue helps boost the country's growing economy.

Legion movie. A mural showed French planters taking their ease in the company of comely Laotian women. It was dark, and the only sign of life came from a small house next to the old French church. Inside the house I met a one-legged French priest drinking whiskey, his wooden leg propped up against a table. He filled a glass for me. He was reading a French translation of *The Green Berets,* a fictional tale of American derring-do in the jungle. "Is this what the Vietnam War is like?" he asked.

For decades I'd wanted to see Pakxong again. I knew the priest would no longer be there, but I hadn't expected that old Pakxong would be gone too. Following my 1968 foray, B-52s had carpet bombed it twice. Only the charred corner of one building remained. In its ruins I could make out faint initials: EDL. It had been the local office of the Laotian electric company.

Pakxong had been obliterated, so why did returning there fill me with a kind of joy? It was the people—seemingly so peppy and happy—busily making a better life. Like Laos itself, Pakxong had been transformed from a battlefield into a marketplace. Where the French cantonment had been was now a sprawling market—chaotic, muddy, littered with plastic and organic refuse, but displaying anything you could want to sell or buy. What fascinated me most was the iron buffalo.

Imagine you're a Laotian peasant entrepreneur and you want everything you've seen on TV, but all you can afford is one thing. The iron buffalo is for you. Unlike a water buffalo, the iron buffalo can pump water as well as pull a plow, and it can light your house. It's basically a multipurpose, portable internal combustion engine you can use to power almost anything. Connect it to your pump: You can grow dry-season crops. Connect it to your plow: You can quadruple the land you cultivate.

Connect your iron buffalo to your cart, and a two-day walk to and from the nearest big market center becomes a morning's expedition. That's how I met Lan Keopanya. He had bolted a Volvo steering wheel to his iron buffalo, which he'd attached to his rubber-tired cart. He was cranking up his homemade pickup truck when we started talking. His village, he said, was 12 miles from the Pakxong market. "The journey costs four liters of diesel, but it's worth it." By getting there so much faster and more often, he could sell the coffee, fruit, and vegetables he grew at the best price. That day Lan was there buying plastic roofing for his new house. All his six children were or would be going to school, he told me proudly. A new road already reached his village. "We expect electricity within two years," he said, as he began moving, hurrying to get that roofing up before the rains began.

The U.S. spent $13.3 million a day conducting the air war over Laos. In 2014 it spent $12 million clearing unexploded ordnance from the war.

In parting, I asked what he wanted next. "We need our land to be cleared of bombs," he said. "If it weren't for the bombs, I could multiply my production."

During the bombing the mountain minorities of Laos suffered horribly. In the end it no longer mattered what side you took. The bombs didn't distinguish between communists and anticommunists any more than they distinguished between soldiers and children. As the bombing accelerated, women used their expertise in embroidery and quilting to depict the catastrophe that fell out of the sky on them. With their images of bleeding children, burning crops, and terrified animals, their wall-size works of art are Laotian equivalents of Pablo Picasso's "Guernica."

Keay Tcha, who told me she was 58, has lived for more than 17 years in Ban Na Oune, a Hmong refugee resettlement located near

Louangphabang. She unfurled one of her peacetime masterpieces for me. It depicted an unlost paradise where sparkling waters ran, luxuriant plants flourished, and a Noah's ark of exotic animals cavorted under a benign, multihued sun. In her hands a scrap of polka-dot cotton became a giraffe. A blue rag became a flowing stream. When I asked to see more, she told me she no longer worked on that scale. "The tourists don't want big tapestries," she said. "They want inexpensive embroidery they can take home in their hand baggage. So now I make many small things I can sell for a lower price." She passed no value judgment on this latest transformation. She was surviving the peace as she'd survived the war, by recognizing what was necessary and doing it.

ONE THING NEVER CHANGES in Laos: the heat of the journey. My quest for a cold drink brought me to Khenchan Khamsao's convenience shop, on the north-south road to Louangphabang. A glass-doored, refrigerated drink dispenser beckoned, but it was her forest green trash container that got us talking. With its shapely pedestal (to keep away vermin), capacious bin, and secure lid, Khenchan's trash container was graceful as well as utilitarian. "They make them from worn-out truck tires," she explained. Like Phet Napia's spoons and bracelets, the bin was an example of the Laotian genius for turning castoffs into useful objects.

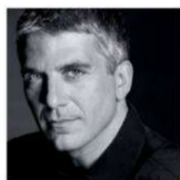
Her own life had been fashioned out of wreckage. She had come from a devastated section of Khammouan Province in central Laos, where many places remain so littered with unexploded ordnance (UXO) that it's impossible to farm there. Because their land was unusable, she and her husband migrated to this wide spot in the road; 12 years later they epitomized the Laotian success story. Their shop occupied the ground floor of their new house. Her husband earned money as a construction worker on an irrigation project at Vangviang, 65 miles to the north. Their three children were studying in government schools—the young ones locally, the eldest in Vientiane.

Khenchan and her family had lived the bombs, and now they were living the money. Money, they'd discovered, brought danger too. When I remarked that in the capital her son would get a better education, she replied, "No, that wasn't why we sent him away. I sent him to Vientiane to get him away from the drug dealers." A war on drugs started in 1989 with U.S. funding to eradicate opium. In 2006 Laos declared itself opium free, but as the economy boomed, an appetite for methamphetamines and other designer drugs took hold. The country is a major regional transit center for methamphetamines, heroin, and opium, which is again on the rise. As in America, rural areas have been especially hard hit.

IN LAOS WHEN THE TEMPERATURE goes below about 70 degrees, people start pulling on their coats and hats and lighting fires, which ignites the season of death. One New Year's Eve three friends in Xiangkhouang Province went camping. It got cold that night, so they started a fire. One was killed right away when the bomb under their campsite exploded. Another was terribly maimed. I visited Yer Herr, the third victim, at his village home. The 18-year-old pulled off his shirt to show me 19 wounds on his back.

In Yer's village people had electricity, satellite TV, mobile phones. Each mother, wife, sister, and child, it seemed, also had a husband, a brother, or a little girl who had been maimed or killed

ONE MORE THING


GREG GORMAN

Stephen Wilkes *is an award-winning fine art and commercial photographer whose work has appeared in the* New York Times Magazine, Vanity Fair, *and* Time. *This is his first feature story for* National Geographic.

▶ What did you want to convey about Laos through your images? These people have an extraordinary ability to forgive and persevere. I hope this piece opens American eyes to the tragedies of the war and that, as a nation, we begin accepting our responsibility to do more.

by American bombs long after the end of the war. At the local high school, algebra was being taught on a blackboard. I couldn't decipher the equations: Laotian teenagers in this remote village were learning mathematics more advanced than I'd been taught at their age in America. Back home, I showed a photo of that blackboard to a mathematician. "It analyzes the velocity of falling objects, like bombs," he told me.

Falling bombs still show up in dreams as well. "I live it inside me," a world-renowned embroidery artist named Tiao Nithakhong Somsanith explained as I admired his use of gold thread to embroider Laotian silk with images of bombers. Tiao Nithakhong is helping revive the traditional arts in his country: classical dance, flower arrangement, costume design, orchestral music, and all kinds of weaving.

Examining his exquisite work in a Louangphabang art gallery, I saw what I'd also seen in villagers' handicrafts. Whether the material is bamboo or plastic, silk or synthetic fiber, weaving is the art at which the Laotian people most excel. Masters at turning every kind of material into something useful and beautiful, they weave palm fronds into baskets, bamboo into fish weirs. They weave silk and gold thread into beautiful women's skirts called *sin.* On a bookshelf in my apartment in New York City, I keep a soccer ball woven from rattan, so perfect Buckminster Fuller might have invented it. I call it a soccer ball, but it's the kind of ball in a game called *kataw* that Laotian youths play, using only their feet to cooperatively keep the ball in the air.

Nearly everyone has a smartphone in Laos, where a third of the people are younger than 15. Laotian ingenuity and drive have put the country on track to be off the UN's list of least developed countries by 2020.

IN TOTAL THE U.S. dropped more than 270 million cluster bomblets, or "bombies," on Laos—more than one for every man, woman, and child in America at the time—as well as four million big bombs. The total weight of the bombs dropped was many times greater than the weight of the people living in Laos, which at the time had a population of perhaps two million. It worked out to as much as a ton of bombs per person.

Periodically during the war Washington announced a "bombing halt," but the munitions conveyor belt stretching from the stockpiles in the U.S. 8,000 miles across the Pacific could not be switched on and off. Bombs that did not fall on Vietnam were redirected to Laos. It was the world's first supply-driven war—the pent-up munitions constantly generating a demand for their use. This mass production of airborne death had no quality control: Possibly 80 million of the bombies didn't explode on impact and are still considered live. Up to 10 percent of all the big bombs also failed to explode.

Laotians are a forgiving people, but as long as Laos remains riddled with explosives, nobody can forget, because forgetting can kill you. No matter how beautiful the scenery on the Plain of Jars, don't forget and climb that nearby hill for a better view. The bombs there could maim you, if they don't kill you. No matter how many times you've warned your kids, don't forget and let them pick up those toylike capsules. Those little round bombies might disfigure or kill them.

When the U.K.-based Mines Advisory Group

held one of its classes about the dangers of UXO, schoolchildren listened as blast victims described their wounds—the psychological as well as the physical ones. Afterward the children were asked what they would say if they happened to meet some of the people who dropped the bombs. One little boy raised his hand. "I would tell him they should pay us money."

The U.S. Congress appropriated $12 million in 2014 for UXO removal. The new U.S. Embassy in Laos cost $145 million. This differential reflects U.S. priorities: a justifiable commitment to enhanced security for diplomats but also a near-total disregard for America's historic responsibilities in Laos, where nearly every unexploded bomb was made in America and put there by Americans.

The Laotian spirit has never been conquered—not by foreigners, not by the country's own rulers. In the future the Laotian people will continue transforming whatever befalls them into works of art that are of practical, everyday use, because it is their great gift to perceive utility and beauty where others see only destruction and waste. During the air war Laotian craftsmen fashioned sleek motorized canoes from the discarded fuel pods of B-52 bombers—craft so distinctive that the Imperial War Museum in London acquired one for its collection.

In our consumer age of fast food and nonbiodegradable refuse, I saw a Pringles can turned into a votive candle holder in the temple behind the Lane Xang Hotel in Vientiane. With the passage of time the temple has become bonded to the great, multirooted shade tree next to it. In addition to fast-food containers, this shrine incorporates stones plucked from the Mekong and auspicious tree roots into a unified, and poignant, expression of piety.

Near the Louangphabang airport I encountered another example of how life in Laos perpetually finds a way to flourish. Vines twine around the dead wires of the antennas the CIA once used to transmit its secrets. This gift for life in no way undoes the harm done—and still being done. □

Portraits of Katrina

On August 29, 2005, Hurricane Katrina slammed into the United States Gulf Coast and became one of the most devastating storms in the country's history. Failed levees in New Orleans, along with poor preparation and a slow governmental response, would have repercussions for years to come. The city became a focus of human tragedy and triumph that riveted the world.

To mark Katrina's ten-year anniversary, we selected photographs that tell a story of resilience—from views of destruction made soon after the storm to present-day portraits showing the vitality of the Mardi Gras Indian and second-line parades. The photographers who made these images show us loss, renewal, and survival. They remind us that New Orleans, iconic as ever, is still thriving in a precarious landscape. *—Jessie Wender*

Robert Polidori

September 2005

Two weeks after the levees collapsed, New Orleans was deserted. While photographing each dwelling, I could imagine its residents. The pictures I took show traces of interrupted and discarded lives. Most of the people didn't die but became refugees in their own country and from their own lives. They had to move on, either living someplace else or perhaps later coming back, but the life they used to live, surrounded by their objects of personal value, was gone forever.

Frank Relle
December 2005

After Katrina I would go out driving in New Orleans, where I was raised. In the complete darkness of a city without electricity, I found locations by using my headlights. Many of the street signs had been washed out, and I often became lost in my own city—a place made surreal by the hurricane and the mass exodus it had caused. Though I've searched many times for this grocery store, I haven't been able to find it again, and so this photograph has become emblematic for me of the disorientation and displacement I felt after the storm.

Will Steacy
Photograph found May 2006

The first trip I made to New Orleans was six weeks after the flood. Nothing could prepare me for what it felt like to be there: the smell, the mud, the stale air, the heat, the mold, the pain, the sheer magnitude of it all. Everyone's possessions were strewn about the streets. I kept seeing flood-damaged family photographs among all the debris. The faces in these pictures, peering up at me, stopped me in my tracks every time. Here was the evidence of people's lives before the storm. I began photographing these altered snapshots as a way to tell the story of the people who weren't there.

Mario Tama
September 2, 2005

I flew to New Orleans two days before the storm made landfall. The National Guard arrived in force on September 2 with aid from the outside and a convoy of trucks to distribute food, water, and supplies to those still at the convention center. This was the day the tide started to shift psychologically, as proper relief appeared. People had been stranded in the city for four or five days, many stuck in the Superdome or the convention center. The stench and heat were overwhelming and unforgettable.

GETTY IMAGES

Charles Fréger
April 2014

Last year I made a series of portraits of Mardi Gras Indians from the different "tribes" in New Orleans. They are African Americans who, during Mardi Gras, wear heavily feathered costumes that reference traditional Native American dress. The organized groups are called tribes, and the members each have roles, including that of chief. I was interested in the history of this ritual, which some people believe stems from stories of Native Americans who sheltered escaped slaves. Many of the Mardi Gras Indians I photographed lived through Katrina. I tried to capture the resiliency of their mythology, their energy, and the intensity of their spirit.

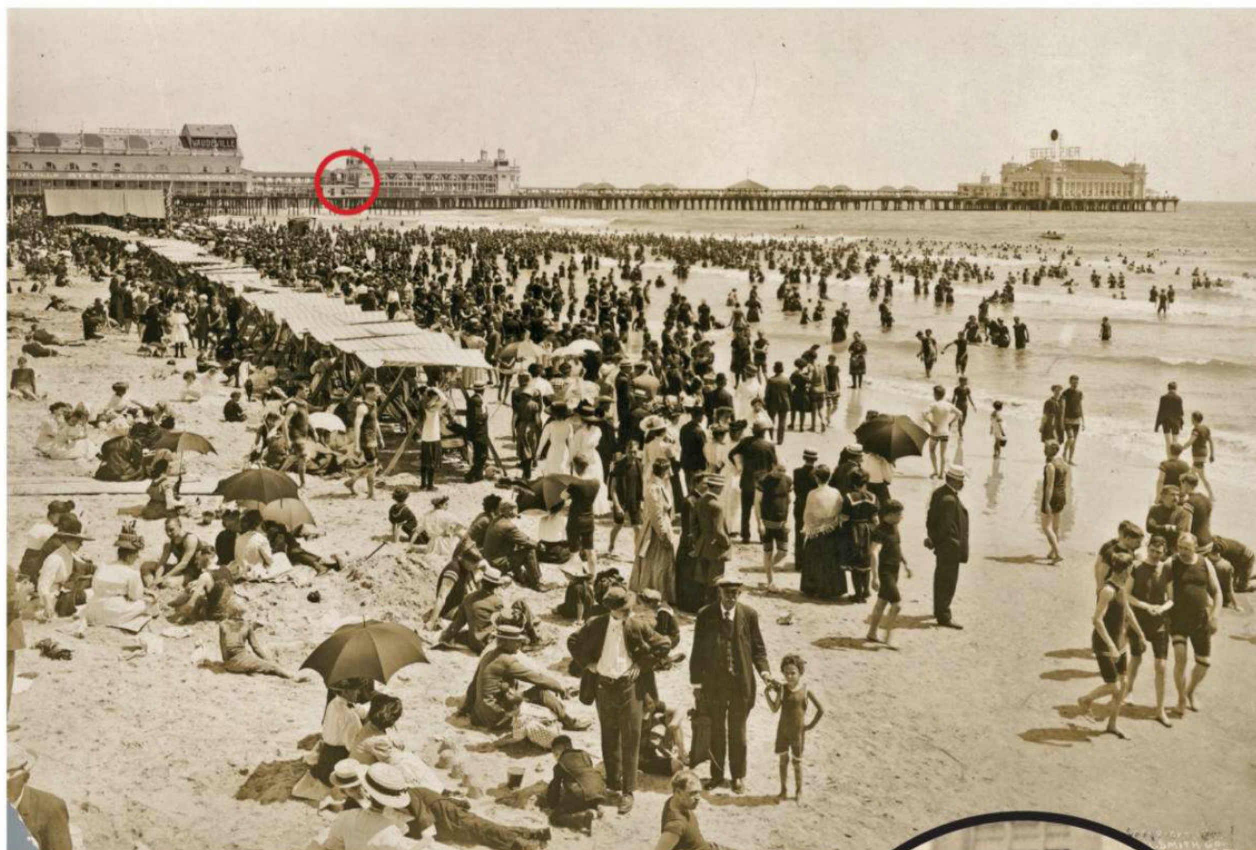
Tyrone Turner
December 2014

Photography has allowed me to understand New Orleans in a way I never did growing up there. Here, a bus takes participants from the Lower Ninth Ward to the start of the Big Nine Social Aid and Pleasure Club second-line parade. "Second line" refers to the dancers who follow the first line of musicians in a jazz parade. Social-aid and pleasure clubs have origins in the 19th-century African-American benevolent societies that helped pay health and burial costs for members. Post-Katrina, second-line parades served as places where dispersed people could reconnect, pass on information, and enjoy pride in their community again.

Stephen Wilkes
May 2014

Almost nine years after Katrina, I made this image. My goal was to show how the architecture was being adapted for rising seas. The change from 2006 was dramatic: resilience and restoration in some areas, abandonment in others. The colorful new buildings were designed to withstand the next hundred-year storm. This project has made clear to me that we have decisions to make—and some will be easier than others.

PANORAMA COMPOSED OF SIX IMAGES



Pier Review

Even in 1909 visitors to Atlantic City, New Jersey, had more than sand and sea to keep them busy. A look through the loupe reveals that the Steeplechase Pier amusement center offered lasting mementos. A sign there reads “Have Your Foto in a Bathingsuit.”

The word “swimsuit” hadn’t yet come into use. Few women knew how to swim. Female beachgoers (in long wool or cotton dresses) simply waded out into the waves to “bathe”—often holding hands with others for stability—going as far as they could walk. —*Margaret G. Zackowitz*

PHOTO: H. SMITH COMPANY/NATIONAL GEOGRAPHIC CREATIVE

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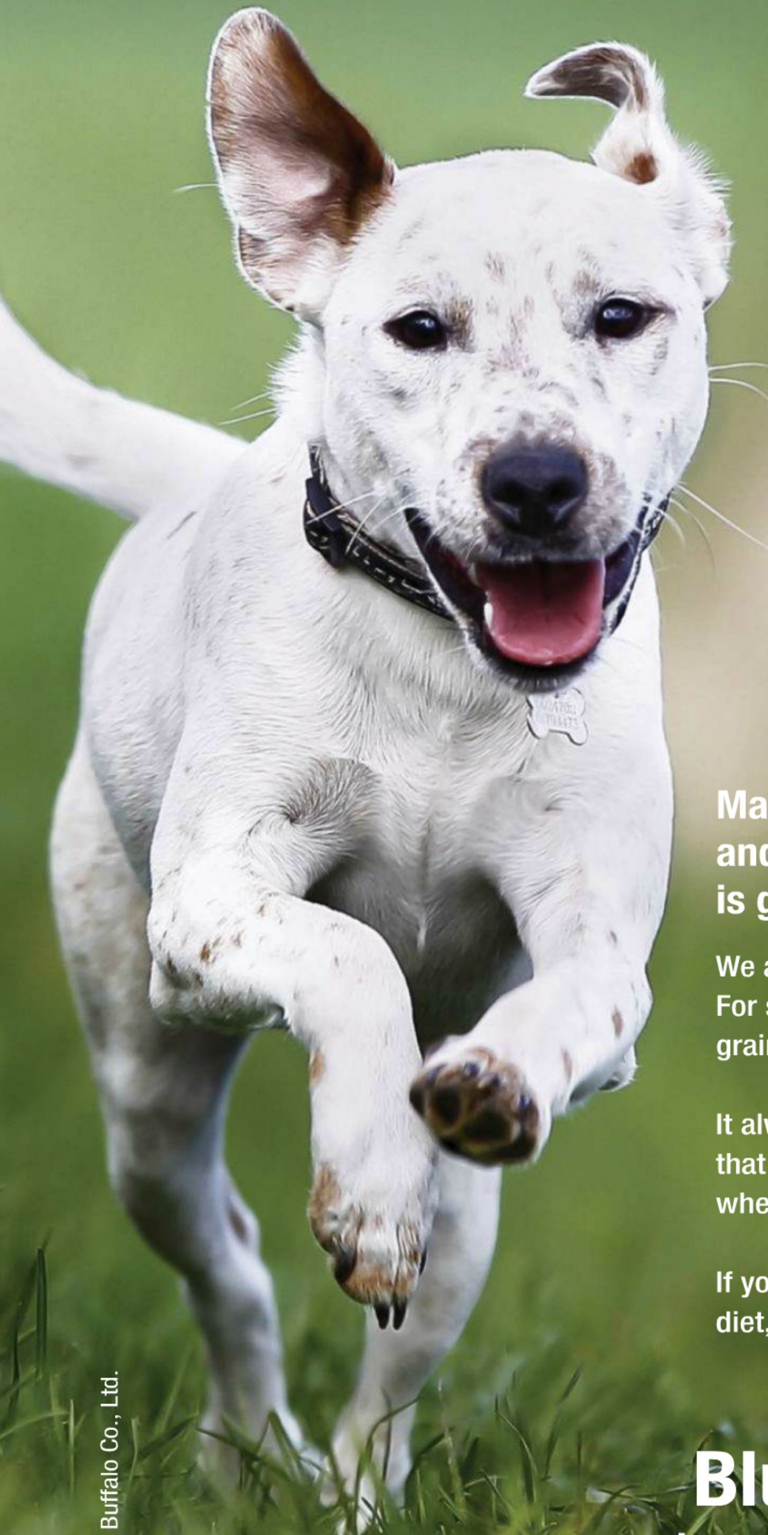

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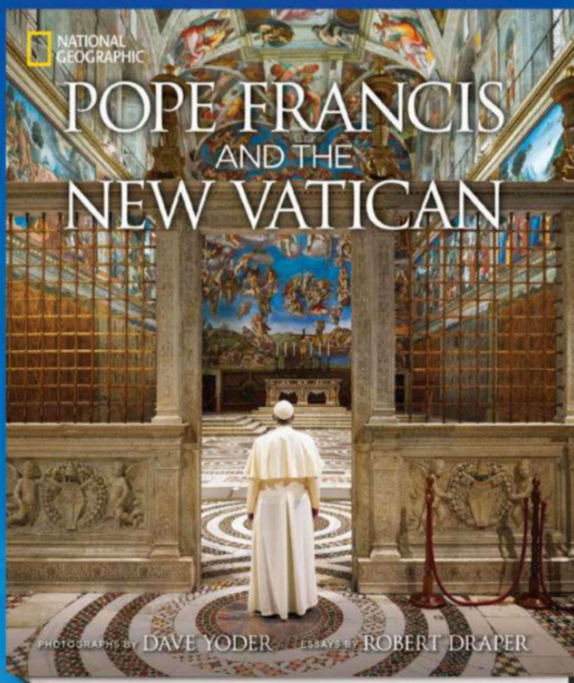

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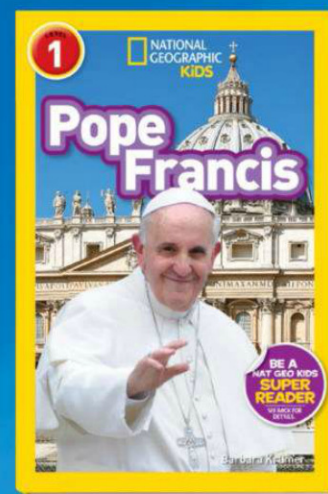

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