CELEBRATING 125 YEARS OF EXPLORATION

White-winged Guan *(Penelope albipennis)*
Size: Head and body length, approx. 50 cm (19.7 inches); tail, approx. 35 cm (13.8 inches)
Weight: Approx. 1.6 kg (3.5 lbs) **Habitat:** Dry wooded slopes and ravines on the west slope of the Andes in Peru **Surviving number:** Estimated at 200

Photographed by Roland Seitre

WILDLIFE AS CANON SEES IT

Now hear this. Announcing his claim to a territory, the male white-winged guan calls with a distinctive "jar jar jar" sound, gradually increasing in speed and ending in a quick "ha ha ha." Monogamous couples share the duty of tending the nest, and young are able to venture out soon after hatching to forage for leaves, buds, fruits, flowers and seeds. Even so, their parents continue to help feed and care for them until they are a year old. But it is not the young alone that need help to survive; once feared extinct and still critically endangered, the species is threatened by habitat loss and the persistence of opportunistic poaching.

As we see it, we can help make the world a better place. Raising awareness of endangered species is just one of the ways we at Canon are taking action—for the good of the planet we call home. Visit **canon.com/environment** to learn more.

Canon

VOL. 223 • NO. 6

NATIONAL GEOGRAPHIC

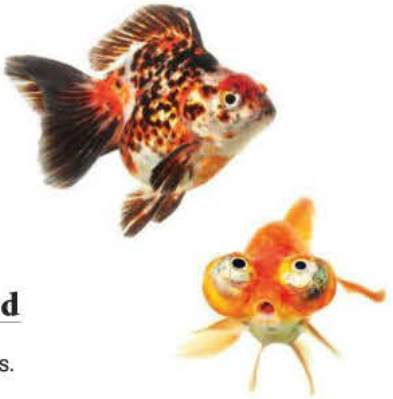
When I arrived at the apex, it was so crowded I couldn't find a place to stand.
page 98

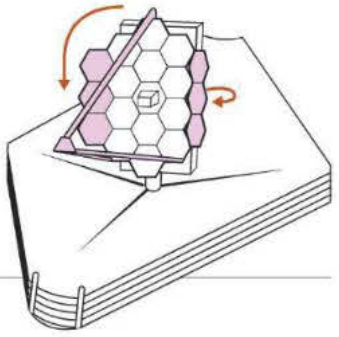
Aboriginals have returned to ancestral homelands and connected with nature. These teens take time to admire the sunset.
AMY TOENSING

June 2013

OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

June 2013

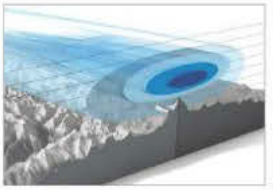




DIGITAL EDITIONS

National Geographic is available on the iPad, the Kindle Fire, and the iPhone.

Risk Takers
Video
Watch Felix Baumgartner and other explorers.



Weather on Everest
Animated Graphic
See how mountaineers find the best time to climb.

Norse Farewell
Video
A mother talks about her teen's leaving home.

On the Cover Film director and National Geographic Explorer-in-Residence James Cameron, photographed in a sound studio at Manhattan Beach, California, on December 6, 2012. See page 143 to learn more about the cover.
Photo illustration by Marco Grob. Digital retouching by Suesstrunk & Jericke

Subscriptions For subscriptions, gift memberships, or changes of address, contact Customer Service at ngmservice.com or call 1-800-NGS-LINE (647-5463). Outside the U.S. and Canada please call +1-813-979-6845.

PHOTO (TOP): MARCO GROB
GRAPHIC: BRYAN CHRISTIE DESIGN

PRINTED ON
100% PEFC-CERTIFIED PAPER
Please recycle.

We create chemistry that makes compost love plastic.

Most plastics don't biodegrade, but ecovio® plastics from BASF biodegrade completely when composted in a controlled environment*. Using compostable bags for collection of organic waste makes disposal more hygienic and convenient. Rather than ending up in landfills, the ecovio® bagged organic waste can be turned into valuable compost where programs exist. When the plastic bag you use today can mean a cleaner future for the environment, it's because at BASF, we create chemistry.

www.wecreatechemistry.com

BASF
The Chemical Company

*ECOVIO® POLYMERS ARE CERTIFIED GLOBALLY BY THE BPI ACCORDING TO ASTM D6400, DIN CERTCO ACCORDING TO EN 13432, THE JBPA ACCORDING TO GREENPLA AND THE ABAM ACCORDING TO AS4736-2006 SPECIFICATIONS.

The Trieste (above) descent took 4 hours and 48 minutes, nearly twice the time it took for the DEEPSEA CHALLENGER to reach bottom.

The DEEPSEA CHALLENGER tested engineering and technology innovations, including a vertical attitude, a special foam developed for extra buoyancy, and an ultrasmall stereoscopic camera designed to withstand pressure at the bottom of the ocean.

PHOTO: MARK THIESSEN/NATIONAL GEOGRAPHIC; ©ROLEX (INSET); ©ROLEX/JEAN-DANIEL MEYER (OPPOSITE)

NATIONAL GEOGRAPHIC

CELEBRATING 125 YEARS

EXPLORING THE DEEPEST PLACE ON EARTH

As the National Geographic Society celebrates 125 years, Rolex salutes the visionary explorers who push the boundaries of human achievement. Two dives to Challenger Deep—the deepest part of the ocean floor, in the Mariana Trench—took place more than 50 years apart. These path-breaking expeditions have one tool in common: a Rolex watch, engineered to withstand the colossal pressures in the deepest depths. Swiss oceanographer and National Geographic contributor Jacques Piccard and the then U.S. Navy Lieutenant Don Walsh in 1960, followed by National Geographic Explorer-in-Residence and filmmaker James Cameron in 2012, made historic dives that contributed invaluable knowledge of our underwater world. They also provided the ultimate proving ground for Rolex deep-sea technology.

THE TRIESTE
A PIONEERING VOYAGE TO THE DEEP

On January 23, 1960 in the Pacific Ocean, the bathyscaphe *Trieste* crewed by Jacques Piccard and Don Walsh made the first dive to Challenger Deep. The Deep Sea Special, an experimental Rolex Oyster watch attached to the exterior of the submersible, accompanied the *Trieste* to a record depth of 35,800 feet and made history in its own right. Successfully resisting the immense water pressure, the watch returned to the surface in perfect working order. The dive was a landmark in Rolex's privileged relationship with the underwater world. It's a history that dates back to 1926 and the invention of the Oyster, the world's first ever waterproof wristwatch.

DEEPSEA CHALLENGER
TECHNOLOGY TO ADVANCE SCIENCE

On March 26, 2012, an experimental Rolex Deepsea Challenge was attached to the robotic manipulator arm of James Cameron's high-tech submersible, the *DEEPSEA CHALLENGER*, and descended to Challenger Deep during an expedition in partnership with the National Geographic Society and Rolex. While James Cameron made key observations for scientific research, the watch remained at the bottom for approximately three hours of an unprecedented solo dive that lasted six hours and 40 minutes. It also returned to the surface in perfect condition, working just as precisely as when it had earned its chronometer certificate.

THE ROLEX DEEPSEA
TIMEKEEPING UNDER PRESSURE

Only Rolex has made watches capable of diving to the deepest point in the ocean. The Oyster Perpetual Rolex Deepsea Challenge is an experimental divers' watch rated waterproof to a depth of 39,370 feet, entirely designed and manufactured by Rolex to withstand the most extreme depths known to mankind.

Specially made to accompany James Cameron on his expedition, it is an enhanced version of the commercial Rolex Deepsea divers' watch, and uses the same Ringlock System case architecture, patented by Rolex.

Rolex congratulates the National Geographic Society on its 125th anniversary.

ROLEX

Coming Home

To an Aboriginal Australian, homeland is not just where you are born. It is where you will die and be buried. It is the center of gravity, heart and soul, beginning and end. To be in control of homeland is to be in control of one's life. But European settlement took control away. Aboriginal history is a litany of dispossession. Still, the relationship with the land endured. Aboriginals are spiritual survivors.

Aboriginals are spiritual survivors.

So how does an outsider enter a world apart? For Amy Toensing, who photographed "First Australians," the answer often lay in sitting and waiting. She learned to value the moments between pictures. Planning was useless in a world where clocks are irrelevant. What did matter was relationships—getting to know someone who had a cousin who had a friend willing to help. Like a tree that branches out and flowers, connections and relationships combined to allow Amy access to Aboriginal communities in Arnhem Land. She witnessed the burial of the remains of three Aboriginals taken during a 1948 scientific expedition and repatriated to their homeland by the Smithsonian Institution. Photographing remains is forbidden. But the elders wanted a record of a rite not performed in 35 years. They asked her to document the burial of the ancestral bones; at their request, the pictures will never be published. "I was giving back," Amy says. "Someday maybe it will help other communities to perform the ceremony and carry on the tradition."

Paintings on an Aboriginal log coffin represent the identity of the deceased.

PHOTO: AMY TOENSING

INTRO ANNUAL FEE OF $0 THE FIRST YEAR, THEN $95

Unseen Libya

Muammar Qaddafi was a monster beyond description, and the world can rejoice at his passing. What he did to Libya is beyond comprehension. I had the opportunity to work in Libya when Qaddafi was in power, and it was without question a reign of terror. Hopefully, as your article suggests, the people of Libya can look forward to rebuilding their country now that this tyrant is dead. They have such a rich history, and your story about their vast wealth and resources doesn't even scratch the surface. The rest of the world and I wish the Libyan people Godspeed for their future.

JOHN M. MASSEY
Dodge, Texas

You've opened the world's eyes to the rich culture and archaeological gems that have been hidden for the past 40 years.

MARY ZIVANOV
Palm Beach Gardens, Florida

The enlightening article would have been even more interesting to readers in the United States if the author had mentioned the source of a quotation on a poster sold by Mustafa Gargoum in one of Benghazi's old souks, shown on page 59. The complete quote is: "Those who would give up essential Liberty, to purchase a little temporary Safety, deserve neither Liberty nor Safety." The author was Benjamin Franklin in 1759.

BRUCE E. JOHANSEN
Omaha, Nebraska

From 1957 to 1964 I worked periodically on seismograph crews in the Cyrenaican Sahara. The operations were usually run out of Tripoli. Often during my break periods I would visit the ancient ruins. I went to Sabratah, Leptis Magna, Cyrene, and Apollonia. Since Leptis Magna is near Tripoli, I visited there more than any of the other ruins. I've got plenty of pictures of what was there. In your pictures Sabratah and Cyrene look today much as they did during my visits there 40-plus years ago, but most of the restoration of Leptis Magna had to have been accomplished during the reign of Muammar Qaddafi. Your article has demonized the man who at the least allowed that restoration to take place.

GEORGE BAXTER CASE
Charleston, Oregon

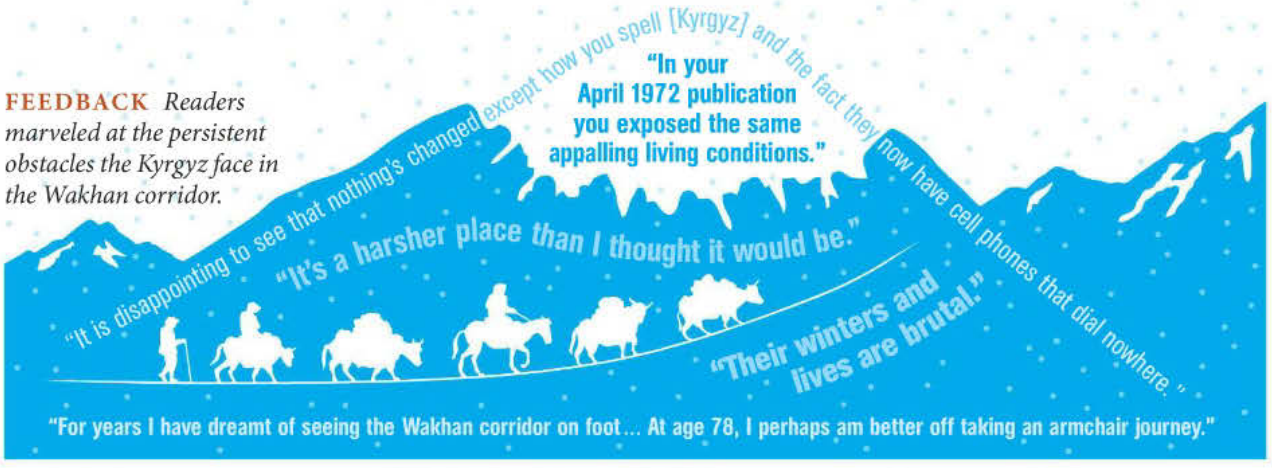
In the name of peace we destroy culture and heritage. What Libyan people had built with soul and pride for future generations are now ruins.

AYAKANNU KANDIAH
Swindon, England

Corrections

FEBRUARY 2013, VISIONS OF EARTH
The plastic fish head in the photo on pages 14 and 15 was misidentified as a swordfish. It is a marlin.

FEEDBACK *Readers marveled at the persistent obstacles the Kyrgyz face in the Wakhan corridor.*



EMAIL ngsforum@ngm.com **TWITTER** @NatGeoMag **WRITE** National Geographic Magazine, PO Box 98199, Washington, DC 20090-8199. Include name, address, and daytime telephone. Letters may be edited for clarity and length.

GRAPHIC: MESA SCHUMACHER

Nikon®

At the heart of the image™

FINALLY, THERE'S A FULL-FRAME NIKON FOR YOUR FULL-TIME PASSION.

THE NIKON D600: A FULL-FRAME CAMERA WITHIN THE REACH OF SERIOUS ENTHUSIASTS.

- Full-frame, FX-format 24.3 megapixel CMOS sensor
- 39-point autofocus system with compatibility up to f/8
- Full HD 1080p video recording
- Optional WU-1b Wireless Mobile Adapter to connect to smartphones or tablets*
- Built-in flash that can wirelessly trigger remote Speedlights
- Extended ISO range from ISO 50 to ISO 25,600
- Compatible with the full range of NIKKOR lenses

80 YEARS NIKKOR LENSES

*For compatibility, specifications and other information regarding the optional WU-1b Wireless Mobile Adapter, please visit www.nikonusa.com/wu1b. Nikon® and D600™ are registered trademarks of Nikon Corporation. ©2013 Nikon Inc.

nikonusa.com/D600

Healing Venom

As a type 2 diabetic, I found a friend in the Gila monster several years ago. My endocrinologist suggested I try a new medicine derived from the saliva of this reptile. The results have been very positive. My blood sugar is tightly controlled, and I've had some weight loss. As Jennifer Holland's story shows, we benefit from the molecular gifts of toxic animals in the fight against a host of debilitating diseases. We owe a lot to the researchers who are creating these gifts.

MARTIN SORENSEN
Lakewood, Colorado

For more than a quarter of a century I have been unhappily and regularly injected with venom from spiders in my Portland, Maine, garden. The work of their venom goes on sometimes for months, slowly dissolving flesh,

As a type 2 diabetic, I found a friend in the Gila monster several years ago.

creating a tunnel through tissues. I never considered that this irritating process might actually benefit someone. I will stop ranting at my spiders and thank them instead.

JACQUELINE MAST
Portland, Maine

Bill Haast, founder of the Miami Serpentarium and a longtime friend of our family's, was a great believer in the healing power of snake venom. Bill regularly injected himself with venom; he had survived countless bites of poisonous snakes before his death in 2011 at the age of 100. He once offered to give my grandmother cobra venom shots to alleviate her severe arthritis. She declined.

ELLEN D. MURPHY
Portland, Maine

Wakhan Corridor

I commented to my wife as I started reading, "I bet they won't explain how the Kyrgyz keep car batteries and cell phones charged on the 'roof of the world.'"

JACK POLAND
Fort Collins, Colorado

The article mentions that the Kyrgyz use solar panels to charge the car batteries that charge their cell phones but doesn't explain how. Single panels are placed on the roofs of mud houses, and wires are run from the solar panel into the house—often through a cracked window, according to photographer Matthieu Paley—to a car battery inside.

The article reads: "He's diminutive too, no more than five feet seven." The average height for a male in the U.S. is only five feet ten, in Iran five feet three, in India five feet five. I hardly think that five feet seven could in any way be seen as diminutive.

JOHN LUCAS
Seattle, Washington

I have a greater appreciation and respect for the incredible determination of the Kyrgyz people to not only survive but thrive in an extremely harsh living environment. Thank you for the insight.

JAMES A. SCHWARTZ
Philadelphia, Pennsylvania

River Otters

In an otherwise delightful article your captions will raise the hackles of Shetlanders anywhere in the world. For the better part of the 1980s I was the chief executive of the Shetland Islands Council. People may be polite to avoid offending an incomer, but in truth "the Shetlands" is an unforgivable solecism, which they may let pass but will not forget. Shetland is the name they favor, and Shetland is the name that should be used whenever their homeland is mentioned in conversation or in writing.

MIKE GERRARD
Warwickshire, England

Soccer

So much déjà vu. In South America our mothers helped us make balls by stuffing and sewing socks. They flew like comets.

EDGARD AROLAS
Vancouver, British Columbia

NEXT: Ocean Currents

The ocean currents picture reminded me of van Gogh's "Starry Night." Watching the video on my Kindle made me imagine his paintings in motion. Pretty cool.

TINA ROY
Canterbury, Connecticut

DELICIOUS DRINK WITH GREAT BODY.

(YOURS)

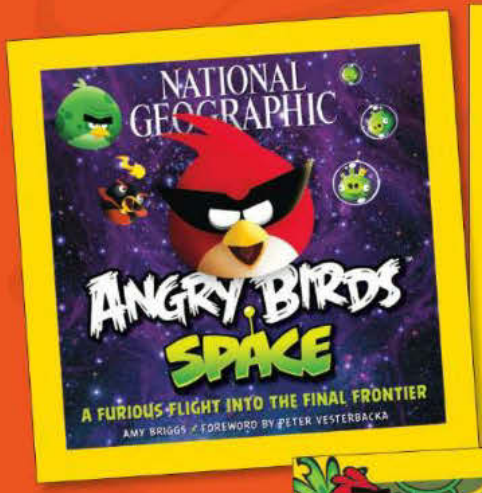
Drink *V8*® 100% vegetable juice as part of a reduced calorie diet along with regular exercise.

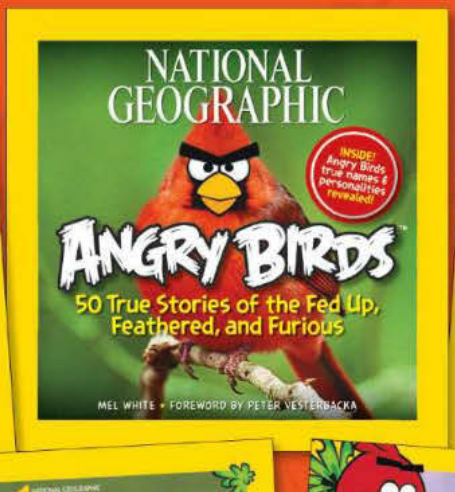
- 70 calories
- 0g fat
- 3g dietary fiber

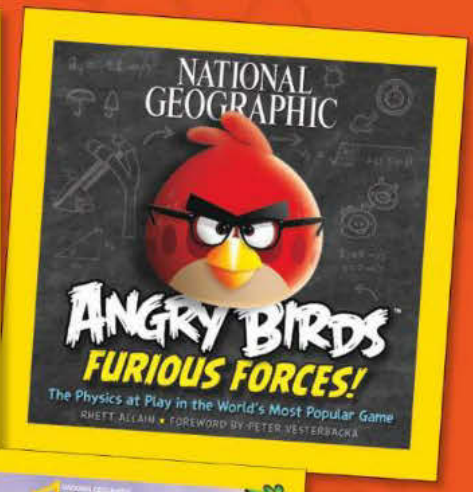
Could've had a V8.®

WARNING!

ANGRY BIRDS ON THE LOOSE!







GREAT GIFTS FOR ANGRY BIRDS ADDICTS EVERYWHERE!

FOR KIDS!

AVAILABLE WHEREVER BOOKS ARE SOLD

and at shopng.com/AngryBirds

FIND ALL ANGRY BIRDS GAMES AT ANGRYBIRDS.COM

NATIONAL GEOGRAPHIC

ROVIO BOOKS

Like us on Facebook.com/NatGeoBooks
Follow us on Twitter.com/NatGeoBooks

GIFTS OF REAL ESTATE:

Give a Home. Give Hope.

FOR YEARS, NATIONAL GEOGRAPHIC has enriched your life at home. Now, for the first time, your home can enrich National Geographic—and the world. Your donation of real estate (a home, second home, or other property) benefits the planet by supporting research and exploration. The same donation benefits you by providing a substantial tax break. Contact National Geographic to learn how your home can make all the difference in the world.

For more information, please call
The Office of Estate Planning at National Geographic
Tel: (800) 226-4438 | Email: plannedgiftinfo@ngs.org
National Geographic is a 501(c)(3) tax-exempt organization.

www.nationalgeographic.org/donate

CELEBRATING 125 YEARS **A NEW AGE OF EXPLORATION**

PHOTO: RAMESH RATWATTE

Inspiring people to care about the planet

NATIONAL GEOGRAPHIC

The National Geographic Society is chartered in Washington, D.C., as a nonprofit scientific and educational organization "for the increase and diffusion of geographic knowledge."

A charitable gift annuity is a safe, easy way to protect the planet while providing yourself with a steady income. When you give a simple gift of cash or stocks, National Geographic will, in return, make reliable fixed payments to you for the rest of your life. You won't have to worry about a fluctuating stock market or economic downturn, because annuity rates are fixed at the time you give your gift. Most importantly, you'll provide for your future, while supporting the future of National Geographic's conservation and research efforts.

"We wanted to 'give back' to one of the most important non-profit organizations in the world. Over the years, we established a number of charitable gift annuities with National Geographic. They provide us generous income payments for life while allowing us to support their research, exploration, education and conservation work."
James and Rebecca Helm, New Hampshire

SAMPLE ANNUITY RATES FOR ONE BENEFICIARY: Age 60=4.4% Age 70=5.1% Age 80=6.8% Age 90+=9.0%
(Rates at other ages available upon request.) Rates are subject to change. Please contact us for the most current rates.
CONTACT US: Phone: (800) 226-4438 • Email: plannedgiftinfo@ngs.org • Web: www.nationalgeographic.org/donate

NATIONAL GEOGRAPHIC

Include National Geographic in your financial plans.

Yes! Please send me information about a National Geographic charitable gift annuity!

Birthdate #1 _____ Birthdate #2 _____
(Minimum age 50. Payments begin at age 60)

Amt.: ☐ $10,000 ☐ $50,000 ☐ $100,000
☐ _____ Other (*Minimum gift $10,000*)

☐ Send me information on including National Geographic in my will.
☐ I have already included National Geographic in my will.

Name _____
Address _____
_____
Phone _____
Email _____

Mail to: National Geographic Society
Office of Estate Planning
1145 17th St. N.W.
Washington, D.C. 20036-4688

The National Geographic Society is a 501(c)(3), tax-exempt organization. Tax ID# 53-0193519.

13PG06ADAPUFFIN

Jørn Hurum
National Geographic
Emerging Explorer

EXPERTISE
Arctic paleontologist

LOCATION
Norway

Breaking Camp

Weather is a paleontologist's biggest enemy in the Arctic. Even in summer it's only about 40°F, and we have to camp up in the mountains to avoid polar bears. The winds are very strong at those high elevations.

My team digs for giant sea-reptile fossils in holes as big as a bus. We dig by hand; some years we move as much as 80 tons of sediment. Team members are often so exhausted they nap in the dig hole. In the good summers we can dig five or six feet before we hit permafrost, in bad years just one or two. During the midnight sun there is no difference between night and day, so we can work whenever we feel like it. We dig a lot in what would be night, because the wind isn't as strong.

One year on Spitsbergen Island our excavation was an hour's walk, all uphill, from our campsite. We could see the camp below as we excavated a pliosaur. During one night's digging we saw a windstorm blow up quickly down below. It was moving fast toward camp. Suddenly the big yurt-shaped kitchen tent was lifted above the ground, with our food and equipment inside. The pegs were blowing away. It was too far to scream to alert the others back in camp; some of us just ran down the hill to save it. Without a tent, there's nowhere in the Arctic to take cover from the elements. More food was an eight-hour walk away. A rescue helicopter wouldn't have brought new tents and food; it would have just evacuated us.

Luckily two members in camp saw it too. When we got there, they were hanging on the ropes, with the wayward tent in the air. They managed to keep it from blowing away. Now we strap tents down with handmade two-foot pegs. We haven't come close to losing any since.

ART: ISTVAN BANYAI. PHOTO: PATRICK DRUCKENMILLER

2 Tier Radial™ cyclones

Why two tiers are better than one.

The new DC50 has 2 Tier Radial™ cyclones that exert over 135,000 G of centrifugal force to capture microscopic dust particles. Its cleanerhead has nylon bristles for deep cleaning on carpets and anti-static carbon fiber filaments to remove fine dust from hard floors.

To get the full story,
visit dyson.com/DC50.

dyson ball

Two tiers of cyclones capture more microscopic dust than any other.

VISIONS

China
Like figures in a shadow theater, mannequin forms—illuminated by bare incandescent bulbs and veiled by a red tarpaulin—captivate shoppers in Guilin. The city's popular night market sells clothing, trinkets, food, and more.

PHOTO: MAX FORSYTHE

Scotland
Champion strong man Gregor Edmunds lets fly a 16-pound shafted hammer at the Cowal Highland Gathering. The annual three-day event in Dunoon—featuring traditional games, music, and dancing—is open to international competitors.

PHOTO: KIERAN DODDS, PANOS PICTURES

Poland
As shadows lengthen near sunset, spring fields near Nowe erupt in a color riot. The photographer paraglided over Pomerania to get this abstract expressionist shot: a brushstroke of red poppy weeds flowering amid green grain sprouts.

PHOTO: KACPER KOWALSKI, PANOS PICTURES

Order prints of *National Geographic* photos online at **PrintsNGS.com.**

We've reimagined Your Shot, our online photo community. Check out more readers' pictures, get assignments, and find feedback from National Geographic photo editors at *yourshot.nationalgeographic.com.*

EDITORS' CHOICE **Lindsay Comer** Stratford, Connecticut

Comer noticed this group of dancing Russians in 2011 while living in St. Petersburg. One woman stood out from the crowd, joyfully moving to the Soviet-era music being played by a nearby brass band. "She had pink socks and gold teeth and just looked so vibrant."

READERS' CHOICE

Chandrabhal Singh
Pune, India

During a trip last year to photograph flamingos that spend the winter near India's Ujjani Dam, Singh watched as this brown-headed gull scanned the glassy water. He pressed the shutter, luckily, at the very moment the bird dipped to catch a fish.

When ~~cancer~~ strikes, we strike back.

At MD Anderson Cancer Center, we are focused on Making Cancer History.®

As the nation's top-ranked cancer center, MD Anderson continues to pioneer new approaches in cancer treatment. Using the latest genetics-based research, we can develop targeted treatments, personalized to the individual patient. To learn more about how we're raising the bar for cancer care worldwide, or to make an appointment, call 1-877-632-6789 or visit MakingCancerHistory.com.

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

Scan to learn more about our latest breakthroughs.

BEST HOSPITALS U.S.News & WORLD REPORT NATIONAL CANCER 2012-13

Ranked number one in the nation for cancer care, six years in a row, by U.S.News & World Report.

Antoine van der Maesen Sellingen, Netherlands

One day last summer van der Maesen brought his camera on an early morning walk with his wife and two dogs. As they approached a small clearing, he stayed back to capture the way the sun poured in. “The light made the forest look like a cathedral,” he says.

PEOPLE WILL TALK.

"I LOVE your ring!"
- Bank teller

"How much?
... seriously?"
- Your husband

"There is NO WAY
this ring cost you
only $79!"
*- Linda from
accounting*

"Wow. That color
is unbelievable!"
- Your hairdresser

"I want one."
- Your best friend

"PLEASE tell me where
you found that ring! "
- Waitress at lunch

87% Less than the independently appraised value*

Wear this stunning 2-carat Tanzanite Ring for only $79! Random compliments are absolutely FREE.

This is not the ring to wear if you want to blend in. Two carats of genuine tanzanite attracts attention. Lots of it. People will talk. That's just what happens when you wear the passionate purple stone experts have called "the most beautiful gem discovered in generations." Put it on your finger and you'll understand why the **Stauer Sunburst Tanzanite Ring** is a spectacular piece of jewelry that refuses to be ignored.

Tanzanite is 1,000 times rarer than diamond. It became a sensation when it was first discovered in 1967 in Tanzania's Merelani Hills (in the shadow of Mount Kilimanjaro). It is found nowhere else on Earth and experts say supplies will not last forever.

Don't miss your chance to make gem history. Nobody knows exactly how much remains to be found, but Fifth Avenue is more than happy to charge you as if the mines were nearly empty. One of the largest jewelry retailers is selling genuine tanzanite rings online for well over $2,000 each. That's ridiculous. Order now and we'll send you an elegant .925 sterling-silver setting loaded with 2 carats of marquise-cut tanzanite for only $79!

Other jewelry stores hate us because we don't play by their rules. We took the Sunburst Tanzanite Ring to an independent appraiser who works with auction houses, estate sales and insurance companies. He valued it at $590.* We thanked him for his professional opinion and then ignored it. Because even if a graduate gemologist tells us that this tanzanite ring is valued at nearly $600, we want you to have it for **ONLY $79**. I know it sounds ridiculous, but we're absolutely serious. For this exclusive offer, we've actually lowered our price for one of the world's most endangered gemstones.

Your satisfaction is 100% guaranteed. If for any reason you don't completely adore your 2-carat Sunburst Tanzanite Ring, just send it back within 30 days for a full refund of your purchase price. Yes, it's really that simple. And yes... it really is that beautiful. *Mention ring size: 5-10*

Stauer®

14101 Southcross Drive W., Dept. TZR511-06
Burnsville, Minnesota 55337
www.stauer.com

BBB ACCREDITED BUSINESS Rating of A+

Sunburst Tanzanite Ring (2 ctw) — Appraised at ~~$590*~~
Was ~~$99~~ *Now Only* **$79** + S&P

Promotional Code TZR511-06 Please mention this code when you call.

CALL NOW! 1-888-201-7112

** For more information concerning the appraisal, visit* ***http://www.stauer.com/appraisedvalues.asp.***

Rahul Tailor
Surat, India

After a weekend visit to a flea market where people sold furniture and old clothes, Tailor passed by a pink mosque wall in his hometown. In front of it, two birds stood with their heads obstructed by an old roof that offered an element of privacy.

Rudranil Ghosal Baharampur, India

It was raining outside, so Ghosal wanted to find something to photograph in his home. Using three forks and a lotus bud that he cut in half, he created a design on a glass table that resembled an intricate flower growing sideways.

SHUT OUT FLEAS, NOT THE DOG.

Prevent an infestation before it begins with FRONTLINE® Plus.

FRONTLINE Plus not only kills adult fleas and ticks, it also kills flea eggs and larvae that lead to an infestation. Plus, it continues killing for 30 days on dogs and cats. No wonder it's the #1 choice of vets for their pets*—and yours.† Ask your vet about FRONTLINE Plus today.

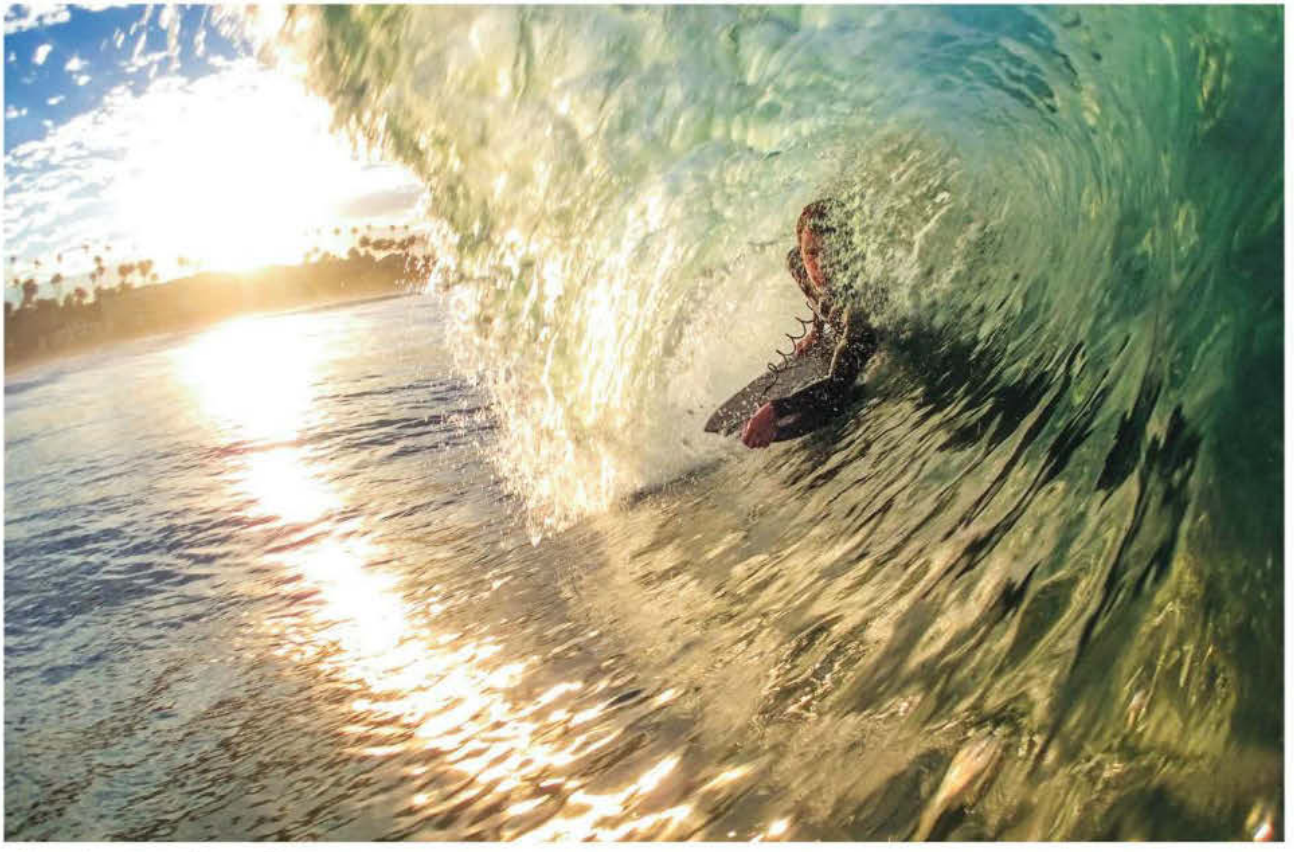
ACCEPT NOTHING LESS.

Like us to get 2 free doses. frontline.com

CRUSHPROOF, SHOCKPROOF, FREEZEPROOF

AND WATERPROOF.

ALL SO YOU CAN BRING BACK ACTUAL PROOF.



Shots taken with the Olympus Tough.

OLYMPUS

Capture your stories.

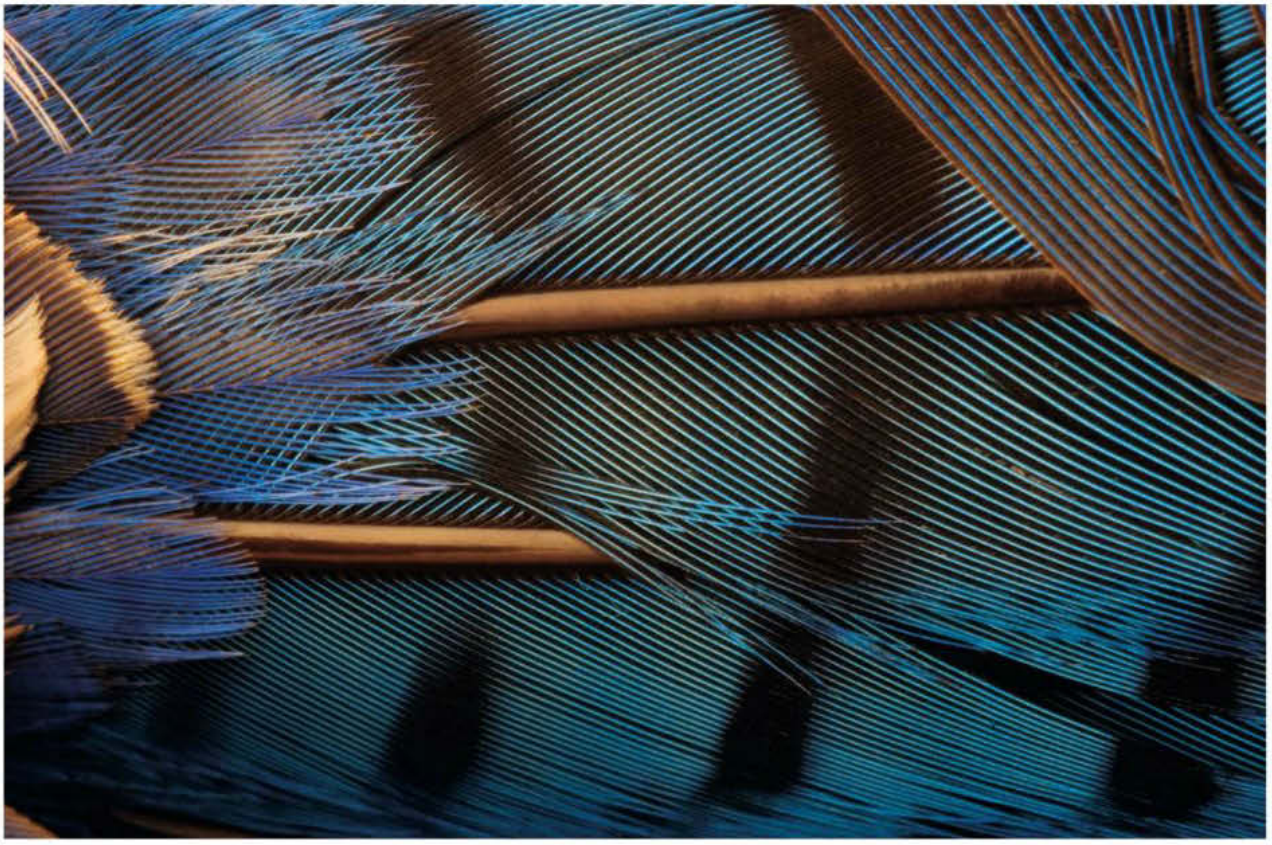
Demand more than durability with the Olympus Tough TG-2 iHS. It's not enough to have a camera as durable as your lifestyle. Now you can capture your adventures with a clarity you once thought unthinkable. The TG-2 iHS is one of the only rugged cameras on the market to include an ultra-bright, high-speed f2.0 lens, allowing you to capture dramatic low light and high-speed action shots. Paired with a 12 Megapixel Backlit CMOS Sensor, 1080p Full HD Video and High-Speed Sequential Shooting, you can now bring back stunning proof of your life's adventures. **getolympus.com/tough**

Simon Lister Sydney, Australia

While his friends surfed during a trip to Papua New Guinea, Lister walked around taking pictures of local people. One family allowed him to photograph their daughter, who was blind and albino, as she delicately peeled a piece of fruit.

Santanu Paul Guwahati, India

At the start of Diwali, a festival across India celebrating light, Paul went with three friends to a neighborhood fireworks show. As the sky lit up, he realized that his friends' spellbound reaction offered a unique angle.



One day this blue jay flew into our house. I took this shot of its finely patterned feathers, then set it free.

THE PHOTOGRAPHER

More of Aaron Ansarov's work can be seen at ansarov.com and legionphoto.com.

Backyard Treasure

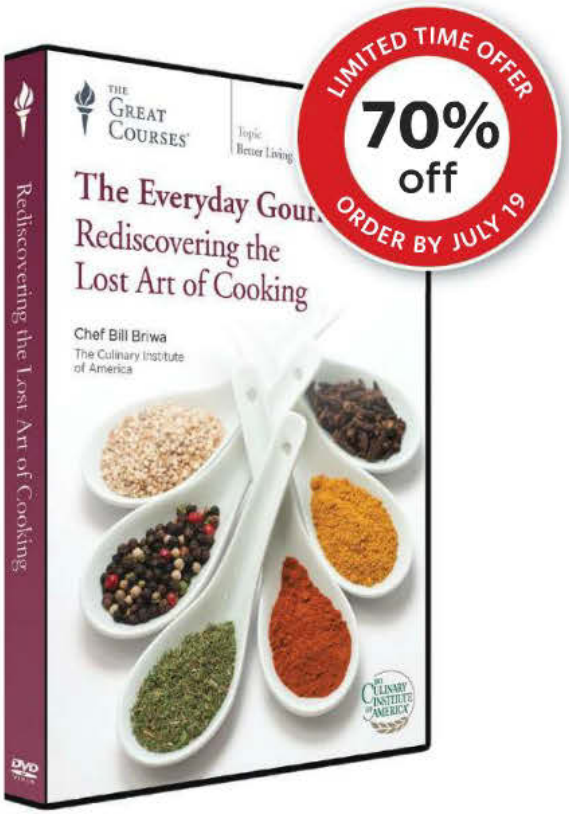
A few years ago I was medically retired from the U.S. Navy, where I'd been a combat photographer. As therapy, I wandered my Virginia backyard and bonded with my young son, teaching him about the animals we encountered. He suggested we escort a few inside and photograph them in detail. When we did, their colors and textures looked larger than life.

Since then we've moved, first to Georgia, then to Florida. We've also spent time in Poland, where my wife was born. But everywhere we've gone, the same thing has happened: New "neighbors"—like a blue jay (above), which chased a dragonfly right into our house, or a curled-up pill bug (left), which we found beneath a log—answer our "critter casting calls." Some even show up at the back door in the morning, as though waiting for their star turn.

This hyper-local approach has given me a new outlook. It doesn't matter where you live, only what you see around you. I have two rules with this project. The first is that captured creatures must be released unharmed. The second rule is that I keep shoots to 15 minutes or less, even if I don't get the picture I hoped for. I don't want to frighten my subjects. Besides, there's always another time—they live right here.

THE GREAT COURSES®

THE CULINARY INSTITUTE OF AMERICA®



Master the Art of Cooking with The Culinary Institute of America

Have you ever wished you could skip the restaurant and make your favorite gourmet dishes at home? You can—regardless of your level of expertise. All it takes is a clear understanding of the fundamentals and the right teacher to show you how.

The Everyday Gourmet: Rediscovering the Lost Art of Cooking offers you both with 24 methodical, hands-on lessons delivered by a chef-instructor at the world-renowned Culinary Institute of America. A veteran of professional kitchens, Chef Bill Briwa has devoted his career to educating audiences around the globe about the craft of cooking, gastronomy, and flavor dynamics. In this course, he reveals the culinary secrets of CIA-trained chefs and arms you with the major techniques all good cooks must know. It's a must-have for anyone who loves to cook—or eat.

Offer expires 07/19/13

1-800-832-2412

WWW.THEGREATCOURSES.COM/5NG

The Everyday Gourmet: Rediscovering the Lost Art of Cooking

Taught by Bill Briwa, Chef-Instructor
THE CULINARY INSTITUTE OF AMERICA

LECTURE TITLES

1. Cooking—Ingredients, Technique, and Flavor
2. Your Most Essential Tool—Knives
3. More Essential Tools—From Pots to Shears
4. Sauté—Dry-Heat Cooking with Fat
5. Roasting—Dry-Heat Cooking without Fat
6. Frying—Dry-Heat Cooking with Fat
7. From Poach to Steam—Moist-Heat Cooking
8. Braising and Stewing—Combination Cooking
9. Grilling and Broiling—Dry-Heat Cooking without Fat
10. Stocks and Broths—The Foundation
11. The Stir-Fry Dance—Dry-Heat Cooking with Fat
12. Herbs and Spices—Flavor on Demand
13. Sauces—From Beurre Blanc to Béchamel
14. Grains and Legumes—Cooking for Great Flavor
15. Salads from the Cold Kitchen
16. Eggs—From the Classic to the Contemporary
17. Soups from around the World
18. From Fettuccine to Orecchiette—Fresh and Dry Pastas
19. Meat—From Spatchcocked Chicken to Brined Pork Chops
20. Seafood—From Market to Plate
21. Vegetables in Glorious Variety
22. A Few Great Desserts for Grown-Ups
23. Thirst—The New Frontier of Flavor
24. Crafting a Meal, Engaging the Senses

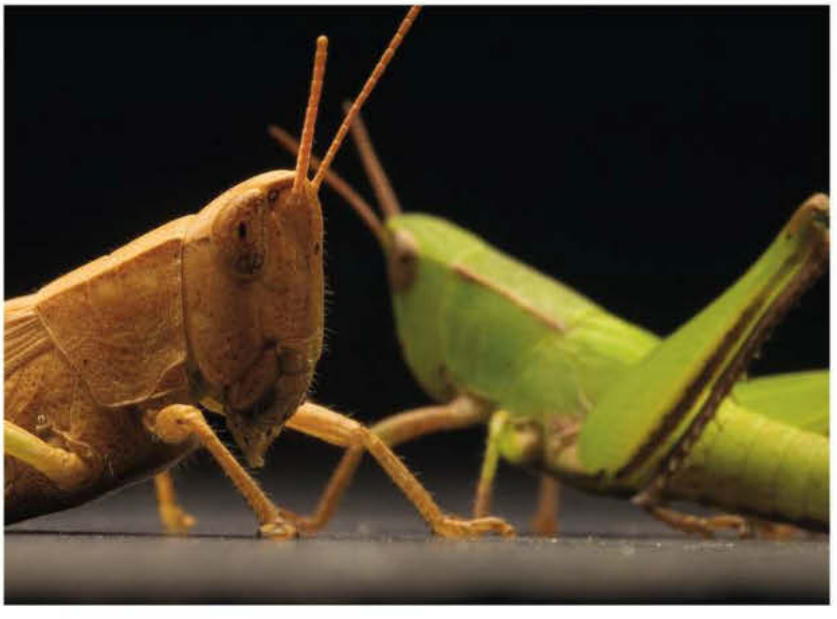
The Everyday Gourmet:
Rediscovering the Lost Art of Cooking
Course no. 9231 | 24 lectures (30 minutes/lecture)

SAVE $185

DVD ~~$254.95~~ NOW $69.95
+$10 Shipping, Processing, and Lifetime Satisfaction Guarantee
Priority Code: 83101

Designed to meet the demand for lifelong learning, The Great Courses is a highly popular series of audio and video lectures led by top professors and experts. Each of our more than 400 courses is an intellectually engaging experience that will change how you think about the world. Since 1990, over 10 million courses have been sold.

The feet of this four-inch-long house gecko—one of three living inside our porch light—are the key to its nimbleness. To catch the lizard safely, I trapped it using a cup and a piece of black foam board. A few minutes later I took this picture. I tend to get my best shots after the first flash, which freezes most creatures for a minute or so.



Sometimes the chase is as thrilling for me as the picture that results. These grasshoppers, for instance, are always fun to try to catch—I feel like a kid when I'm hopping after them in the yard and usually put my hand down just a hair too late. On this occasion I got really lucky and snared a pair. This photograph was one of the first I made of two creatures at once.

"ONCE I STARTED TAKING LYRICA THE **DIABETIC NERVE PAIN** STARTED SUBSIDING."

–TERRY, RETIRED POLICE OFFICER
DIAGNOSED WITH DIABETIC NERVE PAIN.

Artist depiction

Diabetes damages nerves which may cause pain.

Lyrica is FDA approved to treat Diabetic Nerve Pain.

Get specific treatment for Diabetic Nerve Pain.

LYRICA® PREGABALIN Ⓒ capsules

Diabetic Nerve Pain (or pain from Diabetic Peripheral Neuropathy) is characterized by shooting, burning, pins and needles symptoms. **Lyrica provides effective pain relief so patients feel better.*** Some patients also had a significant reduction of pain in as early as one week. And, Lyrica is not a narcotic.**

Ask your doctor about Lyrica today.

*Individual results may vary. **Those who have had a drug or alcohol problem may be more likely to misuse Lyrica.
We asked Terry to tell us about his experience with Lyrica. To hear Terry's story visit Lyrica.com.

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.

To learn more visit www.lyrica.com or call toll-free 1-888-9-LYRICA (1-888-959-7422).

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.

IMPORTANT FACTS

LYRICA PREGABALIN capsules (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
- Weight gain
- Trouble concentrating
- Blurry vision
- Sleepiness
- 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).**

Pfizer Helpful Answers®
Filling a need for prescription assistance

Uninsured? Need help paying for Pfizer medicines? Pfizer has programs that can help. Call **1-866-706-2400** or visit www.PfizerHelpfulAnswers.com.

PARKE–DAVIS, Division of Pfizer Inc., New York, NY 10017

Version January 2013

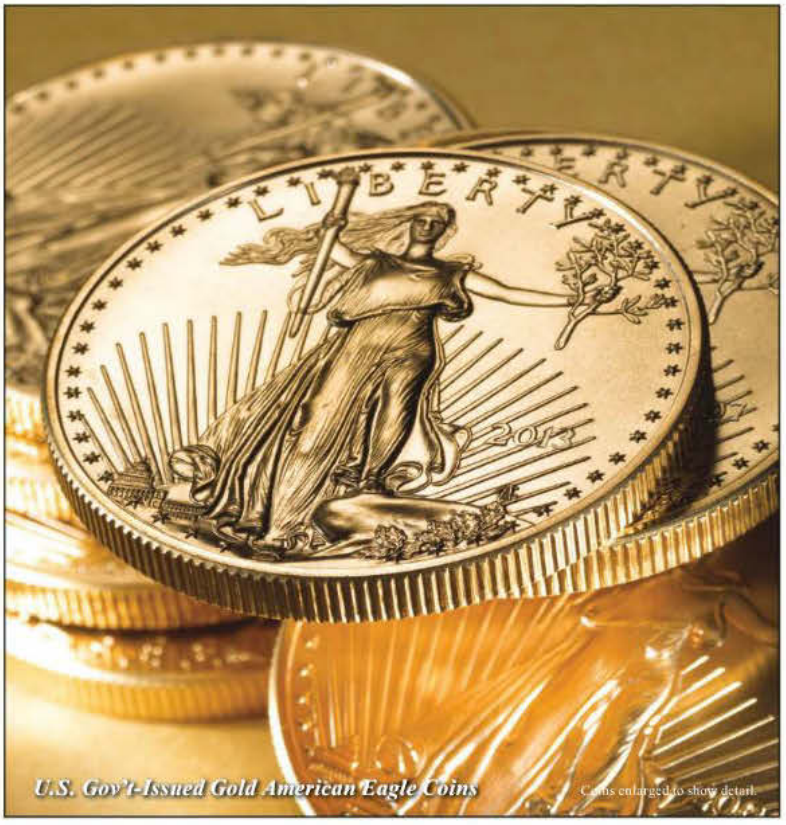
* Avandia and Avandamet are registered trademarks of GlaxoSmithKline.
** Actos is a registered trademark of Takeda Chemicals Industries, Ltd., and is used under license by Takeda Pharmaceuticals of America, Inc., and Eli Lilly and Co.

Rx only

U.S. GOV'T GOLD

U.S. GOLD COINS AUTHORIZED FOR IMMEDIATE RELEASE

The U.S. Money Reserve Vault Facility today announces what could be the final release of U.S. Gov't-Issued Gold Coins previously held in The West Point Depository/U.S. Mint. For a limited time, U.S. citizens will have the opportunity to purchase these $5 Gov't-Issued Gold Coins for the incredible at-cost price of only $149.00 per coin. An amazing price because these U.S. Gov't-Issued Gold Coins are completely free of dealer markup. That's correct—our cost. This may be your final opportunity to buy U.S. Gov't-Issued Gold Coins at cost. Gold is predicted by experts to have the explosive upside potential of reaching up to $5,000/oz. in the future. Please be advised: Our U.S. Gov't Gold inventory will be priced at $149.00 per coin while supplies last or for up to 30 days. These coins may sell out. Call today! U.S. Money Reserve will release these U.S. Gov't-Issued Gold Coins at-cost on a first-come, first-served basis. Orders that are not immediately received or reserved with the order center could be subject to cancellation and your checks returned uncashed. Good luck. We hope that everyone will have a chance to purchase this special U.S. Gov't-Issued Gold at this price because it could be going to $5,000/oz. Order immediately before our vault sells out completely! Special arrangements can be made for gold purchases over $50,000.



U.S. Gov't-Issued Gold American Eagle Coins Coins enlarged to show detail.

AUTHORIZED BY CONGRESS: PUBLIC LAW 99-185

By Executive Order of Congress Public Law 99-185, Americans can now buy new Government-Issued Gold. Congressionally authorized United States Gold Coins provide American citizens with a way to add physical gold to their portfolios. Gold American Eagles are made from solid gold mined here in America, minted at the U.S. Mint at West Point, and produced with a U.S. Dollar denomination—making them Legal Tender United States Gold Coins. They are highly liquid, easily transportable, and, unlike paper assets, Gold American Eagles have a tangible value you can feel each time you hold your own gold. Though no one, including U.S. Money Reserve, can guarantee a gold coin's future value will go up or down, numerous experts are predicting gold to reach $5,000/oz. Now is the time to consider converting part of your paper assets into gold. U.S. Money Reserve has a limited supply and urges you to make your vault reservations immediately. Call a Senior Gold Specialist at 1-800-592-4423 to start your gold portfolio and begin protecting your wealth today. If you've been waiting to move your money into gold, the time is now.

DO NOT DELAY - LIMITED SUPPLIES AVAILABLE!

GOVERNMENT-ISSUED GOLD COIN

THE MARKETS FOR COINS ARE UNREGULATED. PRICES CAN RISE OR FALL AND CARRY SOME RISKS. THE COMPANY IS NOT AFFILIATED WITH THE U.S. GOVERNMENT AND THE U.S. MINT. PAST PERFORMANCE OF THE COIN OR THE MARKET CANNOT PREDICT FUTURE PERFORMANCE. SPECIAL AT-COST OFFER IS STRICTLY LIMITED TO ONLY ONE LIFETIME PURCHASE OF 10 AT-COST COINS (REGARDLESS OF PRICE PAID) PER HOUSEHOLD, PLUS SHIPPING AND INSURANCE. PRICES MAY BE MORE OR LESS BASED ON CURRENT MARKET CONDITIONS. PRICE NOT VALID FOR PRECIOUS METALS DEALERS.

PURE COST - NO DEALER MARKUP!

ONLY $149.00 EACH

SHIPPING & INSURANCE $8-$15

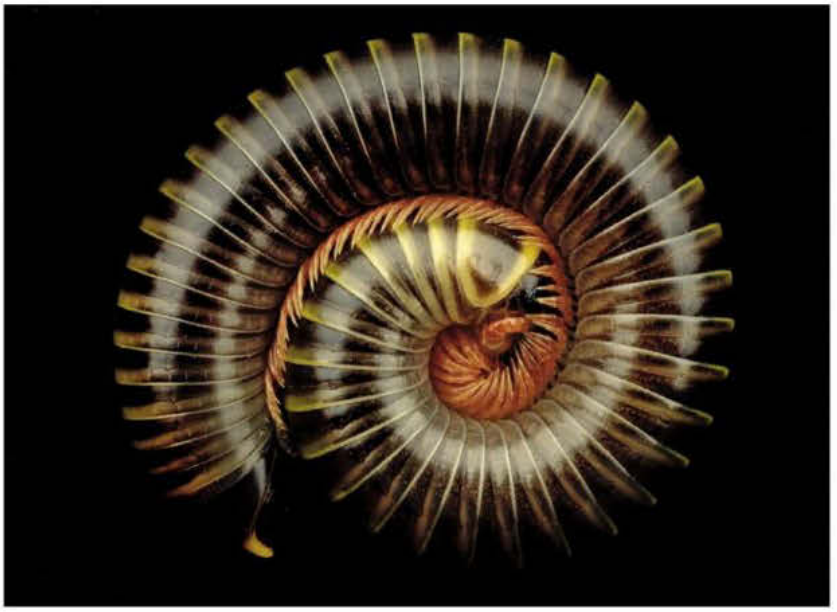
VAULT CODE: NG18-149

Call Toll-Free 7 Days a Week:

1-800-592-4423

MASTERCARD • VISA • AMEX • DISCOVER
CHECK • BANK WIRE • ACH

U.S. MONEY RESERVE



Yellow-banded millipedes are all over the place in Florida. I found this one under a flowerpot, but I've also come across them on sidewalks or outside walls. Whenever they feel threatened, they curl into a protective circle. I think I spent just five minutes with this subject before turning it loose.

I saw this green tree frog in the grass one day, jumping for its life as my lawn was being mowed. After I rescued it, I positioned it on some bamboo canes I had lying around. I remember it hardly moved the whole time.

TOYOTA | Let's Go Places

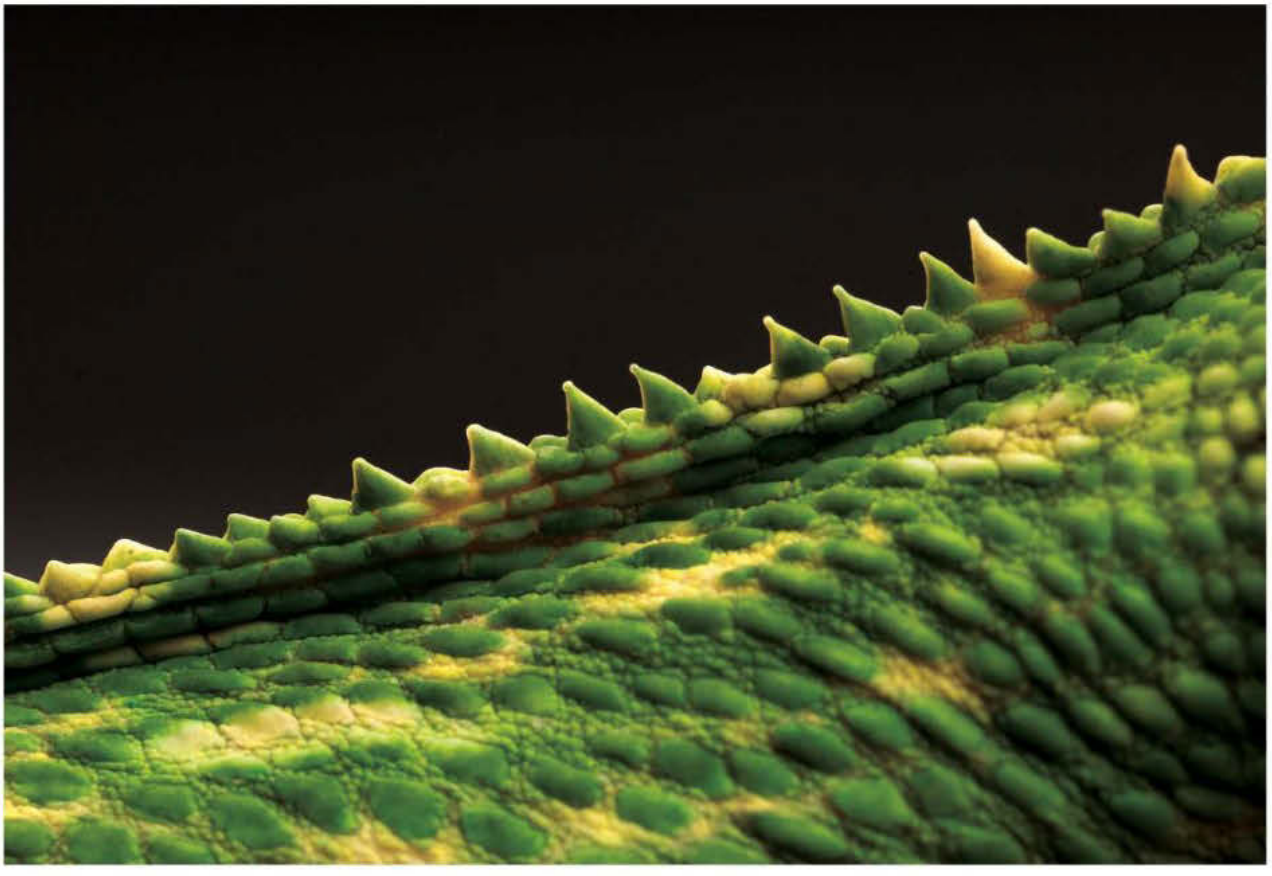
THE ART OF MAKING CARS WILL NEVER BE THE SAME.

THE RADICALLY NEW AVALON

A quantum leap in interior refinement with Qi, the world's first available in-console wireless charging* for your compatible mobile device.

Search: "avalon let's go places"

*Qi wireless charging only available on the Avalon Limited and Avalon Limited Hybrid with advanced Technology Package. Wireless charging may not be compatible with all mobile phones, MP3/WMA players and like models. Options shown. ©2013 Toyota Motor Sales, U.S.A., Inc.



My wife and I saw this foot-long knight anole sunning itself by the side of the road next to the house. But getting it inside for this close-up was easier said than done. These lizards are very aggressive, puffing themselves up with air when they feel cornered. This one bit my pinkie when I caught it, and its mouth stayed open the whole shoot.

The tail of this house gecko is a mix of colors, textures, and patterns. To really set it off in detail, I decided to photograph this one on black foam board.

The Invention of the Year is Great News for your Ears

NEW More Power & Clarity

Perfect Choice HD™ is simple to use, hard to see and easy to afford… it's like reading glasses for your ears™!

New Personal Sound Amplification Product is an affordable way to "turn up the volume!"

Over the years, technology has made the way we live easier, safer and more convenient. In many cases, it's even made many products more affordable… (remember how much the first VCR used to cost?). Now, if you need some help in turning up the volume on the world around you, a new solution has been invented… it's called Perfect Choice HD™.

Affordable, Simple to use, Virtually impossible to see

Perfect Choice HD is NOT a hearing aid. Hearing aids can only be sold by an audiologist or a licensed hearing instrument specialist following hearing tests and fitting appointments. Once they have you tested and fitted, you could pay as much as $5000 for the product.

Reading glasses for your ears. While some people need hearing aids, many just need the extra boost in volume that a PSAP gives them. Now, thanks to the efforts of the doctor who leads a renowned hearing institute, there is Perfect Choice HD. It's a PSAP designed to accurately amplify sounds and deliver them to your ear. Because we've developed an efficient production process, we can make a great product at an affordable price. The unit has been designed to have an easily accessible battery, but it is small and lightweight enough to hide behind your ear… only you'll know you have it on. It's comfortable and won't make you feel like you have something stuck in your ear. It provides high quality audio so sounds and conversations will be easier to hear and understand.

Why Perfect Choice HD is the best choice !		
Lightweight / Inconspicuous	✓	Less than 1 ounce
Sound Quality	✓	Excellent – up to 50 dB
Test and Fitting required	✓	No
Free Extra Hearing Tubes	✓	Yes 3 to choose from
One-on-One personal set up	✓	Free
Friendly Return Policy	✓	60 Days

We want you to be happy with Perfect Choice HD, so we are offering to let you try it for yourself with our exclusive home trial. . If you are not totally satisfied with this product, simply return it within 60 days for a refund of the full product purchase price. Don't wait… and miss out on another conversation… call now!

Are you or a loved one frustrated in these situations?

• Restaurants • Dinner parties
• Outdoor conversations
• Lectures • Sermons • Meetings
…and other times where you need to turn up the volume

Perfect Choice HD™

Call now for our lowest price and get FREE Bonus Hearing Tubes.

Please mention promotional code 46677.

1-866-327-2688

1998 Ruffin Mill Road • Colonial Heights, VA 23834

Perfect Choice HD is not a hearing aid. If you believe you need a hearing aid, please consult a physician.

80393

THANK YOU

FOR SUPPORTING A NEW AGE OF EXPLORATION

NATIONAL GEOGRAPHIC DONORS make our work possible, from groundbreaking research and intrepid exploration to our stunning, world-famous images. We are deeply grateful to all the individuals, foundations, and corporations that support our work and help us to know our world better. Learn more about the exploration, education, and engagement programs your gift supports by visiting *nationalgeographic.org/explorers.*

Thank you to everyone who supported National Geographic with a gift of $25,000 or more in 2012. For a complete list of 2012 donors and to read more about the incredible work your gifts make possible, please go to nationalgeographic.org/2012report.

Anonymous (5)
Jeffrey and Darlene Anderson
The Annenberg Foundation
The Asen Foundation
Mr. W. Sprague Bartels
Lucy and Henry Billingsley
Robert K. Black and J. Ormond Sanderson, Jr.
Blancpain
The Walter A. Bloedorn Foundation
Mr. and Mrs. Darlow G. Botha
Barbara Bowman
The Brinson Foundation
Mrs. Judith S. Brown
The Keith Campbell Foundation for the Environment, Inc.
The Case Foundation
Coty SAS
David and Alice Court
Dallas Women's Foundation
Mrs. Shirley R. Deering
The Charles Engelhard Foundation
Rosemary and Roger Enrico
ESRI
Fairmont Hotels & Resorts
Bruce and Mary Feay
The Lee and Juliet Folger Fund
Fox Networks Group
Gannett National Shared Service Center
GEICO
Google
Mr. and Mrs. Peter Grant
James and Sjon Harless
Ms. Karine Hauser and Ms. Anna Hauser
Bert Headden and Cindy Thomas
Mr. and Mrs. Howard Hight
Ms. Barbara D. Hitchings
Mrs. Jane N. Holt
Sara H. Horsman
The Mildred J. Husband Revocable Living Trust*
Estate of Violet K. Ihlenfeld*
International Paper
Mr. Willie C. Jones, Jr.
Mr. and Mrs. Joseph Kampf
Kautz Family Foundation
David H. Koch
Mr. Paul P. Koszarek
Iara Lee & George Gund Foundation
Marguerite and Gerry Lenfest
Estate of Irwin A. Levy*
Lockheed Martin Corporation
The Henry Luce Foundation
David P. Margulies
Teryl and Michael Matkins
The mGive Foundation
Greg Moga and Mary Dunn-Moga
Mark and Inna Moore
Harold M. and Adeline S. Morrison Family Foundation
Seymour and Pearl Moskowitz
Mr. and Mrs. Gib Myers
National Science Foundation
Dr. Theodore and Mrs. Monica Nicholas
One World Apparel, LLC
Oracle
Estate of William R. Pennington*
Plum Creek
Puerto Rico Tourism Company
The Randolph Company in memory of Louise Dieterle Nippert
Rolex
Mr. and Mrs. Edward P. Roski, Jr.
Malcolm S. Rountree Trust*
Royal Bank of Canada
Mr. and Mrs. Thomas D. Rutherfoord, Jr.
Mr. and Mrs. B. Francis Saul II
Estate of Sharon S. Scotti*
The Seaver Institute
Mr. Earl Shallow
Shell International B.V.
The Harold and Mary Margaret Shore Trusts*
M. Sickels, Ph.D.
Jill and Richard Sideman
Alfred P. Sloan Foundation
Vinny and Tori Smith
Mr. Richard Sneider and Mr. Fabian Oberfeld
Mr. Thomas H. Stutzman
Swedish Postcode Lottery
Estate of Lois B. Sweet*
U.S. Fish and Wildlife Service
United States Agency for International Development
Verizon Foundation
Wallace Genetic Foundation, Inc.
The Walton Family Foundation
Garry and Donna Weber
Angie and Leo Wells
Tracy and Catherine Wolstencroft
Mr. Frank R. Wraspir
Pamela Mars Wright
YMCA of Greater Seattle

*Denotes bequest

We are all explorers. Join us today. To make a gift, call (800) 373-1717 or (202) 862-8638, or contact us at givinginfo@ngs.org.

NATIONAL GEOGRAPHIC

NEXT

Funny Honey

Usually a honeybee's legs are coated in powdery yellow pollen. Last fall in Ribeauvillé, France, bees returned to the hive in blue, green, and red syrup—a result of foraging at a factory that processed waste from making M&M's. The French beekeepers couldn't sell the candy-coating-colored honeycombs, taking a bite out of the region's 1,100 tons of honey a year. By most countries' laws, honey can have only one ingredient: nectar cured by bees. Color's a giveaway of adulteration, says the American Beekeeping Federation's Tim Tucker. True honey ranges from white to brown.

Bees will always choose nectar over cane sugar because it's easier to break down and turn into food. In drought situations or when blooms are scarce, though, all bets are off. "They're looking every day. If the nectar flow stops, bees collect any sugar out there," says Tucker. Trash cans around convenience stores are favorite spots, brimming with cola-bottle dregs and candy wrappers. He adds, "We hope they don't find those locations." *—Johnna Rizzo*

PHOTO: VINCENT KESSLER, REUTERS

Introducing National Geographic's 2013

Emerging Explorers

Visit **nationalgeographic.com/emerging** to see and hear the Emerging Explorers.

Photo: Vikki Boyes

Conservation Biologist
Steve Boyes champions protection of Botswana's uniquely pristine Okavango Delta as well as parrot species on the brink of extinction throughout Africa.

Photo: Rolex Awards/Thierry Grobet

Conservation Biologist
Erika Cuéllar empowers local people with scientific conservation skills to help protect the wild environment and rich biodiversity of South America's Gran Chaco region.

Photo: Michael Wells

Anthropologist
Jason De León documents clandestine migration between Mexico and the United States to provide new insight into the complex, multilayered border-crossing phenomenon.

Photo: Lance Hayashida/Caltech

Planetary Geologist
Bethany Ehlmann searches our solar system for once habitable environments, now using the Curiosity rover to analyze Martian rocks for clues of conditions that may have supported ancient life.

Photo: Abid Mehmood

Archaeologist
Sayed Gul Kalash strives to preserve one of the world's oldest, most unique cultures and languages, her own critically endangered Kalash, still surviving in a remote region of Pakistan.

NATIONAL GEOGRAPHIC
Mission Programs

WHO WILL MAKE TOMORROW'S DISCOVERIES?

Each year the National Geographic Emerging Explorers Program identifies and recognizes the next generation of scientists and storytellers who push the boundaries of discovery, adventure, and global problem solving. The 2013 class consists of amazing individuals who are innovators in their respective fields. They are the new visionaries, leading efforts to educate and inspire people to care about the planet.

Photo: Anastasia Cronin/NGS

Computer Scientist & Roboticist
Chad Jenkins works to make robotic technology more accessible, easy to use, and helpful to the public at large by teaching robots to learn from human demonstration.

Photo: British Council Hong Kong

Science Educator & Astrobiologist
Brendan Mullan inspires a new generation of scientists by making astronomy education and communication more accessible, engaging, and entertaining.

Photo: Chinmay Rane/Felis Images

Wildlife Filmmaker & Photographer
Sandesh Kadur creates documentary films and books to raise awareness about the world's threatened species and habitats and inspire his audience to protect them.

Photo: Courtesy of Erin Pettit

Geophysicist & Glaciologist
Erin Pettit pioneers innovative techniques to aid in glacier exploration, analyzing findings from the ice to help understand and predict changing climate and rising seas.

Photo: Nimish Jain

Artist
Raghava KK blends creativity and technology to develop interactive art that considers issues from multiple perspectives, challenges perceptions, inspires tolerance, and engenders empathy.

Photo: Chiun-Kai Shih

Computational Geneticist
Pardis Sabeti unravels complex genetic codes to detect evolutionary mutations that allow disease to spread and humanity to survive.

Photo: Sebastian Humphreys/Omo Child

Humanitarian
Lale Labuko fights to end the ritualistic killing of infants and children in Ethiopia's Omo River Valley and provides safe shelter, care, and education for the children he rescues.

Photo: Benjamin Grimes

Engineer
Shah Selbe identifies innovative technologies that can be used to protect the world's seas from illegal fishing through better monitoring, tracking, collaboration, and surveillance.

Photo: Australia Unlimited

Innovator & Entrepreneur
Tan Le develops EEG innovations and a data-sharing platform that could dramatically accelerate research and understanding of the human brain.

Photo: Thatcher Cook/PopTech

Data Artist
Jer Thorp translates complex data sets into novel representations that make information more digestible, understandable, meaningful, and ultimately more human.

Photo: Chris Rohner/WWF

Conservation Biologist
Andrea Marshall leads groundbreaking research and conservation programs to save globally threatened manta rays and other vulnerable marine megafauna, and their critical habitats.

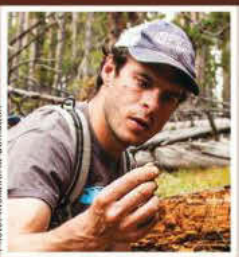


Photo: Alexandria Bombach

Adventurer & Researcher
Gregg Treinish connects research scientists with outdoor adventurers to collect data in hard-to-reach areas, using their findings and his own expeditions to advance conservation worldwide.

Muscles make up roughly half of a human's body weight.

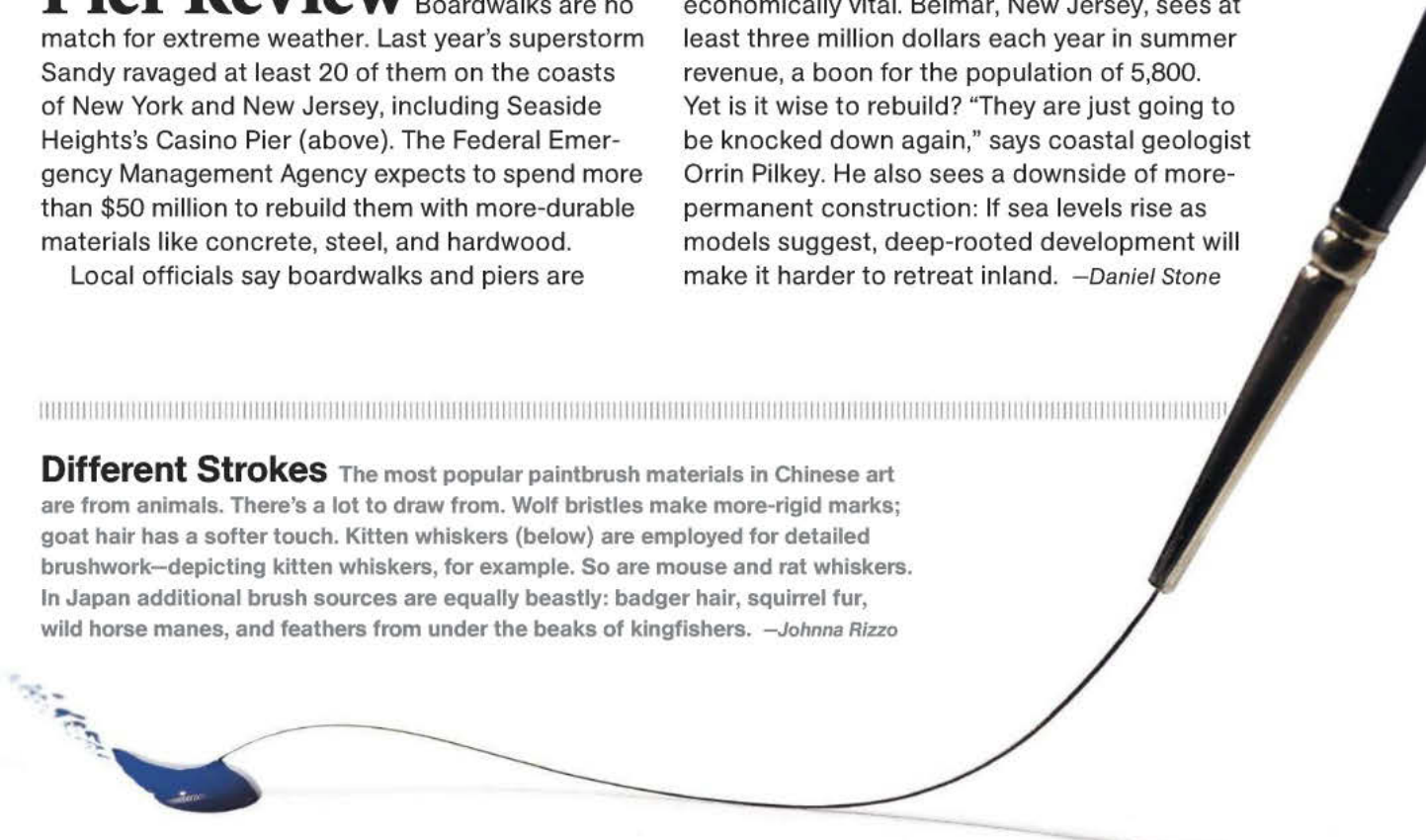
Pier Review

Boardwalks are no match for extreme weather. Last year's superstorm Sandy ravaged at least 20 of them on the coasts of New York and New Jersey, including Seaside Heights's Casino Pier (above). The Federal Emergency Management Agency expects to spend more than $50 million to rebuild them with more-durable materials like concrete, steel, and hardwood.

Local officials say boardwalks and piers are economically vital. Belmar, New Jersey, sees at least three million dollars each year in summer revenue, a boon for the population of 5,800. Yet is it wise to rebuild? "They are just going to be knocked down again," says coastal geologist Orrin Pilkey. He also sees a downside of more-permanent construction: If sea levels rise as models suggest, deep-rooted development will make it harder to retreat inland. *—Daniel Stone*

Different Strokes

The most popular paintbrush materials in Chinese art are from animals. There's a lot to draw from. Wolf bristles make more-rigid marks; goat hair has a softer touch. Kitten whiskers (below) are employed for detailed brushwork—depicting kitten whiskers, for example. So are mouse and rat whiskers. In Japan additional brush sources are equally beastly: badger hair, squirrel fur, wild horse manes, and feathers from under the beaks of kingfishers. *—Johnna Rizzo*



PHOTOS (FROM TOP): MARIO TAMA, GETTY IMAGES; REBECCA HALE, NGM STAFF
GRAPHIC: ÁLVARO VALIÑO. SOURCE: HARVARD MEDICAL SCHOOL

How to Outsmart a Millionaire

Only the "Robin Hood of Watchmakers" can steal the spotlight from a luxury legend for under $200!

Mr. Bigshot rolled up in a roaring high-performance Italian sports car, dropping attitude like his $14,000 watch made it okay for him to be rude. That's when I decided to roll up my sleeves and teach him a lesson.

"Nice watch," I said, pointing to his and holding up mine. He nodded like we belonged to the same club. We did, but he literally paid 100 times more for his membership. Bigshot bragged about his five-figure purchase, a luxury heavyweight from the titan of high-priced timepieces. I told him that mine was the ***Stauer Corso, a 27-jewel automatic classic now available for only $179.*** And just like that, the man was at a loss for words.

The Stauer *Corso* is proof that the worth of a watch doesn't depend on the size of its price tag. Our factory spent over $40 million on Swiss-made machinery to insure the highest quality parts. Each timepiece takes six months and over 200 individual precision parts to create the complex assembly. Peer through the exhibition back to see the 27-jeweled automatic movement in action and you'll understand why we can only offer the ***Corso*** in a limited edition.

Our specialty is vintage automatic movements. The ***Corso*** is driven by a self-winding design, inspired by a 1923 patent. Your watch will never need batteries. Every second of power is generated by the movement of your body. The dial features a trio of complications including a graphic day/night display. The ***Corso*** secures with a two-toned stainless steel bracelet and is water-resistant to 3 ATM.

Your satisfaction is 100% guaranteed. Test drive the Stauer ***Corso***. If you don't love it, send it back within 30 days and we'll refund every dollar of your purchase price. And you're welcome to keep the $99 sunglasses as our gift! Spending more doesn't make you smarter. But saving thousands on a watch this stunning will leave you feeling (and looking) like a genius!

Limited Edition... Order Today!

Exclusive OFFER!

Order the Stauer Corso and these Stauer Flyboy Optics™ Sunglasses (a $99 value) are yours ***FREE****!*

A Stauer Exclusive Not Sold in Stores

Ostentatious Overpriced Competitors Price ~~$14,575.00~~

Stauer's Corso Timepiece — *PLUS Free $99 Stauer Flyboy Optics™ Sunglasses* — only $179 +S&P

Call now to take advantage of this fantastic offer with our 30-day money back guarantee.

1-800-859-1626

Promotional Code CSW370-04
Please mention this code when you call.

Scan to see the elegant Corso Timepiece in action!

Stauer®

14101 Southcross Drive W.,
Dept. CSW370-04
Burnsville, Minnesota 55337
www.stauer.com

27-jeweled Vertex automatic movement - Interior dials - Transparent caseback - Dual-toned stainless steel case and bracelet band fits wrists 6 ½"–9"

TAKE A BOLD ADVENTURE INTO THE UNKNOWN

A NIGHT OF EXPLORATION

COMING IN JUNE

KILLING LINCOLN
FRIDAY JUNE 7 · 8P

CROSSING THE ICE
FRIDAY JUNE 14 · 8P

SECRETS OF THE LOST GOLD
FRIDAY JUNE 21 · 8P

JOURNEY TO THE EDGE OF THE UNIVERSE
FRIDAY JUNE 28 · 8P

NATIONAL GEOGRAPHIC CHANNEL

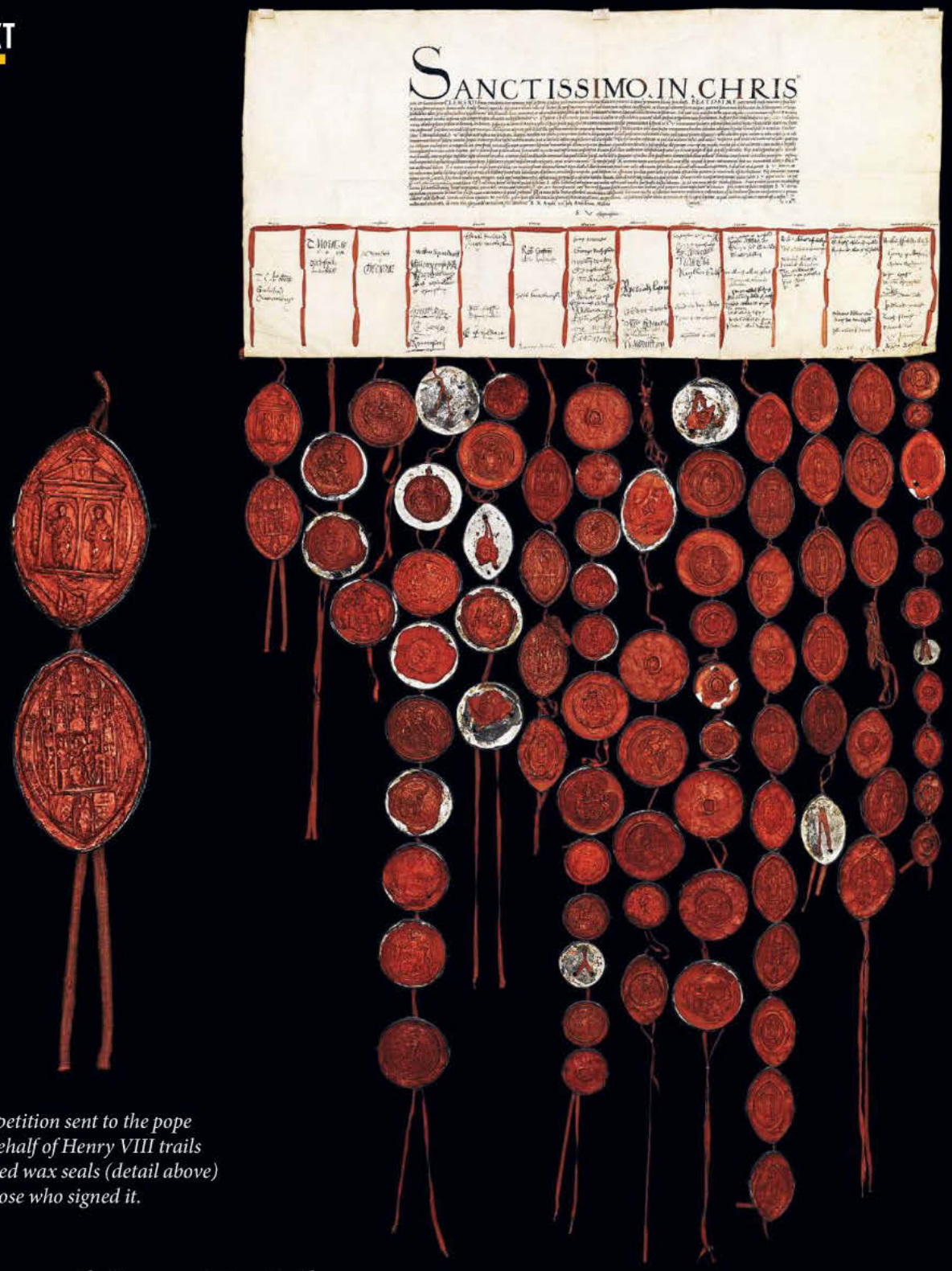
natgeotv.com/exploration

ONLY NATIONAL GEOGRAPHIC CAN TAKE YOU ON A HEART-POUNDING ADVENTURE LIKE THIS

ULTIMATE SURVIVAL ALASKA

NEW EPISODES SUNDAYS 9P

NEXT



The petition sent to the pope on behalf of Henry VIII trails the red wax seals (detail above) of those who signed it.

Breaking Faith This piece of parchment—from the Vatican Secret Archives—helped sow the seeds of the rift between the Church of Rome and the English monarch Henry VIII. Signed by 83 English nobles and clergy members in 1530, the document urged Pope Clement VII to annul the marriage between Henry VIII and Catherine of Aragon, who had failed to produce a male heir. When the pope refused, the king took matters into his own hands. He divorced Catherine and married Anne Boleyn. Clement's subsequent efforts to excommunicate Henry paved the way for the establishment of the Anglican Church.

"The fascination of this document lies in the stories of each of the signers," says Vatican archivist Marco Maiorino, who studied the petition for three years. "Some supported the king, then distanced themselves from him after the schism, and paid for it with their lives." *—Cathy Newman*

PHOTOS: ARCHIVUM SECRETUM VATICANUM, A.A., ARM. I-XVIII 4098A

Chicago Doctor Invents

Affordable Hearing Aid

Outperforms Many Higher Priced Hearing Aids

CHICAGO: A local board-certified Ear, Nose, Throat (ENT) physician, Dr. S. Cherukuri, has just shaken up the hearing aid industry with the invention of a medical-grade, affordable hearing aid. **This revolutionary hearing aid is designed to help millions of people with hearing loss who cannot afford—or do not wish to pay—the much higher cost of traditional hearing aids.**

Dr. Cherukuri knew that untreated hearing loss could lead to depression, social isolation, anxiety, and symptoms consistent with Alzheimer's dementia. **He could not understand why the cost for hearing aids was so high when the prices on so many consumer electronics like TVs, DVD players, cell phones and digital cameras had fallen.**

Superb Performance From Affordable Hearing Aid

The high cost of hearing aids is a result of layers of middlemen and expensive unnecessary features. Dr. Cherukuri concluded that it would be possible to develop a medical grade hearing aid without sacrificing the quality of components. **The result is the MDHearingAid PRO®, starting well under $200 including FREE batteries for a full year. Order on our 45 Day Risk Free Trial.**

Tested By Leading Doctors And Audiologists

The MDHearingAid PRO® has been rigorously tested by leading ENT physicians and audiologists who have unanimously agreed that the **sound quality and output in many cases exceeds more expensive hearing aids.**

- **Designed By A Board Certified ENT Doctor**
- **Doctor-Recommended, Audiologist-Tested**
- **Free Shipping Available**
- **FDA-Registered**
- **Save Up To 90%**
- **★★★★★ Top rated hearing aid online—thousands of satisfied customers**
- **Batteries Included! Comes Ready To Use**
- **100% Money Back Guarantee!**

DOCTORS AND PATIENTS AGREE:
"BEST QUALITY SOUND"
"LOWEST AFFORDABLE PRICE"

*"I have been wearing hearing aids for over 25 years... **Their sound quality rivals that of my $3,000 custom pair of Phonak Xtra digital ITE"*** —Gerald Levy

*"I have a $2,000 Resound Live hearing aid in my left ear and the MDHearingAid PRO® in the right ear. **I am not able to notice a significant difference in sound quality between the two hearing aids."***
—Dr. May, ENT Physician

For the Lowest Price Call Today
1-800-873-0680
Phone Lines Open 24 Hours EVERY DAY

Use Offer Code HW95 to get
FREE Batteries for a Full Year!
FREE Shipping Available

MDHearingAid PRO®
THE DOCTOR'S CHOICE FOR AFFORDABLE HEARING AIDS

100% MONEY BACK GUARANTEE — 45 DAY RISK FREE TRIAL

BBB RATING A

Proudly assembled in the USA
from Domestic & Imported Components.

www.MDHearingAid.com/HW95

Fantastic variety and freaky features are breeders' goldfish standard.


GIBEL CARP

GOLDEN OPPORTUNITIES | In Ocean Park Hong Kong's goldfish house, waters flash with vivid colors and fanciful fins, bulbous eyes and outlandish bodies. These are not the fish you win at a fair and bring home in a plastic bag.

Yet they belong to the same species. First raised by Chinese Buddhists in the Tang dynasty, goldfish are all descended from the gibel carp (top). They've long been "symbols of peace, friendship, and good fortune," says Charlie Young, an Ocean Park curator. By the 10th century they were prized as pets. By the 16th they were being bred for variety—color, shape, eyes, tails. The hobby soon swam to Japan, then on to Europe. It reached the United States as early as 1850.

Today hundreds of organized breeding clubs dot the globe, says Dave Mandley, a U.S. breeder and fellow at the Goldfish Society of Great Britain. Part of the allure is possibility: Two sets of chromosomes from each parent mean mutations abound. "With all that recessive baggage," says Mandley, "you get lots of surprises if you don't know grandma and grandpa."

That also means new varieties appear each year—a fish tale that grows with the telling. *—Jeremy Berlin*

There are approximately 1.4 billion insects for every human being.

Preferences persist: Chinese favor dragon-like features; Japanese crave symmetry. These goldfish are four to ten inches long. Some varieties—there are about 300—have sold for tens of thousands of dollars.

1. TRICOLOR RANCHU 2. RED PEARL-SCALE 3. CALICO RYUKIN 4. BLACK DRAGON-EYE 5. RED CELESTIAL-EYE 6. RED BUBBLE-EYE 7. CHOCOLATE WHITE BUTTERFLY MOOR 8. TRICOLOR DORSAL-FINNED BUBBLE-EYE 9. TRICOLOR RYUKIN 10. CALICO ORANDA

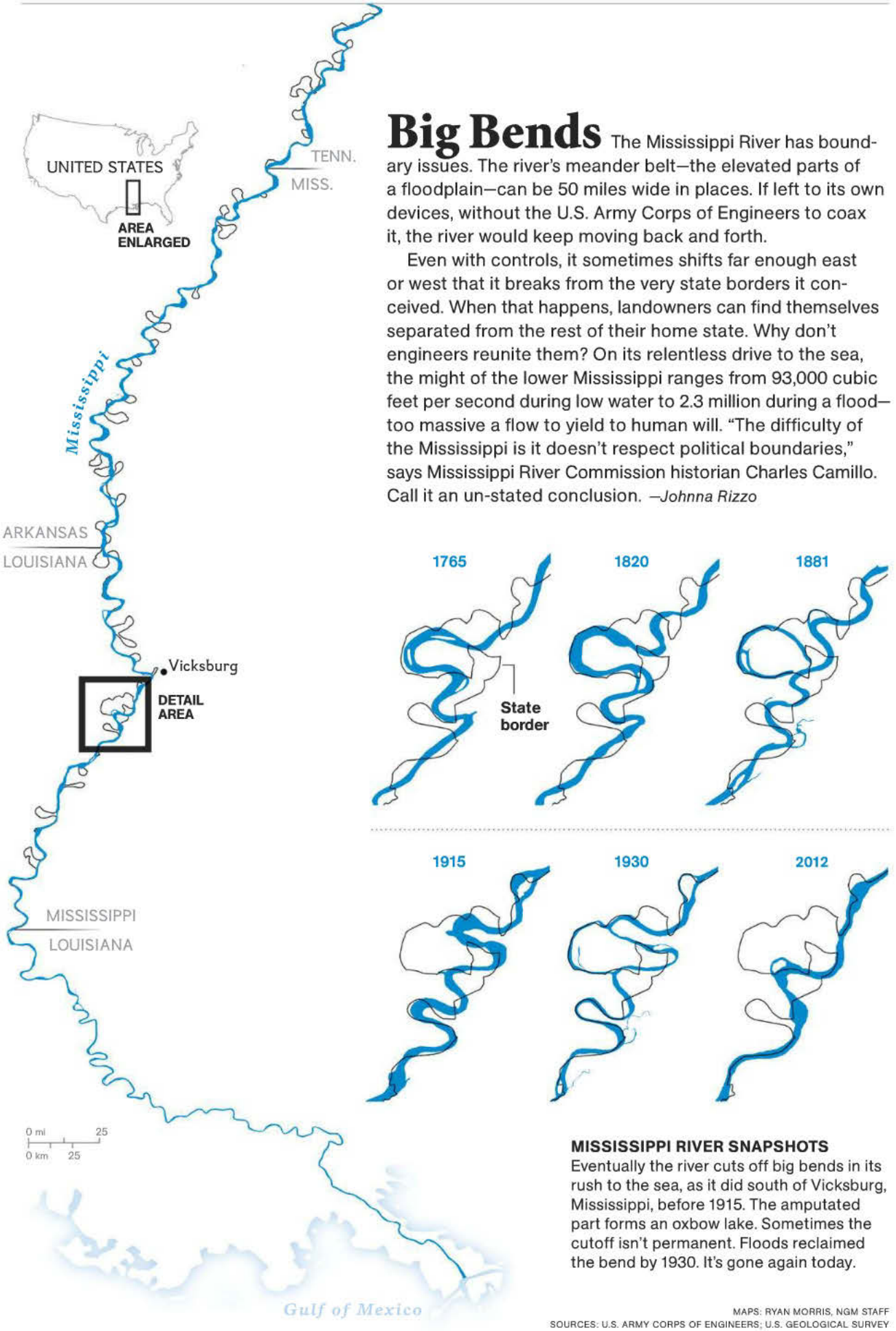
Images are not to scale.

PHOTOS: JOEL SARTORE. GRAPHIC: ÁLVARO VALIÑO. SOURCE: SMITHSONIAN

Big Bends

The Mississippi River has boundary issues. The river's meander belt—the elevated parts of a floodplain—can be 50 miles wide in places. If left to its own devices, without the U.S. Army Corps of Engineers to coax it, the river would keep moving back and forth.

Even with controls, it sometimes shifts far enough east or west that it breaks from the very state borders it conceived. When that happens, landowners can find themselves separated from the rest of their home state. Why don't engineers reunite them? On its relentless drive to the sea, the might of the lower Mississippi ranges from 93,000 cubic feet per second during low water to 2.3 million during a flood—too massive a flow to yield to human will. "The difficulty of the Mississippi is it doesn't respect political boundaries," says Mississippi River Commission historian Charles Camillo. Call it an un-stated conclusion. *—Johnna Rizzo*



MISSISSIPPI RIVER SNAPSHOTS
Eventually the river cuts off big bends in its rush to the sea, as it did south of Vicksburg, Mississippi, before 1915. The amputated part forms an oxbow lake. Sometimes the cutoff isn't permanent. Floods reclaimed the bend by 1930. It's gone again today.

MAPS: RYAN MORRIS, NGM STAFF
SOURCES: U.S. ARMY CORPS OF ENGINEERS; U.S. GEOLOGICAL SURVEY

For arthritis patients, it's simple physics:

A body in motion tends to stay in motion.

Celebrex can help relieve arthritis pain...so you can keep moving.

Staying active can actually relieve arthritis symptoms. But if you have arthritis, staying active can be difficult. Celebrex can help relieve arthritis pain...so *your* body can stay in motion.

- **Just one 200mg Celebrex a day can provide 24-hour relief for many with arthritis pain and inflammation.***
- **Celebrex is proven to improve pain, stiffness and daily physical function in clinical studies.****
- **Celebrex can be taken with or without food.**
- **Celebrex is not a narcotic.**

When it comes to finding the right arthritis treatment for you, you and your doctor need to balance the benefits with the risks. So ask your doctor about prescription Celebrex. It could be an important step towards keeping *your* body in motion.

Visit **celebrex.com** or call 1-888-CELEBREX for more information.

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.

*Individual results may vary. **Clinical studies with osteoarthritis patients.

Important Safety Information:

All prescription NSAIDs, like CELEBREX, ibuprofen, naproxen and meloxicam have the same cardiovascular warning. They may all increase the chance of heart attack or stroke, which can lead to death. This chance increases if you have heart disease or risk factors for it, such as high blood pressure or when NSAIDs are taken for long periods.

CELEBREX should not be used right before or after certain heart surgeries.

Serious skin reactions, or stomach and intestine problems such as bleeding and ulcers, can occur without warning and may cause death. Patients taking aspirin and the elderly are at increased risk for stomach bleeding and ulcers.

Tell your doctor if you have: a history of ulcers or bleeding in the stomach or intestines; high blood pressure or heart failure; or kidney or liver problems.

CELEBREX should not be taken in late pregnancy.

Life-threatening allergic reactions can occur with CELEBREX. Get help right away if you've had swelling of the face or throat or trouble breathing. Do not take it if you have bleeding in the stomach or intestine, or you've had an asthma attack, hives, or other allergies to aspirin, other NSAIDs or certain drugs called sulfonamides.

Prescription CELEBREX should be used exactly as prescribed at the lowest dose possible and for the shortest time needed.

See the Medication Guide on the next page for important information about Celebrex and other prescription NSAIDs.

Pfizer Helpful Answers®
Filling a need for prescription assistance

Uninsured? Need help paying for Pfizer medicines?
Pfizer has programs that can help. Call **1-866-706-2400** or visit **PfizerHelpfulAnswers.com**

CELEBREX® (CELECOXIB CAPSULES) 100 mg 200 mg *For a body in motion™*

Medication Guide
for
Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

(See the end of this Medication Guide for a list of prescription NSAID medicines.)

What is the most important information I should know about medicines called Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)?

NSAID medicines may increase the chance of a heart attack or stroke that can lead to death.

This chance increases:

- with longer use of NSAID medicines
- in people who have heart disease

NSAID medicines should never be used right before or after a heart surgery called a "coronary artery bypass graft (CABG)."

NSAID medicines can cause ulcers and bleeding in the stomach and intestines at any time during treatment. Ulcers and bleeding:

- can happen without warning symptoms
- may cause death

The chance of a person getting an ulcer or bleeding increases with:

- taking medicines called "corticosteroids" and "anticoagulants"
- longer use
- smoking
- drinking alcohol
- older age
- having poor health

NSAID medicines should only be used:

- exactly as prescribed
- at the lowest dose possible for your treatment
- for the shortest time needed

What are Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)?

NSAID medicines are used to treat pain and redness, swelling, and heat (inflammation) from medical conditions such as:

- different types of arthritis
- menstrual cramps and other types of short-term pain

Who should not take a Non-Steroidal Anti-Inflammatory Drug (NSAID)?

Do not take an NSAID medicine:

- if you had an asthma attack, hives, or other allergic reaction with aspirin or any other NSAID medicine
- for pain right before or after heart bypass surgery

Tell your healthcare provider:

- about all of your medical conditions.
- about all of the medicines you take. NSAIDs and some other medicines can interact with each other and cause serious side effects. **Keep a list of your medicines to show to your healthcare provider and pharmacist.**
- if you are pregnant. **NSAID medicines should not be used by pregnant women late in their pregnancy.**
- if you are breastfeeding. **Talk to your doctor.**

What are the possible side effects of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)?

Serious side effects include:

- heart attack
- stroke
- high blood pressure
- heart failure from body swelling (fluid retention)
- kidney problems including kidney failure
- bleeding and ulcers in the stomach and intestine
- low red blood cells (anemia)
- life-threatening skin reactions
- life-threatening allergic reactions
- liver problems including liver failure
- asthma attacks in people who have asthma

Other side effects include:

- stomach pain
- constipation
- diarrhea
- gas
- heartburn
- nausea
- vomiting
- dizziness

Get emergency help right away if you have any of the following symptoms:

- shortness of breath or trouble breathing
- chest pain
- weakness in one part or side of your body
- slurred speech
- swelling of the face or throat

Stop your NSAID medicine and call your healthcare provider right away if you have any of the following symptoms:

- nausea
- more tired or weaker than usual
- itching
- your skin or eyes look yellow
- stomach pain
- flu-like symptoms
- vomit blood
- there is blood in your bowel movement or it is black and sticky like tar
- skin rash or blisters with fever
- unusual weight gain
- swelling of the arms and legs, hands and feet

These are not all the side effects with NSAID medicines. Talk to your healthcare provider or pharmacist for more information about NSAID medicines.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

Other information about Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

- Aspirin is an NSAID medicine but it does not increase the chance of a heart attack. Aspirin can cause bleeding in the brain, stomach, and intestines. Aspirin can also cause ulcers in the stomach and intestines.
- Some of these NSAID medicines are sold in lower doses without a prescription (over-the-counter). Talk to your healthcare provider before using over-the-counter NSAIDs for more than 10 days.

NSAID medicines that need a prescription

Generic Name	Tradename
Celecoxib	Celebrex
Diclofenac	Cataflam, Voltaren, Arthrotec (combined with misoprostol)
Diflunisal	Dolobid
Etodolac	Lodine, Lodine XL
Fenoprofen	Nalfon, Nalfon 200
Flurbiprofen	Ansaid
Ibuprofen	Motrin, Tab-Profen, Vicoprofen* (combined with hydrocodone), Combunox (combined with oxycodone)
Indomethacin	Indocin, Indocin SR, Indo-Lemmon, Indomethagan
Ketoprofen	Oruvail
Ketorolac	Toradol
Mefenamic Acid	Ponstel
Meloxicam	Mobic
Nabumetone	Relafen
Naproxen	Naprosyn, Anaprox, Anaprox DS, EC-Naproxyn, Naprelan, Naprapac (copackaged with lansoprazole)
Oxaprozin	Daypro
Piroxicam	Feldene
Sulindac	Clinoril
Tolmetin	Tolectin, Tolectin DS, Tolectin 600

* Vicoprofen contains the same dose of ibuprofen as over-the-counter (OTC) NSAIDs, and is usually used for less than 10 days to treat pain. The OTC NSAID label warns that long term continuous use may increase the risk of heart attack or stroke.

This Medication Guide has been approved by the U.S. Food and Drug Administration.
LAB-0609-1.0

Released to the Public: Bags of Vintage Buffalo Nickels

Historic 1920-1938 "Buffalos" by the Pound

Actual size is 21.2 mm

2013 marks the 100th anniversary of an American Classic: the Buffalo Nickel. To honor this milestone, New York Mint is releasing to the public bags of original U.S. government Buffalo Nickels not seen in circulation for decades. Now they can be acquired for a limited time only—not as individual collector coins, but by weight—**just $49 for a full Quarter-Pound Bag.**

100% Valuable Collector Coins—GUARANTEED!

Every bag will be filled with collectible vintage Buffalos from over 70 years ago, GUARANTEED ONE OF EACH:

- **1920-1929—*"Roaring '20s" Buffalo***
- **1930-1938—*The Buffalo's Last Decade***
- **Mint Marks (P,D, and S)**
- **ALL Collector Grade Very Good Condition**
- **FREE Stone Arrowhead with each bag**

Every vintage Buffalo Nickel you receive will be a coveted collector coin—GUARANTEED! Plus, order a gigantic full Pound bag and you'll also receive a vintage Liberty Head Nickel (1883-1912), a valuable collector classic!

Long-Vanished Buffalos Highly Coveted by Collectors

Millions of these vintage Buffalo Nickels have worn out in circulation or been recalled and destroyed by the government. Today, significant quantities can often only be found in private hoards and estate collections. As a result, these coins are becoming more sought-after each day. In fact, the market price for Buffalo Nickels has risen 76% in the last ten years alone!

Supplies Limited—Order Now!

Supplies of vintage Buffalo Nickels are limited as the availability continues to shrink. And the 100th anniversary is certain to drive demand up even further! They make a precious gift for your children, family and friends that will be appreciated for a lifetime.

NOTICE: Due to recent changes in the demand for vintage U.S. coins, this advertised price may change without notice. Call today to avoid disappointment.

30-Day Money-Back Guarantee

You must be 100% satisfied with your bag of Buffalo Nickels or return it within 30 days of receipt for a prompt refund (less s/h).

FREE Liberty Head Nickel with One Full Pound

Order More and SAVE

QUARTER POUND Buffalo Nickels
Plus FREE Stone Arrowhead **$49** + *s/h*

HALF POUND Bag
Plus FREE Stone Arrowhead **$79** + *s/h* **SAVE $19**

ONE FULL POUND Bag *Plus FREE Stone Arrowhead and Liberty Head Nickel* **$149** + *s/h* **SAVE $47**

TOLL-FREE 24 HOURS A DAY
1-800-695-2018

Offer Code VBB182-01
Please mention this code when you call.

New York Mint

14101 Southcross Drive W.,
Dept. VBB182-01
Burnsville, Minnesota 55337
www.NewYorkMint.com

world beat

EVENTS & OPPORTUNITIES • ADVERTISING & PROMOTIONS

SEE WHAT DELTA CAN DO

Delta®Faucet creates products based on the belief that there are smarter ways for you to experience water. These products go beyond beautiful design to incorporate thoughtful innovation, such as faucets with Touch$_2$O®Technology, which turn on and off with just a touch.

To learn more, visit *deltafaucet.com.*

DELTA
see what Delta can do™

HOMEOWNERS INSURANCE AVAILABLE THROUGH PROGRESSIVE

Save even more when you bundle your home and auto policies.

Learn more at *Progressive.com* or call 1-800-PROGRESSIVE.

PROGRESSIVE

NATIONAL GEOGRAPHIC PRESENTS JERUSALEM 3D

National Geographic will present JERUSALEM in museum theaters worldwide this fall. Destroyed and rebuilt countless times over 5,000 years, Jerusalem's enduring appeal remains a mystery. Experience as never before the beauty and majesty of this ancient and beloved city as you discover some of its many secrets.

For more information, go to *nationalgeographic.com/movies.*

AN ARCANE/COSMIC PICTURE FILM
JERUSALEM
FILMED IN IMAX 3D

NATIONAL GEOGRAPHIC
ENTERTAINMENT

TRAVELODGE— FREE KIDS ZOO TICKET OFFER

Travelodge Hotels wants to make your summer vacation even better! Stay two nights at a Travelodge in the U.S. and you can receive two children's zoo tickets—that's what's called a ZOOcation! Plus get free breakfast, free Internet, and kids under 17 stay free at more than 350 locations around the U.S.

For more information, visit *Travelodge.com/Zoocation.*

Travelodge®

100% ENJOYMENT, 49% MORE TREES

No wonder you ♥ paper

Did you know that there are now 49% more trees growing in the U.S. than 50 years ago?*

To discover some surprising environmental facts about print and paper, visit *youlovepaper.info/us.*

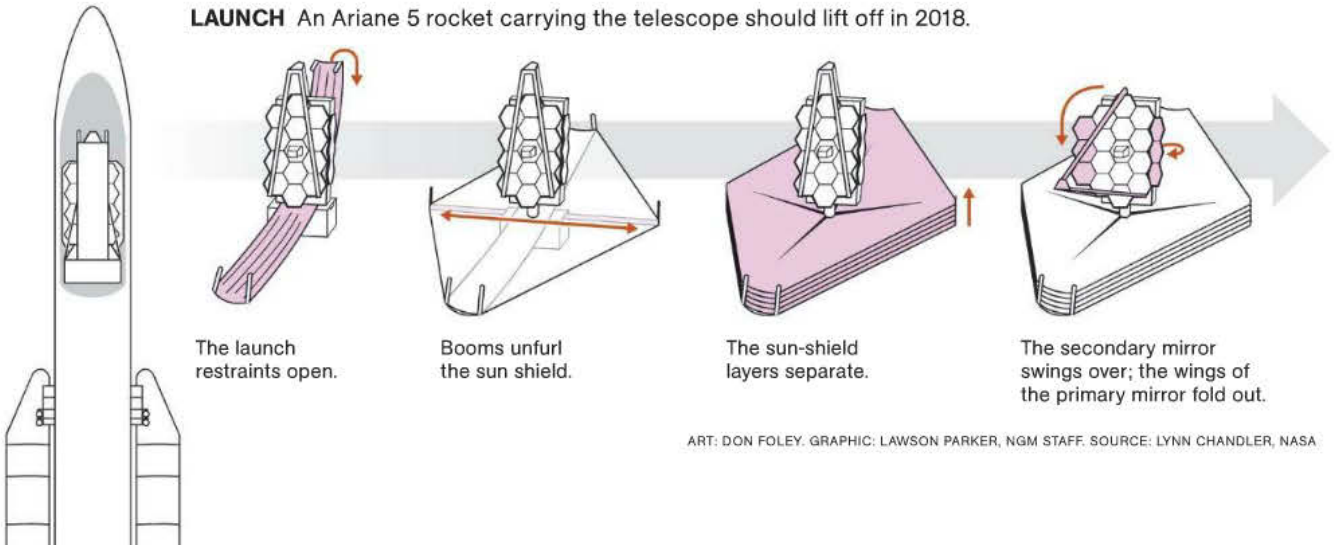
Print and Paper. The environmental facts may surprise you

TWO SIDES

*Society of American Foresters

Seeing Stars

Move over, Hubble. When the James Webb Space Telescope—a joint project of NASA, the European Space Agency, and the Canadian Space Agency—launches, it will sail past the older telescope to a location a million miles from Earth. There a huge sun shield will block heat from the sun and Earth, cooling the craft to below -370°F so its infrared equipment will work. Notes ESA space science research head Mark McCaughrean: "What we really hope to see are the very first stars ever born in the universe." *—Elizabeth Preston*



ART: DON FOLEY. GRAPHIC: LAWSON PARKER, NGM STAFF. SOURCE: LYNN CHANDLER, NASA

Paul Salopek follows local guides into the Afar Desert on a 22,000-mile walk to retrace the human diaspora. Keep up with Salopek's trek at *outofedenwalk.nationalgeographic.com*.

JOHN STANMEYER

THE MYSTERY OF RISK

Why do we do it? What makes an explorer face danger and yet press on when others would turn back?

By Peter Gwin

The man who led a landmark attempt to navigate the entire length of the Grand Canyon did not exactly look the part of a dashing gilded-age adventurer. John Wesley Powell stood only five feet six, had a shock of bristle-brush hair and an unruly tobacco-stained beard that splayed onto his chest. The right sleeve of his jacket hung empty, the result of a minié ball at the Battle of Shiloh. Yet after the war he went on to survey large swaths of the Rocky Mountains, live among hostile bands of Indians, raft the Green and Colorado Rivers, and probe the unmapped labyrinths of one of the world's largest canyon systems. A stranger might reasonably have wondered what had steered this slight, one-armed university professor to embark on some of the riskiest explorations of his age.

In fact, the same could have been asked of each of the 32 men who joined Powell on January 13, 1888, at Washington, D.C.'s Cosmos Club. Like him, most had pursued their own perilous journeys into unknown wildernesses. Among them were veterans of the Civil War and Indian campaigns, naval officers, mountaineers, meteorologists, engineers, naturalists, cartographers, ethnologists, and a journalist who had crossed Siberia. They were men who had been stranded in the Arctic, survived violent weather at sea, escaped animal attacks and avalanches, endured extreme hunger, and persevered against the soul-crushing loneliness of traveling in remote landscapes.

They had gathered that evening to found the National Geographic Society and had agreed that their new organization's mission—"the increase and diffusion of geographical knowledge"—would require difficult explorations into unknown territories. Their ethos could be summed up by a passage Powell had written in his journal during his Colorado River expedition almost two decades earlier. After his team, riding in small boats, made several harrowing descents through rapids and over waterfalls, three of the men decided to quit and climb their way out of the canyons, taking their chances crossing the desert. "They entreat us not to go on, and tell us that it is madness to set out in this place," Powell wrote. And yet "to leave the exploration unfinished, to say that there is a part of the canyon which I cannot explore, having already nearly accomplished it, is more than I am willing to acknowledge, and I determine to go on."

Exploration of all sorts is rooted in the notion of taking risks. Risk underlies any journey into the unknown, whether it is a ship captain's voyage into uncharted seas, a scientist's research on dangerous diseases, or an entrepreneur's investment in a new venture. But what exactly pushed Christopher Columbus to embark on a

voyage across the Atlantic, or Edward Jenner to test his theory for an early smallpox vaccine on a child, or Henry Ford to bet that automobiles could replace horses? For that matter, why did Powell ignore the cautions of his men and the obvious dangers in front of him to venture deeper into the wilds of the Grand Canyon?

Some of the motivations for taking risks are obvious—financial reward, fame, political gain, saving lives. Many people willingly expose themselves to varying degrees of risk in their pursuit of such goals. But as the danger increases, the number of people willing to go forward shrinks, until the only ones who remain are the extreme risk takers, those willing to endanger their reputation, fortune, and life. This is the mystery of risk: What makes some humans willing to jeopardize so much and continue to do so even in the face of dire consequences?

One hundred and twenty-five years after that night at the Cosmos Club, scientists have begun to open up the neurological black box containing the mechanisms for risk taking and tease out the biological factors that may prompt someone to become an explorer. Their research has centered on neurotransmitters, the chemicals that control communication in the brain. One neurotransmitter that is crucial to the risk-taking equation is dopamine, which helps control motor skills but also helps drive us to seek out and learn new things as well as process emotions such as anxiety and fear. People whose brains don't produce enough dopamine, such as those who are afflicted with Parkinson's disease, often struggle with apathy and a lack of motivation.

On the opposite end of the spectrum, robust dopamine production holds one of the keys to understanding risk taking, says Larry Zweifel, a neurobiologist at the University of Washington. "When you're talking about someone who takes risks to accomplish something—climb a mountain, start a company, run for office, become a Navy SEAL—that's driven by motivation, and motivation is driven by the dopamine system. This is what compels humans to move forward."

Dopamine helps elicit a sense of satisfaction when we accomplish tasks: the riskier the task, the larger the hit of dopamine. Part of the reason we don't all climb mountains or run for office is that we don't all have the same amount of dopamine. Molecules on the surface of nerve cells called autoreceptors control how much dopamine we make and use, essentially controlling our appetite for risk.

In a study conducted at Vanderbilt University, participants underwent scans allowing scientists to observe the autoreceptors in the part of the brain circuitry associated with reward, addiction, and movement. People who had fewer autoreceptors—that is, freer flowing dopamine—were more likely to engage in novelty-seeking behavior, such as exploration. "Think of dopamine like gasoline," says neuropsychologist David Zald, the study's lead author. "You combine that with a brain equipped with a lesser ability to put on the brakes than normal, and you get people who push limits."

This is where the discussion often confuses risk takers with thrill seekers or adrenaline junkies. The hormone adrenaline is also a neurotransmitter, but unlike dopamine, which can push us toward danger in the course of achieving certain goals, adrenaline is designed to help us escape from danger. It works like this: When the brain perceives a threat, it triggers the release of adrenaline into the bloodstream, which in turn stimulates the heart, lungs, muscles, and other parts of the body to help flee or fight in a life-threatening situation. This chemical release generates a feeling of

exhilaration that continues after the threat has passed, as the adrenaline clears the system. For some people that adrenaline rush can become a reward the brain seeks. They are prompted to induce it by going to scary movies or engaging in extreme sports or by artificial means such as taking narcotics.

But adrenaline isn't what motivates explorers to take risks. "An Arctic explorer who's slogging through ice for a month isn't motivated by adrenaline coursing through his veins," says Zald. "It's the dopamine firing in his brain."

Critical to this process is how the brain measures risk. Photographer Paul Nicklen describes how his definition of acceptable risks has evolved over time. "When I was a kid living in the Arctic, I would paddle ice floes like rafts, which was probably risky. Then I learned to dive, and I just kept wanting to go deeper, stay in the water longer, get closer to the animals.

"For a long time I told myself I wouldn't dive with Atlantic walruses," he says. "The reason there aren't many photos of Atlantic walruses swimming under polar ice is because it's incredibly difficult and dangerous to cut a hole in ice that's several feet thick and dive into water barely above freezing and try to get close to 3,000-pound animals that can be highly aggressive when disturbed. There are a lot of ways to die doing that."

Nicklen's reward for taking those risks is capturing walrus images that are so close, so three-dimensional, that they cast a spell over a reader. "I want readers to feel like they *are* a walrus, swimming with other walruses. For fleeting moments, that's what I feel like at times. The only way I can describe how powerful a feeling that is is through these pictures. I guess I am sort of addicted to it."

The movement of Nicklen's personal "risk line" is his brain's way of recalibrating risks based on past experience, says Larry Zweifel. "He is very comfortable recognizing what potential threatening situations look like and how to successfully avoid those situations. His brain calculates the risks and the potential reward, facilitated by his dopamine system, which then motivates him to do the dive."

And yet, says Zweifel, "if he were to repeatedly dive with animals that threaten his life and encounter many near-death experiences but continue to make such dives regardless of the negative outcomes, then that would be compulsive behavior, which can become pathological, like losing everything because of a gambling problem."

ACCLIMATING TO RISK is something we all do in our daily lives. A good example of this occurs when learning to drive a car. At first a new driver may fear traveling on freeways, but over time that same driver with more experience will merge casually into speeding traffic with little consideration for the significant potential dangers.

"When activities become routine and familiar, we let our guard down, especially when nothing bad happens for quite some time," says Daniel Kruger, an evolutionary psychologist at the University of Michigan. "We have a system designed to react to short-term threats, but when it is on all the time, it can have a detrimental impact on the body," such as elevating blood sugar and suppressing the immune system.

This familiarity principle can also be applied to help deal with the fear associated with high-

---

Senior writer Peter Gwin wrote about Africa's rhino-poaching epidemic in the March 2012 issue.

"For a long time I told myself I wouldn't dive with Atlantic walruses. It's incredibly dangerous to get close to 3,000-pound animals that can be highly aggressive. There are a lot of ways to die doing that."

—Paul Nicklen, photographer

risk situations. By practicing an activity, humans can become used to the risk and manage the fear that arises in those situations, says Kruger. "Tightrope walkers start by learning to walk on a beam on the ground and then move to a rope just off the ground, until finally they graduate to the high wire. It appears more dangerous to an audience that has never walked a tightrope than it does to the tightrope walker."

Last October former Austrian paratrooper Felix Baumgartner took this principle to the extreme when he rode a helium balloon into the stratosphere and leaped out, descending 22.6 miles to the Earth. His record-setting parachute jump included a four-and-a-half-minute free fall that exceeded 843 miles per hour.

In preparation for such an epic feat, he and his team had spent five years refining his equipment, using an altitude chamber to simulate the temperatures and pressures he would encounter, and practicing jumps from various altitudes.

"To people on the outside, the jump looks like an extraordinary risk," Baumgartner says. "But if you look carefully at the details, you find out the risk is minimized as much as possible."

It is, however, important to remember that a person doesn't have to jump from space to be a risk taker, says Kruger. "Taking risks is part of our human legacy. We are all motivated to survive and reproduce. To accomplish both involves choices that might lead to negative outcomes. Essentially, that is risk taking."

THE NOTION THAT WE ARE ALL descended from risk takers fascinates writer Paul Salopek. "Humans leaving the Great Rift Valley were the first great explorers," he reasons. With this in mind, he has embarked on a seven-year, 22,000-mile journey to follow in their footsteps as they radiated out of Africa and across the planet. It is the trail of some of the first risk takers, who along the way took bites of unknown plants and animal flesh, learned to traverse deep water, and discovered ways to sustain their body temperature in cold.

In making this journey Salopek is taking his own set of extraordinary risks. "The idea is to walk the daily length that nomads did when they left Africa 50,000 to 70,000 years ago. Scientists have found that to be about ten miles a day," he said in January, shortly before he began the trek from the site in northeastern Ethiopia's Afar region where some of the first anatomically modern human fossils were found. At this pace he plans to pass through three continents and 30-odd international borders, as well as scores of languages and ethnic groups, mountain ranges and rivers, deserts and high plains, dying cities and bustling new metropolises.

Salopek is no novice when it comes to challenging travel. In August 2006 he was covering the conflict in Darfur, Sudan, as part of an assignment for *National Geographic* when he was kidnapped by militiamen, who beat and threatened to kill him. He was eventually released.

"The philosophy behind this walk is to get readers to focus less on the notion that the world is a dangerous place," he says. "The world can kill you in a heartbeat, whether you stay at home or leave home." Instead, he hopes "to get readers to think about the wider horizons, the wider possibilities in life, the trails taken and not taken, and be comfortable with uncertainty."

Basically Salopek wants to remind people that at our innermost core we are all risk takers, if some more than others. And this shared willingness to explore our planet has bound our species from the very beginning.

It's a noble idea, albeit one that is fueled by dopamine. □

Photographs by Marco Grob

Into the Unknown

SYLVIA EARLE has spent nearly a year of her life diving beneath the ocean. In the 1960s the oceanographer had to fight to join expeditions. Women weren't welcome. Today the legendary 77-year-old explorer fights for marine sanctuaries.

Have you ever gotten in over your head, so to speak?
I have come up at the end of a dive, and the boat was not where I left it. I had to take care of a buddy who did panic. But I was confident the boat would come back.

Are you ever afraid?
I do my utmost to satisfy myself that everything is checked. I trust the engineers who built the machine, and I know there are backups. If there's a problem, there are protocols to follow. Then I park those worries on the surface and enjoy the privilege of being under the sea, where primates typically don't go.

How has the ocean changed over the course of your career?
We've learned more, and we have lost more. Half the coral reefs are gone or in a state of decline. It's like a race: Can we take action while there is still time?

FELIX BAUMGARTNER is the first to break the sound barrier just by... falling. Last October a balloon lifted him to the stratosphere. He jumped, parachuting a record 22.6 miles and hitting 843.6 mph. At 44, he now plans to pilot rescue helicopters.

There are those who say what you did was a stunt.
Give me some names!

You were sponsored by Red Bull. And a 22.6-mile jump is stuntlike.
I don't like the word "stunt." But what is a stunt? An attempt to do something super-risky. It requires planning. Safety is a priority. Same thing here.

If it's not a stunt, what did you learn?
We proved high altitude is survivable, tested the next-generation pressure suit. NASA is interested in the data about what happens if a person breaks the speed of sound.

Take us on the jump with you.
I was not frightened. I had practiced. In the beginning it feels like floating. You gain speed. You're hauling ass but never realize how fast you're going. [Space] is breathtaking but hostile. Without protection we have no business up there.

INTERVIEWS BY RACHEL HARTIGAN SHEA (EARLE) AND MARC SILVER (BAUMGARTNER)

Adventurers Supreme

SIR RANULPH FIENNES has been called the "world's greatest living explorer." He rejects the label, but his résumé is beyond dispute. Over 40 years the Briton has led record-setting expeditions up rivers, across deserts, and to both Poles. Now 69, Fiennes was to cross Antarctica this past winter—the coldest walk on Earth, in near-total darkness—when frostbite forced him to pull out, leaving him "gutted."

You've lost fingers, had heart attacks, been in a coma. Why do you do it?
Speaking for my longtime team, we simply want to be first. We also do projects between expeditions to raise money for charity. But the most basic motivation is that I never got to do what my dad did: command Scotland's last cavalry regiment.

What happened?
I wasn't designed to pass A-level math, so I didn't get into the U.K.'s officer academy. But I enlisted in the army anyway, where I taught soldiers how to canoe, ski, climb mountains—adventure training. In civilian life it's called an expedition. And sponsorship, I learned, is easier to get if you're going for a big world first.

Which great explorers do you consider mentors or role models?
In my desert travels I really admired Wilfred Thesiger. Polarwise it would be Douglas Mawson. And of course Captain Robert Scott, the first man to penetrate Antarctica.

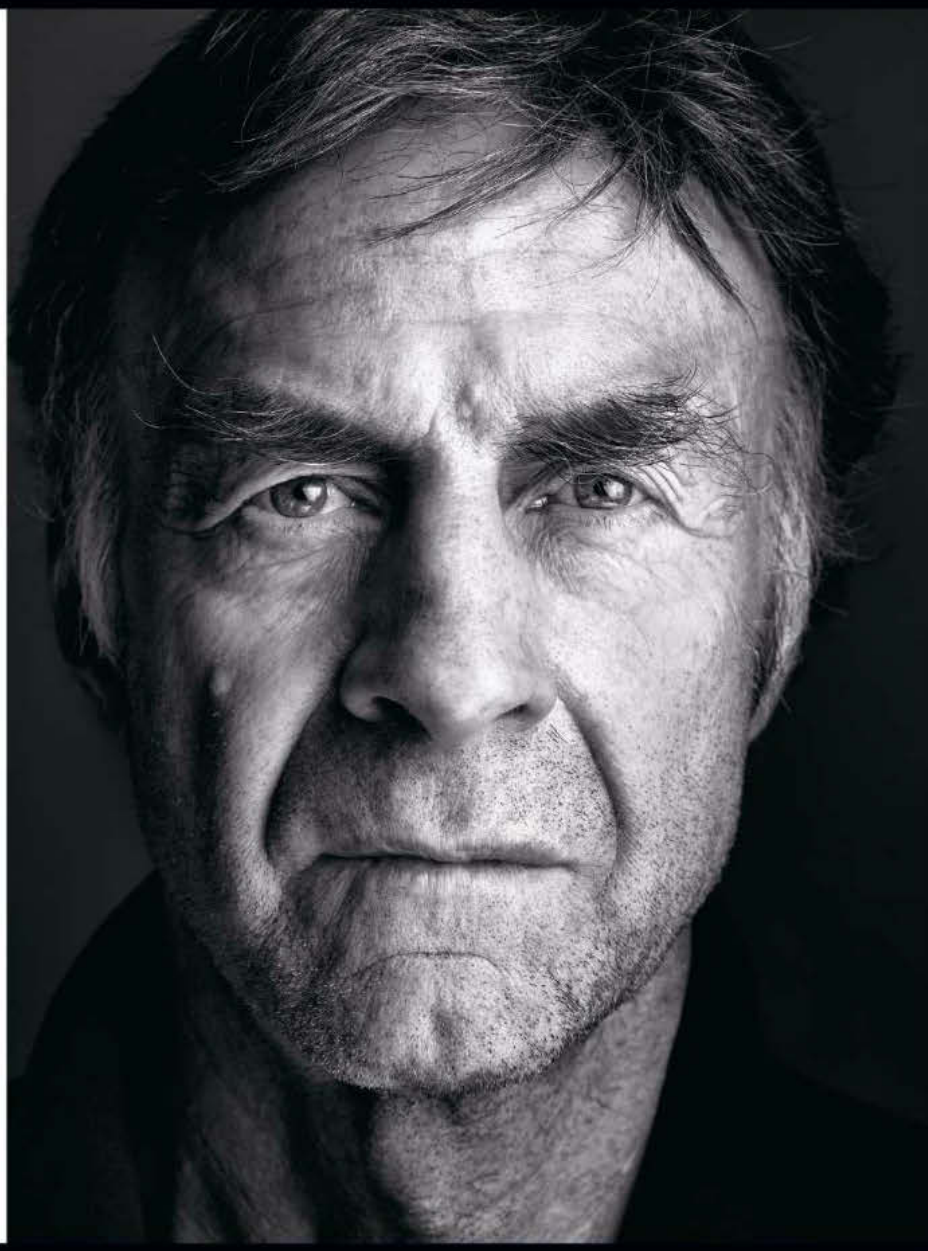
Do you have a mantra or talisman to help overcome fear in the field?
I have a five-inch cuddly toy that I've taken everywhere, a pink piglet called LEP—Little English Pig. My late wife gave it to me on a polar expedition 30 years ago.

Does one of your adventures stand out as the riskiest?
In 2007, to confront my vertigo, I climbed the Swiss Eiger. But when I got to the top, I realized I'd never looked down—I'd only succeeded because I hadn't faced my fear.

How do you rebound from a failure or a near miss?
I would summarize 40 years of expeditions mathematically: 50 percent failed. You can't assume you're going to break a world record. If you know that, you also know you can often try again—using a different attack system, from a different angle.

Watch photographer Marco Grob's videos of these six risk takers on our digital editions.

INTERVIEW BY JEREMY BERLIN



GERLINDE KALTENBRUNNER is the first woman in history to summit all 14 of the world's 8,000-plus-meter peaks without supplemental oxygen, a feat she completed on K2 in August 2011. The 42-year-old Austrian has plowed through chest-deep snow, subzero temperatures, rockfalls that have caused others to turn back. Still, the veteran climber says she feels "quite safe" most of the time.

Why do you climb?
I feel completely myself when I'm in the mountains with only the bare essentials. There's a freedom in total concentration. Nothing else exists, only the climb.

Anything special you always carry with you?
My bracelet from Tibet. The stones represent power, energy, success, and health.

What's the scariest moment you've faced?
On Dhaulagiri [in Nepal] in 2007 there was an avalanche one morning, and I was swept away inside my tent. When it stopped, I didn't know if I was up or down; it was so dark. But I thought, OK, at least I can breathe. I always carry a small knife in my harness, so I was able to cut a hole in the tent. I was terrified that the snow would suffocate me. Slowly, slowly, I made it out. I searched for three Spanish climbers who had camped near me. Two of them were dead. In that moment everything seemed to be over. For the first time I just wanted to leave the mountain.

How did you move past that terrible experience?
It helped to talk with my husband, Ralf, who is also a climber and understands me completely. I realized that I couldn't make the tragedy unhappen, and I couldn't stop climbing—this is my life. A year later I returned to the same spot. There was the most beautiful sunrise I have ever seen. Joy and sorrow can be so close together.

Is this what you've always wanted to do?
Yes. As a teenager, I dreamed of becoming a professional mountaineer, but I didn't know how. I was a nurse until 2003, when I dared to devote myself only to climbing.

What advice would you give a teenager with similar dreams now?
The most important thing is to have this passion inside. It's not about what other people say is best for you—listen to your soul, your body, your gut instincts. If you really love something, you'll find a way to reach it. But without passion, it's pointless.

INTERVIEW BY AMANDA FIEGL

Image Makers

PAUL NICKLEN spent much of his childhood in remote towns on Baffin Island, Canada, exploring the Arctic landscape with Inuit kids. Those experiences led him to photography. Now 44, he shoots wildlife above and below the polar ice.

How did your childhood prepare you for life as a photographer?
We didn't have radio, TV, or phone. My whole life was outdoors. When I was seven, I took my dad's ice pick, hiked over a mountain, and chopped a hole in the ice to fish for Arctic char. I was having fun, but I was learning to survive in this environment.

What's the most dangerous situation you've faced?
I was photographing walruses—far more unpredictable than polar bears—alone under thick ice when my regulator quit. I knew I couldn't make it back to the ice hole, and it dawned on me, this is how I die. Luckily, the regulator started working.

How do you handle the extreme cold of diving under polar ice?
I eat raw seal meat. Polar bears live on it. It tastes rich, like eating beef liver soaked in oil, but it makes you feel like a fire is burning in your stomach.

JAMES NACHTWEY joined the Merchant Marine after college and later taught himself photography. In a career spanning more than 30 years, he has traveled to the world's most violent places, documenting many of humanity's greatest struggles.

This work is dangerous, and it comes with a price.
You can do everything right and still get taken out. Several times people next to me have been shot, sometimes killed, but I wasn't hit. Beyond the physical dangers, I've witnessed so many tragedies. It's created a weight that I have to carry.

You were badly wounded in a grenade attack in Iraq. Yet you went back.
I had recovered as much as I was going to recover. I thought our countrymen should recognize and honor the sacrifice of our military personnel, as well as understand the real cost of the war and ask valid questions about it.

Do you consider war photography a form of exploration?
I interpret history in real time. So it's an exploration of the unknown. I negotiate dangerous terrain. I constantly absorb sensory information and make rapid and sometimes life-and-death decisions.

INTERVIEWS BY PETER GWIN (NICKLEN) AND NEIL SHEA (NACHTWEY)

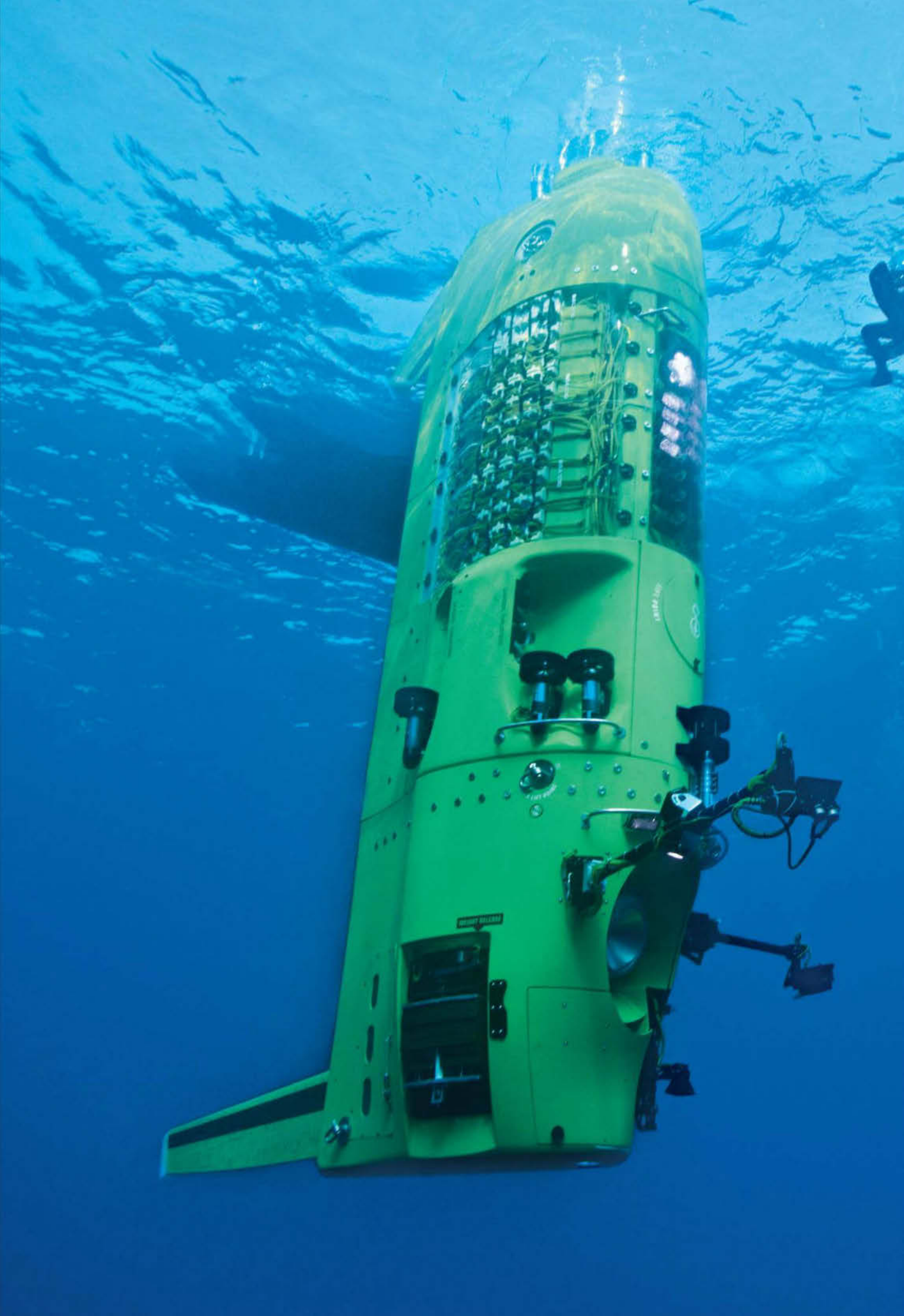
DEEP SEA CHALLENGE

For years he dreamed of diving to the bottom of the Mariana Trench, the deepest spot in the ocean. But to make it happen, explorer and filmmaker James Cameron had to design and build his own vehicle, a futuristic submersible called *DEEPSEA CHALLENGER*. After seven years spent on research, design, and testing, one question remained: Could the sub survive the crushing pressure at 36,000 feet? As he neared the end of a two-month expedition, Cameron was staking his life on the answer.

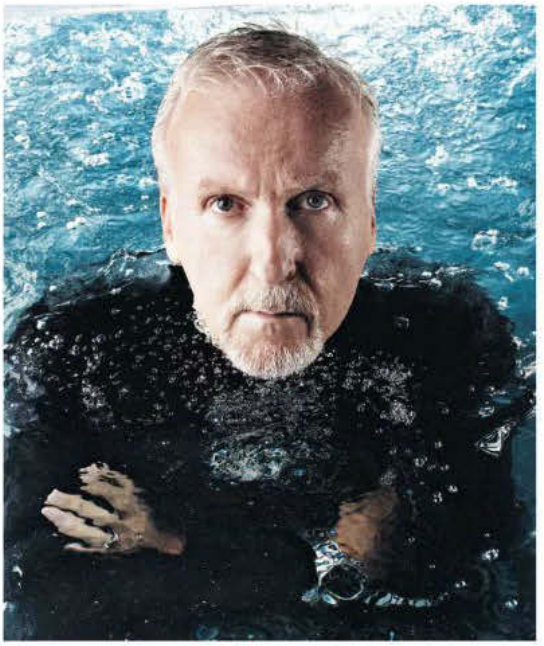
PHOTOGRAPHS BY MARK THIESSEN

Dive even deeper into the *DEEPSEA CHALLENGE* expedition in our digital editions.

DEEPSEA CHALLENGER **is lifted on deck by a shipborne crane after a test dive to 26,972 feet. The orange bag adds buoyancy for the ascent; the gray ones shift the sub to a horizontal position for recovery.**



Divers wrangle a 3-D camera while filming a test in the New Britain Trench off Papua New Guinea. The sub bristles with lights, cameras, and scientific equipment.



Storm season was rolling in, and time was running out. Rough seas kept delaying James Cameron's dive to Challenger Deep, lowest spot of the Mariana Trench, at nearly seven miles below the surface. When the swells subsided just a little, the ship's captain gave the go-ahead. Cameron climbed into the capsule and watched a crew member seal and lock the 400-pound hatch. In this exclusive account, he describes the intensity and wonder of his white-knuckle ride to the bottom.

05:15, MARCH 26, 2012
11° 22' N, 142° 35' E
(WSW OF GUAM, WESTERN PACIFIC)

Predawn in a pitch-black sea. My sub *DEEPSEA CHALLENGER* heaves and lurches as huge Pacific swells roll above me. We've all been up since midnight, starting our predive checks after a couple of restless hours of sleep, and the whole team is running on adrenaline. These are the roughest conditions I've dived in so far on the expedition. Through my external cameras I can see the two divers just outside my tiny cockpit getting whipped around like tetherballs as they struggle to rig the sub for descent.

The pilot's chamber is a 43-inch-diameter steel ball, and I'm packed into it like a walnut in its shell, my knees pushed up in a hunched sitting position, my head pressed down by the curve of the hull. I'll be locked in this position for the next eight hours. My bare feet rest on the 400-pound steel hatch, locked shut from the outside. I'm literally bolted in. People always ask me if I get claustrophobic in the sub. To me it just feels snug and comforting. My visual field is filled by four video screens, three showing views from the external cameras, one a touch screen instrument panel.

The sub, painted electric green, is hanging upright in the swells like a vertical torpedo aimed at the center of the Earth. I tilt my 3-D camera, out on the end of its six-foot boom, to look up the face of the sub. The divers are getting into position to release the buoyant lift bag attached to the sub, holding it at the surface.

I've had years to contemplate this moment, and I won't say there hasn't been dread in the past few weeks, thinking about all the things that could go wrong. But right now I feel surprisingly calm. I am wrapped in the sub, a part of it and it a part of me, an extension of my ideas and dreams. As co-designer, I know its every

THE NEW AGE OF EXPLORATION is a yearlong series of articles celebrating *National Geographic* at 125.

DEEPSEA CHALLENGE is a joint scientific expedition by James Cameron, the National Geographic Society, and Rolex. Learn more at **deepseachallenge.com.**

MARCO GROB

function and foible intimately. After weeks of pilot training, my hand goes to a specific control or switch without thinking. There's no apprehension at this point, only determination to do what we came out here for, and childlike excitement for what's ahead.

Let's do this. I take a breath and key the mike. "OK, ready to initiate descent. And release, release, release!"

The lead diver yanks a lanyard, freeing the lift bag. The sub drops like a stone, and in seconds the divers become toy figures far above on the churning surface. They dwindle and fade, leaving only darkness. A glance at the readouts shows that I'm dropping at almost 500 feet per minute. After a lifetime of dreaming, seven years developing the sub, grueling months of construction, and the stress and emotion of the voyage here, I'm finally on my way to Challenger Deep, the deepest spot in the world's oceans.

05:50, DEPTH 12,500 FEET, SPEED 3.5 KNOTS

I pass the depth of *Titanic* in only 35 minutes, going four times the speed of the Russian *Mir* submersibles we used in 1995 to film that famous wreck for the movie. At that time *Titanic* seemed to me to exist at the most extreme depth imaginable, and going there was as exotic as traveling to the moon. Now I give a jaunty wave as I pass that depth as if I'm going down my driveway past the mailbox. Fifteen minutes later I pass 15,617 feet, the depth of the battleship *Bismarck.* While I was exploring that wreck in 2002, the bulb of a floodlight imploded with the force of a grenade going off just outside our *Mir*'s hull. That was my first experience with a deepwater implosion. If *DEEPSEA CHALLENGER*'s hull fails, I won't feel a thing. It'll be a CUT TO BLACK. But that won't happen. We spent three years designing, forging, and machining this little steel sphere. I trust our engineering and the engineers who put it all together.

The external temperature is reading 35°F, down from 85° at the surface. The pilot's sphere is cooling rapidly, its inside now covered with big drops of condensation. My bare feet, pressed against the steel of the hatch, are freezing. In the confined space it takes several minutes to put on wool socks and waterproof booties. I pull on a watch cap to protect my head from the cold wet steel pressing down on me, and yeah, OK, to look more like an explorer. In the darkness outside, the only indications of movement are particles of plankton racing upward through the sub's lights, as if I were in a car driving in a blizzard.

06:33, 23,200 FEET, 2.8 KNOTS

I've just passed the maximum operating depth of the deepest diving manned submersible in the world, the Chinese *Jiaolong.* Minutes ago I passed the maximum depths of the Russian *Mirs,* the French *Nautile,* and the Japanese *Shinkai 6500.* I'm going deeper than any other piloted sub in existence can go. And all those other subs were the products of government-funded programs. Our little green torpedo was built privately, in a commercial space sandwiched between a plumbing supply wholesaler and a plywood shop in the suburbs of Sydney, Australia. Our team members, most of whom had never worked on a sub before, came from Canada, China, the United States, Australia, and France. This was a passion project for dreamers from all over the world, who believed they could do the impossible. Today we'll see if we can.

06:46, 27,000 FEET, 2.5 KNOTS

I've just gone below the depth of my previous solo record dive in the New Britain Trench, off Papua New Guinea, three weeks ago. It seems incredible that I still have 9,000 feet to go. Time seems to stretch. I've gone through every item on my descent checklist, and I have nothing to do during this long, quiet fall through limbo but think and watch the depth numbers tick higher. The occasional hiss of the oxygen solenoid is the only sound. I look at my feet on the hatch and think about the massive force pushing in against it. If the sub springs a leak, the water will drill in like a laser, cutting right through anything in its path—myself included. I think about how that would feel. Would it hurt? Does the question

have any meaning if you're alive for only another second or two?

07:43, 35,600 FEET, 0.5 KNOTS

Another hour has passed, with the sub slowing during the final 9,000 feet. I've dropped some shot ballast, steel ball bearings released by an electromagnet to trim the sub's buoyancy. I'm almost "neutral," neither heavy nor light, descending very slowly on thrust alone. The altimeter indicates the bottom is 150 feet below. The cameras are all rolling, the lights aimed straight down. I'm gripping the thruster controls, white-knuckled, peering at the blank screens.

One hundred feet…ninety…eighty…I should be seeing something. Seventy…sixty… Finally, I see a ghostly glow reflecting from the bottom. It looks as plain as an eggshell, with no detail, no scale reference to judge distance. I give a tiny braking burst with the vertical thrusters. Five seconds later the faintest downwash hits the seafloor, and the nothingness below me ripples like a silken veil.

I'm not sure yet if there really is a solid surface. Taking a hand briefly off the thruster controls, I aim the spotlight outward across the landscape. The water is gin-clear. I can see far into the distance: nothing. The bottom is utterly uniform, devoid of any character but the absence of character, of dimension and direction. I've seen seafloors in more than 80 deep-ocean dives. Nothing like this. Nothing.

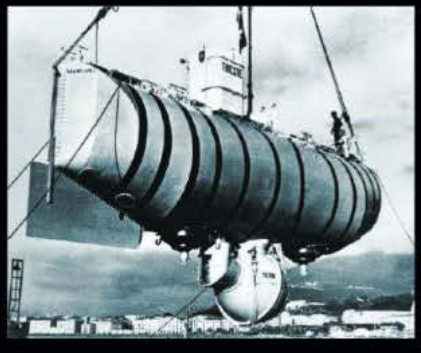
07:46, 35,756 FEET, ZERO KNOTS

I nudge the sub downward, closing the gap to the bottom. On the boom camera I see the foot of the vehicle sink in about four inches before it stops. I'm down. The descent has taken two and a half hours. A cloud of the finest silt I've ever seen rises up in silken tendrils like cigarette smoke, hanging almost motionless. Then, a voice from seven miles above me: "*DEEPSEA CHALLENGER*, this is surface. Comms check." The voice is faint but eerily clear. Our calculations suggested there wouldn't be any voice comms at all this far down.

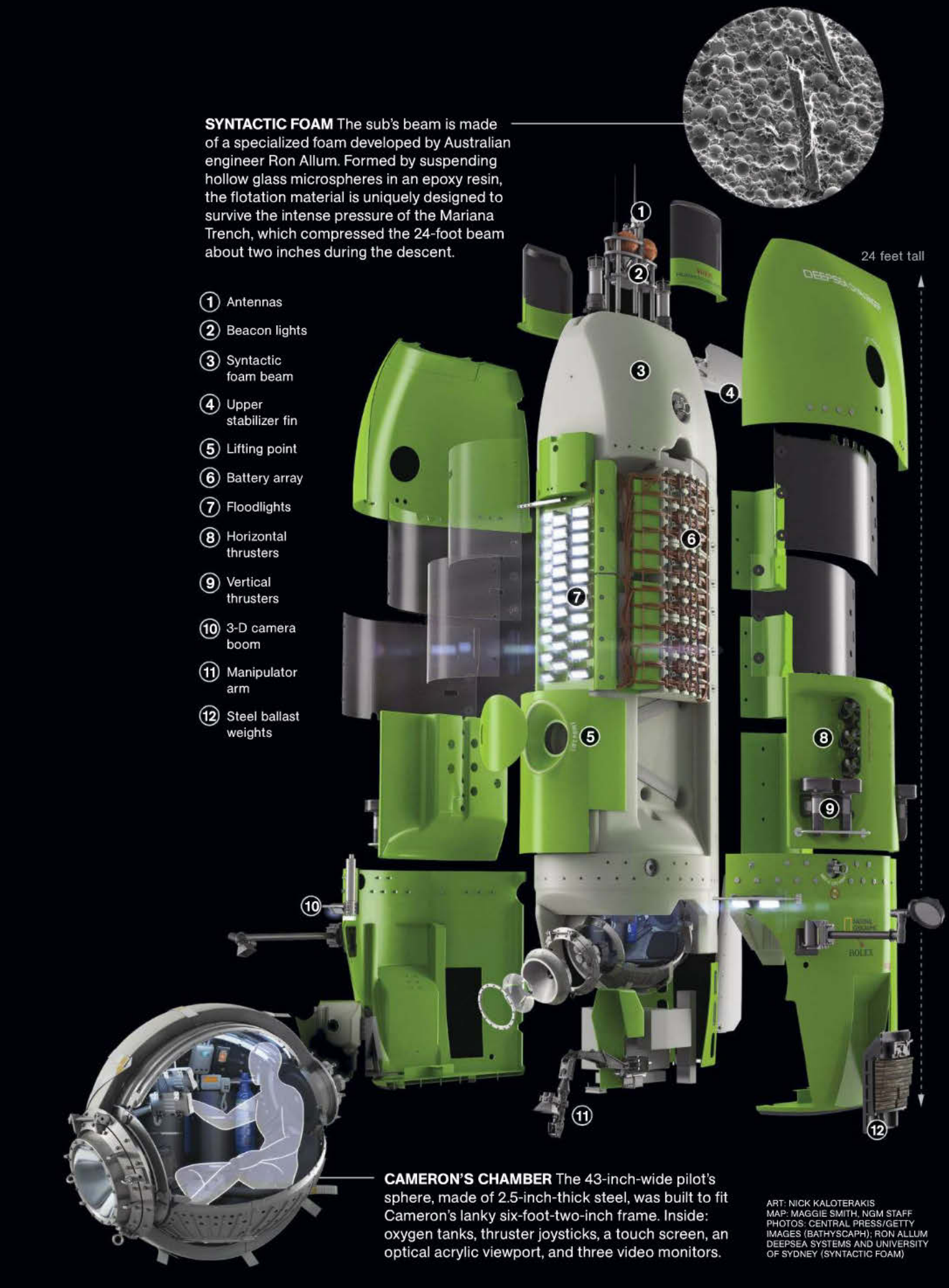
I glance at the depth gauge and key the mike. "Surface, this is *DEEPSEA CHALLENGER*. I am

DEEPSEA CHALLENGER

Designers James Cameron and Ron Allum envisioned *DEEPSEA CHALLENGER* as a sleek underwater rocket ship to dive fast and ascend faster, allowing for more time to explore the deep seafloor.



***TRIESTE* BATHYSCAPH**
Jacques Piccard and Lt. Don Walsh made the first descent of the Mariana Trench in 1960 in the U.S. Navy bathyscaph *Trieste*. Cameron's solo dive took place some 23 miles from the site where *Trieste* reached the bottom.



ART: NICK KALOTERAKIS
MAP: MAGGIE SMITH, NGM STAFF
PHOTOS: CENTRAL PRESS/GETTY IMAGES (BATHYSCAPH); RON ALLUM DEEPSEA SYSTEMS AND UNIVERSITY OF SYDNEY (SYNTACTIC FOAM)

on the bottom. Depth is 35,756 feet…life support's good, everything looks good." Only now does it occur to me that I might have prepared something more memorable, like "One small step for man." At least I've got my watch cap.

Long seconds tick by as my message races up from the bottom of the world at the speed of sound and the answer comes back down. "Copy that." The ex-Navy man on comms is even more matter-of-fact than I am. Military training. But I can visualize them all grinning and clapping up there on the ship. I know my wife, Suzy, will be glued to the telemetry screen, deeply relieved. I feel a surge of pride in the team, in their accomplishment. Most of the guys who built the sub are up there in that control room, scarcely believing yet what they've achieved. The sub is a tangible manifestation of their imagination, their knowledge, and their will. Infused with their collective spirit. In a sense they are all down here, with me.

Thirty-five thousand seven hundred fifty-six feet. What the hell, I'll round it off to 36,000 feet at cocktail parties. The next voice I hear is completely unexpected. "Godspeed, Baby," Suzy says, sending radar love down to the most remote place on Earth. Hearing her voice, my two worlds collide in a strange but beautiful way. Suzy has been by my side throughout the expedition, hiding her apprehension and backing me 100 percent. I know it's been nerve-racking for her.

Time to get to work. We've planned for just five hours on the bottom, and there is a lot to do. I turn the sub, using the cameras to peer around at the world I've arrived in. The bottom is flat and featureless in all directions. An alien limbo. I power up the hydraulics, open the external door to the science compartment, then deploy the manipulator arm to take my first sediment core sample. If everything goes to hell in ten minutes, at least I'll be coming back with some mud for the scientists.

James Cameron is a National Geographic explorer-in-residence. Mark Thiessen is a staff photographer.

Launched from the *Mermaid Sapphire* (left), the sub relies on 180 different systems, from battery packs to sonar. Inside the pilot's sphere (above) Cameron monitors the systems on a touch screen.

It was never enough just to build a sub that could set the world's depth record. It was important to me that it be a science platform as well. There's no point in exploring the least understood frontier on our planet and not being able to record data and take samples.

Core sample safe on board, I take a moment to shoot a close-up of the Rolex Deepsea watch for the Swiss firm that has partnered with us on the expedition. The watch, strapped to the manipulator arm, is still ticking, despite 16,300 pounds per square inch of pressure. In 1960, as part of a U.S. Navy project, Lt. Don Walsh and Jacques Piccard dived in the massive bathyscaph *Trieste* to the same depth, the only other humans to ever do so. They also brought a specially built Rolex, and it too withstood the pressure just fine.

But not everything is working so well. Moments after taking an image of the watch, I see constellations of yellow oil globules floating up across my viewport. The hydraulic system is leaking. In minutes I lose all function in the arm, and the science door as well. With no more ability to take samples but my cameras still working, I set off to continue exploring.

09:10, 35,752 FEET, 0.5 KNOTS

With short bursts of the thrusters, I'm driving north across a plain of ponded sediment, as the geologists call it. The surface is like new-fallen snow on an endless parking lot. I haven't seen anything alive on the bottom, and only occasional amphipods floating past, tiny as snowflakes. Soon I should be encountering the "wall" of the trench, which I know from our multibeam sonar maps is not really a wall, but rather a gently rising slope. I hope I'll find exposed rock outcroppings that might harbor life.

All my viewing so far has been through the high-definition cameras. Remembering a promise I made to myself before the dive, I decide to land

A panel of LED lights illuminates the bottom during a test dive off the Ulithi Atoll. Sediment samples later collected in the Mariana Trench revealed previously unknown microorganisms.

the sub. There is no way I'm coming down here to the deepest place in the ocean without seeing it with my own eyes. It takes me several minutes to move the equipment out of my way and contort myself into a position where I can look directly out the window. I spend a few minutes taking in the stillness of this alien place, so far from all human experience. Human eyes have been down this deep only once before. But Walsh and Piccard dived 23 miles west of here, in another part of the Challenger Deep now called the Vitiaz Deep. No one has ever seen *this* place before.

All other deep seafloor that I've ever visited, even as deep as 27,000 feet in the New Britain Trench, was crisscrossed with the tracks of worms, sea cucumbers, and other animals. Here there is literally no sign of life. The surface is undisturbed, and has been for who knows how long. I know it's not truly sterile—we'll almost surely discover new species of microbes living in that sediment sample I took earlier. But I have the inescapable feeling that I've dived beyond the limits of life itself. And with that comes an awe, a sense of the great privilege of being here, of bearing witness to a primordial world.

Some scientists on our team think life may indeed have originated in these black hadal depths, some four billion years ago, powered by the slow, steady chemical energy generated as one tectonic plate was dragged inexorably under another, releasing trapped fluids. This darkling plain has been here for countless eons, existing whether we witness it or not. I am humbled by the vastness of all we don't know, both down here and out in the darkness of space. I feel how tiny a candle I've brought in these brief minutes and how enormous the task remains to explore our world.

10:25, 35,686 FEET, 0.5 KNOTS

I've found the north slope and am working up along its gently undulating ridges. I'm about a

mile north of my landing site. So far no rock outcroppings. In my travel across the flat trench floor I'd found and photographed two possible signs of life: one a gelatinous blob smaller than a child's fist sitting on the bottom, the other a dark scar five feet long that might have been the home of a subterranean worm of some kind. Both were enigmatic and unlike anything I'd seen in years of diving. I took good HD images, and I'll let the scientists puzzle over them. A couple of my batteries are dangerously low, my compass is glitching, and the sonar has died completely. Plus, I've lost two of the three starboard thrusters, so the sub is sluggish and hard to control. The extreme pressure is taking its toll. I press on, knowing that time is running out but hoping to get to the kind of steeper cliffs I saw in the New Britain Trench, which harbored a completely different community of animals from those on the trench floor.

Abruptly, I feel the sub yaw to the right, and I check my thruster status display. The one remaining starboard thruster has failed. Now I can only turn in circles. I can't take samples, and I can't explore beyond this point, so there is no productive reason to stay. I've been on the bottom less than three hours, far less than my planned stay of five. Reluctantly, I call the surface and tell the team I'm preparing to ascend.

10:30, 35,686 FEET, ACCELERATION TO SIX KNOTS

The moment when you throw the switch that drops the ascent weights always gives you pause. If the weights don't drop, you're not coming home. Period. I spent years designing the weight-release mechanism, and the engineers who built and tested it did a thorough job making it the most reliable system on the sub. But as you reach for that switch, you always wonder. I don't milk it out, thinking about it. I just throw the switch.

Click. I hear the familiar *shtoonk* as the two 536-pound weights slide out of their tracks and plummet to the seafloor. The sub lurches, and the bottom immediately drops away into its abiding darkness. As the speed builds up, trapped sediment churns violently out of the sub's science bay, like the ice falling off the cryogenic tanks during a Saturn V launch. I feel the sub buck and rock as it fires upward. I'm going over six knots, the fastest the sub has ever gone, and I'll be on the surface in less than an hour and a half. I imagine the pressure coming off the sub, like a great python that was unable to crush it slowly giving up its grip. A feeling of relief washes over me as the numbers get progressively lower. I'm on my way back to the world of sunlight and air, and Suzy's sweet kiss. □

Editor's note: Eight months after *DEEPSEA CHALLENGER* completed its mission, the team announced its preliminary science results. Analysis of images and samples collected during the Mariana Trench dive—as well as during 12 other dives by the sub and 19 by unmanned landers—revealed abundant life-forms. Twenty thousand microbes were isolated from Challenger Deep alone. Among the fauna collected were isopods (above) and six species of shrimplike amphipods, at least some of them new species. (Interestingly, one amphipod from Challenger Deep produces a compound currently in clinical trials to treat Alzheimer's disease.) Further analysis of expedition data could shed light on the adaptation of life at high pressures, and perhaps even on the origin of life itself.

In another surprise, recalculation of the maximum depth of the Challenger Deep dive showed that the sub actually reached 35,787 feet, effectively tying the *Trieste*'s recorded depth of 35,800 feet, taking into account the margin of error.

OPPOSITE: GREAT WIGHT PRODUCTIONS PTY LTD AND EARTHSHIP PRODUCTIONS, INC

First Australians

Aboriginals had the continent to themselves for 50,000 years. Today they make up less than 3 percent of the population, and their traditional lifestyle is disappearing. Almost. In the homelands the ancient ways live on.

Savoring the sun and sea, Mawunmula Garawirrtja, a Yolngu Aboriginal girl, floats in a tide pool near the community of Bawaka on the Arnhem Land coast of northern Australia.

The forest provides for Bronwyn Munyarryun, who strips off the soft sheathing of a paperbark tree to fashion a bed to be used in a healing ceremony. She lives on the monsoon-swept fringe of Arnhem Land.

The Anangu of central Australia call the iconic sandstone monolith Uluru. They believe it was created by their ancestral beings. Europeans dubbed it Ayers Rock in 1873, but the name was changed back to Uluru in 1985.

By Michael Finkel
Photographs by Amy Toensing

A finger across the throat and a glance seaward. That's the signal. The two men grip their spears, hand-carved from stringybark trees, and walk barefoot over the red soil to the water's edge.

Then into the aluminum dinghy, engine revved, and across a warm shallow bay of the Arafura Sea, at the wild edge of Australia's Northern Territory.

Terrence Gaypalwani stands at the bow, feet spread for balance, staring intently at the water and indicating with the tip of his spear which direction to travel. He's 29 years old, mid-career as a hunter. Peter Yiliyarr, over 40, a senior citizen, works the motor. The shoreline's a lattice of mangrove roots; the sun's a heat lamp. No sign of another human. Gaypalwani stares, points. Thirty minutes. The men haven't spoken, though even when they're not hunting, the Yolngu sometimes communicate solely in sign language.

Then Gaypalwani raises his spear, cocks his shoulder, and I look over the side of the dinghy and see a great shadow in the water. Yiliyarr guns the motor, and the spear is heaved, a violent throw. The shadow rises, the spear falls, and the two intersect at the water's surface.

The turtle, struck, dives deep. It's as big around as a card table and probably older than either of the men. The metal tip of the spear, buried in the turtle's shell, dislodges from the shaft, as designed. The shaft floats off—they'll retrieve it later—but a rope has been tied to the notched base of the spearhead, and the line whizzes out, fed from a coil by Yiliyarr. Both men have thin, elongated scars across their palms and chests. The line runs completely free, though attached to the other end is a white, basketball-size buoy. It flies from the boat and disappears beneath the water. The men stand, scanning.

The ball pops up, and the boat zips toward it. This time it's Yiliyarr with his spear, and when the turtle appears, he lets fly, and again the spear is true. The tip dislodges, and a second rope plays out. Gaypalwani reaches into the water to grab the first rope, and both men tug, veins rising, hauling the ropes in hand over hand, and soon the turtle is pulled to the side of the boat.

The men reach over, and each grabs a thick, flapping flipper, braces his feet against the side of the boat, and leans back. The turtle rises from the water, and the men fall backward as it slides into the tiny boat, the weight of the creature tossing the dinghy about.

BEFORE I WAS ABLE to visit Matamata, a lost-in-the-bush village of 25 or so people, I needed permission from Gaypalwani's mother. Phyllis Batumbil is the matriarch of Matamata, a woman of unrestrained opinions whose laugh could loosen your hat and whose scowl could, and often did, set a dog to whimpering. There are two telephones in Matamata. Batumbil owns one. The rest of the village shares the other.

I rang, and Batumbil answered. She speaks several dialects of Yolngu Matha, the language of the Yolngu, as well as excellent English. Like many Yolngu, she uses an English first name and an Aboriginal second name and prefers to be addressed by her Aboriginal name. Batumbil is an artist—painting is among her many avocations—and we had been put in touch by the manager of an art gallery that represents her. She creates highly symbolic depictions of stingrays and lizards and other sacred totems on strips of

The Yolngu eat every edible bit of the green sea turtle, from organs to yellow connective tissue.

bark and on hollow logs, using a brush made from her own hair.

I asked Batumbil if I could stay in Matamata for a couple of weeks and said I'd pay for room and board. Permission granted. Was there anything, I wondered, that I could bring?

"Dinner for 25," she said.

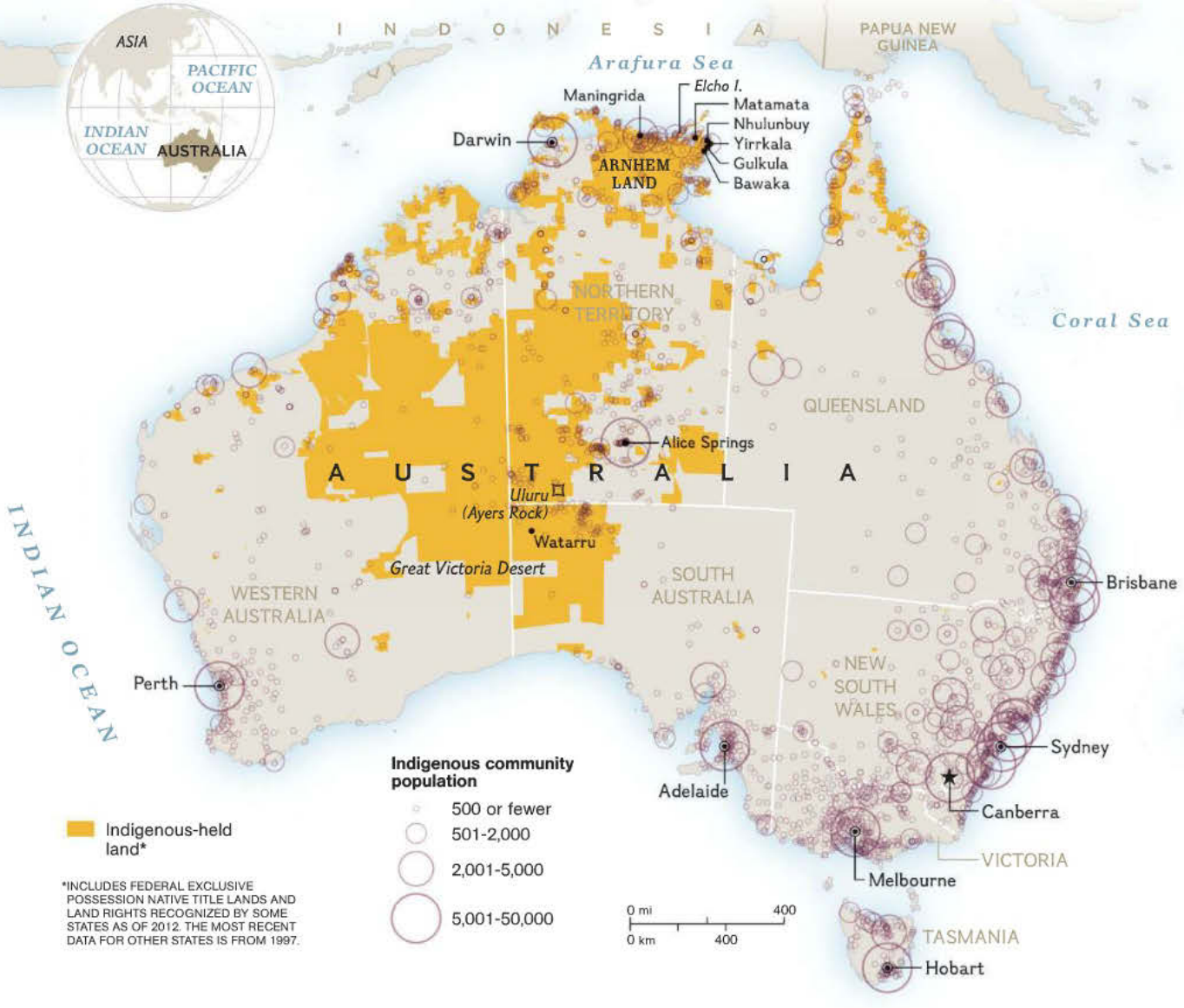
I CHARTERED a Cessna from one of the nearest towns, and the pilot flew low over the bush, the trees thin and straight and widely spaced, like a bad hair transplant, until we reached a large rectangular clearing with a handful of boxcar-shaped houses on one side, and the pilot set the plane down. Batumbil was sitting beneath an old mango tree, knitting a handbag out of natural fibers, surrounded by her five dogs. She was wearing a black tank top, a vibrant purple sarong, plastic-framed reading glasses, and red nail polish. Her hair, a ruckus of springy black curls, was corralled atop her head with a yellow ribbon.

I unloaded two duffels of personal effects and a dozen bags of groceries. Dinner for 25, I mentioned, is quite a load. Batumbil nodded. Take a look at all that food, she said. Could you imagine catching that much in one day using

---

Michael Finkel acquired a real taste for sea turtle during his reporting. Amy Toensing spent more than three years documenting Aboriginal communities.

In the 1970s Aboriginals began moving from large settlements back to ancestral homelands reclaimed from the government. The result: healthier communities with lower rates of obesity, diabetes, and alcohol-related injury. Today 21 percent of Australia's estimated 670,000 indigenous people live in remote areas.



only a spear? And then again the next day and the day after that? I said it would be just about impossible. Aboriginal people, she said, have been doing it every day for at least 50,000 years.

For 49,800 of those years they had the continent to themselves. There were once about 250 distinct Aboriginal languages, hundreds more dialects, and many more clans and subgroups. But there is deep spiritual and cultural overlap among them, and indigenous Australians I spoke with said it was not insulting to combine everyone together under the general title of Aboriginal. They call themselves Aboriginals. They lived for a couple of thousand generations in small, nomadic bands, as befits a hunter-gatherer existence, moving in their own rhythms about the vast expanse of Australia. Then on April 29, 1770, British explorer James Cook landed his ship, the *Endeavour,* on the southeastern shore. The next two centuries were a horror show of cultural obliteration—massacres, disease, alcoholism, forced integration, surrender.

More than a half million Aboriginals currently live in Australia, less than 3 percent of the population. Few have learned to perform an Aboriginal dance or hunt with a spear. Many anthropologists credit Aboriginals with possessing the world's longest enduring religion as well as the longest continuing art forms—the cross-hatched and dot-patterned painting styles once

JEROME N. COOKSON, NGM STAFF; SHELLEY SPERRY. SOURCES: JON ALTMAN AND FRANCIS MARKHAM, AUSTRALIAN NATIONAL UNIVERSITY; AUSTRALIAN DEPARTMENT OF COMMUNICATIONS, INFORMATION TECHNOLOGY AND THE ARTS

inscribed in caves and rock shelters. They are one of the most durable societies the planet has ever known. But the traditional Aboriginal way of life is now, by any real measure, almost extinct.

Almost. There remain a few places. Foremost is a region known as Arnhem Land, where Matamata is located, along with a couple dozen other communities, all connected by rough dirt roads passable only in dry weather.

Arnhem Land is not fully insulated from the modern world. It has solar electricity, satellite phones, aluminum boats, and flat-screen televisions hooked to DVD players. But it is impenetrable enough, rife with thorns and snakes and bugs and crocs. If the new generation chooses the supermarket over the spear, then the end will have truly arrived. I wondered what the likelihood of survival was. So I called Batumbil.

She surveyed my bags of supermarket food and asked if they were really for sharing. I assured her they were. Moments later—I don't know what signal she made—people congregated around the groceries. I'd brought steaks and vegetables and cans of ravioli and boxes of fruit juice. Matamata is basically one extended family, home to Batumbil's children, grandchildren, nieces, brothers. In a flash, everything was pocketed, even the snacks I'd purchased for myself. A few empty green shopping bags rotated in the breeze.

The look on my face must've given it away: Batumbil asked if I was hungry. I admitted I was. "Go with the boys and get a turtle," she instructed.

Ganyin pulls out a thick white worm about a foot long. "Eat it," he says, eyes alight. I do. Not bad, like a salty calamari.

HERE'S HOW YOU EAT a sea turtle. First dig a very large fire pit. Collect firewood. Ignite. Place a few fist-size rocks in the fire, then drag the turtle over, plug the spear holes in its shell with bits of twig—this prevents the blood from spilling out while it's cooking—and decapitate with an ax. Save the head; turtle cheek is delicious. Pull out the long white fire hose of intestines. These will be cleaned and boiled and eaten as well.

Using two sticks as tongs, remove the rocks you've heated in the fire and drop them in the turtle's neck hole—this helps cook the meat from the inside—then stuff the hole with freshly cut foliage. With a partner, heave the turtle onto the fire, upside down, and cover with coals. A turtle comes prepacked in its own cooking container, like Jiffy Pop popcorn. Heat just ten minutes, then remove.

With the turtle still on its back, use your knife to carve open the flat bottom shell. Slice out large chunks of ivory-colored meat and ribbons of bright green fat. Collect the blood in a container. Distribute to everyone in the village; dogs get the flippers. Feast.

SUNSET IN MATAMATA is the time of the sand flies. Percussive slaps, palms on skin, sound from every front porch. There are five houses in Matamata, all in a rough line perpendicular to the shore, fronting the dirt runway. The modular homes, provided by the government, have corrugated-steel exteriors to thwart termites and are divided into three simple rooms.

Cooking is done outside over an open fire, though each house does have a sink with running water as well as a refrigerator. For the Yolngu, all the world's a canvas—boulders, trees, bedroom walls, the exteriors of houses. They're typically adorned with cross-hatchings or petroglyph-style human and animal figures. In Matamata even the refrigerators are painted; one is festooned with a spray of red and yellow palm prints and kiss marks.

Between the homes are small groves of mango

Nellie Gupumbu (left) and Lisa Garrayn-jarranga camp along the Arafura Sea with their grandmother, Lily Gurambara. Remote doesn't mean out of touch for Gurambara, who works the phone to arrange community events.

At the Garma Festival in Gulkula, Yolngu women massage a visitor with oils and herbs. The annual event attracts tourists eager to experiment with Aboriginal rituals.

and banana and cashew trees. Getting a snack requires little more than reaching into the branches. Even in a village this small—strolling the length of Matamata, leisurely, takes about three minutes—there are various neighborhoods: a couple of houses of bachelors, a couple of families with kids, and at the end farthest from the sea, Batumbil's compound.

She shares a room with her mother's sister, who's in her 90s, while the other rooms are occupied by one of her sons and one of her grandsons, who himself has a young son—five generations, at times, in a single house. On Batumbil's bed is a fuzzy blanket with a portrait of Elvis Presley. She loves Elvis. Everyone in Matamata generally gets along, but it's still family. Each time Batumbil mentioned one person in the village, she automatically appended the word "lazy" to the name. Two of Batumbil's grandsons once had such a fierce disagreement they ended up slicing each other with their knives.

The smothering heat of daytime is passed languidly, doing domestic chores—whittling spears, washing clothes—or if the tide is right, going spearfishing. Turtle's a year-round staple, but the men also catch stingray and kingfish and a walrus-size marine mammal called a dugong. It's not until sand fly hour that Batumbil's creativity begins to spike; she often paints or knits deep into the night and sleeps late. "My head's not right in the morning," she explains. Batumbil was born in 1956 in a community run

by Methodist missionaries on Elcho Island, just off the northern coast of Arnhem Land. Her father had eight wives. Soon after birth, she was promised to a man, in traditional Yolngu fashion, and at age 15 was married. Her husband was more than 20 years older. He died in 2000.

In 1976 the Aboriginal Land Rights Act for the Northern Territory returned Arnhem Land, more than 35,000 square miles, to its traditional owners. Similar legislation repatriated tracts of territory elsewhere in Australia, though few as untrammeled as Arnhem Land. Some Aboriginal communities by this time were devastated by alcoholism and other ills. They still are. A hallmark of a hunter-gatherer lifestyle is immediate consumption; as soon as food is procured, it's promptly shared and devoured. This makes complete sense in the bush, where leftover food swiftly spoils.

Most of the world had 10,000 years to gradually adapt to the cadence of a sedentary, agricultural society, one in which patience, planning, and preserving are key to survival. Aboriginals were expected, impossibly, to convert virtually overnight. Untempered consumption plus unlimited supply of a product like alcohol equals disaster. Same with processed sugars; obesity and diabetes are prevalent among Aboriginals. Also tobacco. Gasoline sniffing got so bad that a special brand of low-aromatic, nonaddictive fuel called Opal is all that's sold in some Aboriginal areas.

In the town of a few hundred residents where Batumbil and her husband lived on Elcho Island—he was a painter, she worked as a seamstress—it could be difficult to escape the lure of alcohol and its attendant violence. This was no place to start a family. Batumbil and her husband became convinced that the only happy life was one lived in quiet isolation, dependent on the bounty of the land. So they moved into the bush. "We decided to come home," she says.

Her decision, according to local health workers I met, was wise. Possibly lifesaving. Compared with Aboriginals who reside in cities and towns, those in remote homelands eat healthier food, live longer, and are exposed to a fraction of the violence. The largest city in the Northern Territory is Darwin. In January 2012, in Darwin, one of Batumbil's brothers was murdered in a knife fight. His body was delivered to Matamata. A sister-in-law, a drinker, undergoes daily dialysis treatments in Darwin. "If she'd been living here, she would have been saved from that sickness," says Batumbil. "Anyway, we'll bury her here."

The saltwater crocodiles, known as salties, can grow to 20 feet long. During the two weeks I'm in the bush, two children are eaten by them.

After moving into the bush with her husband, Batumbil had two sons—Gaypalwani's the older one—and one daughter. Her daughter gave birth to three sons, then died of a heart ailment. The three boys, now in their teens and early 20s, all live in Matamata. Formal education in the village is intermittent. Batumbil is the teacher; she received education training at a college in Darwin. During my stay, though, no classes were conducted, and I never spotted a single book.

But the bush schooling is impeccable. Gaypalwani and his wife have twin nine-year-old boys, curly haired and exuberant. They race around with kid-size spears and sometimes accompany their father in his boat, observing him hunt. Every day they practice the intricate Yolngu dance steps while their parents clap along. Marriage promises and multiple wives, Batumbil says, are no longer common. Finding a partner now, she explains, is more modern. "You just run around everywhere like a brown ant until you get satisfied. Then you make a big hill."

No alcohol is permitted in Matamata. This is, foremost, Batumbil's *(Continued on page 80)*

Men in Maningrida decorate a log coffin they will use to bury the skull of an ancestor. The skull, housed until recently in a museum in Darwin, had just been returned to the community.

Flames painted on arms and chests, Bronwyn Jimmy (left) and Tinpulya Mervin of Watarru perform a fire dance in the Great Victoria Desert, a rite for women only. Aboriginals set fires to clear the land of underbrush.

Aboriginals in touch with the land see desert oaks and imagine the drinking water in the trees' cavities. They see a full moon above Uluru-Kata Tjuta National Park and find light for a nocturnal event.

rule. It is also the law. The Northern Territory Emergency Response of 2007, better known as "the intervention," was billed chiefly as a reaction to the alleged number of child-abuse cases in Aboriginal communities. The controversial and racially charged initiative added more police officers to Aboriginal areas and imposed strict regulations on alcohol, among other measures. Some Aboriginals I spoke with reluctantly admitted that it has alleviated aspects of the crisis, though many Australians vehemently oppose it, saying the new rules infringe too greatly on personal freedoms.

In a mostly unpoliced area like Matamata, it'd be easy to circumvent the law, but Batumbil has zero tolerance for alcohol, and I never saw a drop. Batumbil, however, along with many of the adults, smokes like a chimney. She uses a long wooden pipe made from a hollowed-out tree branch—Batumbil's cousin Djutu is the village pipemaker—stuffed with store-bought Log Cabin tobacco. Two items from the outside world dictate the quality of life in Matamata: tobacco and gasoline. When there's no gas, boat engines can't run, and turtles aren't caught, and everyone gets hungry. When there's no tobacco, it's worse. I witnessed one intense shortage during which Batumbil smashed her favorite pipe, scraped out the resin caked inside, and smoked it in a new pipe.

Money to purchase tobacco and gas and other staples—tea, flour, sugar, and a favorite in Matamata, tins of Tom Piper Homestyle Irish Stew—comes from several sources. The Yolngu are occasionally employed to perform manual jobs in various communities; during my visit a group of men helped raise a water tank onto a tower. For this work they receive a government wage of up to $280 a week. Many who aren't working are given money as well, government payments that low-income Australians are entitled to, Aboriginal or not. Other Aboriginal communities receive large royalty payments from mining companies. Bauxite, a chief source of aluminum, is bountiful in Arnhem Land. Batumbil has steadfastly refused to allow a shovelful of her land to be touched by a mining company, despite lucrative entreaties. "You'd have to shoot me and walk over my dead body before mining here," she says.

Batumbil's bark paintings, intricately crosshatched, the pigments homemade from white clay, sell for $1,500. Her string bags, ornamented with bird feathers, cost $500. Her dream is to acquire satellite Internet—that'll soon be possible—and start a website and sell her work online, thereby avoiding art gallery commissions. A couple of the men also earn money buying and selling a tan powdered substance called kava, made from the root of a plant, that's mixed with water to produce a nonalcoholic but sedative drink used to unwind in the evenings.

There's a car in Matamata, a rusty white Land Cruiser that everyone yearns to ride around in, possibly because it contains the village's only air conditioner. The temperature can climb close to 100°F nearly every month of the year. Several times a day a load of people will drive the tenth of a mile to the shoreline to check whether the tide's right for turtle hunting. The last of the gas is usually saved for a shopping trip. The nearest decently stocked store, in the mining company town of Nhulunbuy, is a four-hour drive, high speed on the narrow, sandy roads, tree branches clawing the Cruiser's sides.

Matamata has two general seasons—the wet, usually from December to March, and the dry, the rest of the year. The roads turn to soup during the wet, but you can always take a boat around the coastline, half a day to town. A plane also lands at least once a week to bring in a health worker, and when it flies off to other Aboriginal communities, a couple of people will often take the empty seats, for a modest fee, and spend time visiting friends and relatives. The Yolngu like to be in motion; the population of Matamata is never the same from day to day. When one of Batumbil's grandsons hopped in the plane, he took his puppy and his television—"so I can sit down and relax with it"—but didn't even consider bringing footwear.

BATUMBIL DOES NOT like sand flies—nobody does—and she has no qualms about killing

them. But she does believe she's related to them. She calls them her grannies. "I tried to have a nap," she once told me, "but my grannies were all there." She was being funny—she said it with a smile—though her meaning was serious. Sand flies might torment her, but they are part of her land and therefore imbued with a meaning and a spirit and an essential purpose. The purpose that day, she suggested, was to prevent her from napping, to help her understand that life is not easy.

According to Aboriginal lore, all the Earth's surface was once a featureless expanse of mud or clay. Then ancestral beings emerged from beneath the surface or from the sky, assumed the form of an animal or plant or human, and journeyed across the land, performing great deeds of creation, shaping the mud into rivers, hills, islands, caves. This took place in an age known as the Dreamtime. And the path each of these beings took, the countryside they molded before burrowing back into the ground, is called a Songline.

The ancestral beings also gave birth to all living things, including humans. They bestowed language, knowledge, ritual, and faith. Every Aboriginal has a Dreaming—the ancestor that gave rise to him or her, be it snake or turtle or yam. One of Batumbil's family's Dreamings is the dingo, the wild dog of Australia, which is why she loves to be surrounded by dogs. It's essential, Batumbil says, to know the Songline of your Dreaming, to be able to follow the route of your particular ancestral being, to speak its language, to learn its music.

This all-encompassing spirituality is not expressed overtly. People in Matamata don't go around constantly praying or singing. In daily life, in fact, there seems to be no obvious ritual at all, though there are superstitions. Walking alone, it's believed, makes you vulnerable to sorcery. Even when someone in Matamata goes to the bathroom—there are outhouses—it is standard to take a partner along. At the Matamata cemetery, the grave sites piled with plastic flowers, the only religious symbol is a Christian cross with the words "I Am the Way" written on it in English, evidence of the Methodist missionaries who arrived in Arnhem Land in the early 1900s. There are two main occasions when the full force of Aboriginal beliefs is on display: at a boy's initiation ceremony, which takes place around age ten, and at a funeral.

The dancers seem to shift shape before my eyes, contorting their bodies, elongating their necks, all moving together, a many-legged creature.

I'm invited to join several people from Matamata at a funeral for a respected Yolngu elder, held on an expanse of beach sand near the town of Yirrkala. The men smear their faces and bodies with white clay and move onto the sand in a large group, carrying ceremonial spears. They stand before a specially constructed cloth-walled tent in which the body lies. Older men provide the music—a rhythmic crack of clapsticks, a trilling chant, the thrumming drone of the didgeridoo. Then the dancers, like the ancestral beings of the Dreamtime, seem to shift shape before my eyes, contorting their bodies, elongating their necks, stomping their feet and thrusting spears, all moving together, a many-legged creature, sand flying, sweat streaming.

Each dance, mimicking an animal or a natural event, is short and intense. There's the white seagull dance, the octopus dance, the north wind dance, the cockatoo dance. Some are performed only by women. The dances last all day, and another, and another—the funeral carries on for ten days—as people stream in from communities across the bush to pay respect, to dance some more, to set the soul on its journey with the grandest possible send-off. I ask a couple

Fire is a tool, a gift, and a possible danger, which Anangu children learn at an early age in Watarru, one of many Aboriginal homelands where tradition still lights the way.

of people for a description of the afterlife, and their answers are similar. "We don't know what happens when you die," they reply.

THE YOLNGU, says Batumbil, are people of fire. Not long ago they started fires by spinning a stick between their palms. Now they use disposable cigarette lighters. As they walk about their territory, they set frequent bushfires. Children, even toddlers, are permitted to start their own. This practice keeps the land clear of downed trees and tall grasses, allowing easier movement through the bush and renewing plant life.

But look at everyone's eyes when a fire is lit: This is something deeper than good forest stewardship. Touch a flame to the tip of a palm leaf. It's the dry season; the leaf explodes. In moments the whole tree's ablaze, a cauldron of fire, and the flames leap to the next tree and drop to the ground. The air turns orange, the heat's like a bear hug, and the fire dashes whichever way the wind blows it, the bush crackling and smoking—if you're in the way, run!

There's no stopping it now; the fire will do what it will. Walk back to Matamata, and in the morning scope the horizon. A brown smudge hangs low in the sky where the fire's still burning.

IT TAKES 30 TO 40 YEARS for a Yolngu to absorb the full breadth of Aboriginal knowledge—to become, as Batumbil describes it, a "living encyclopedia." Batumbil fears there may soon be

no more Yolngu encyclopedias; many Aboriginal groups throughout Australia have already buried their final one. Hunting with boomerangs, used by some tribes for 10,000 years—though never by the Yolngu—hardly exists. "I worry about the next generation," says Batumbil.

A young man named Marvin Ganyin convinces me that her concern is unnecessary. Ganyin is 23; he and his wife live in the room next to Batumbil. His mother was Batumbil's daughter, the one who passed away. His father is also dead. He has a two-year-old son.

For a while I'm not sure about Ganyin. The first thing he shows me is a cell phone video of a street brawl he was involved in while visiting Elcho Island. His two loves, he tells me, are fighting and playing Australian rules football. He displays the scars on his knuckles from all his fights. He says he can't understand the purpose of books. "Reading? What can you do with it when you're hungry—eat the book?"

But then, on a day when the supply of gas is low and some of the older men drive into town to purchase more, he taps me on the shoulder, hands me a spear, and indicates that I should follow him. We walk into the bush, tabletop flat, anthills the size of tombstones scattered everywhere. He stops beneath a tree and shakes it, and a bunch of wild apples fall out, bright red skin rumpled like bell peppers. "Eat these," he says, "and you can walk a long way."

Every creature in the Australian bush, it seems, wants to poison you. There are king brown snakes, cane toads, redback spiders, and taipan snakes. You can't even swim in the sea—box jellyfish, polka-dot stingrays, blue-ringed octopuses, dozens of species of shark. Then there are the saltwater crocodiles, known as salties, which can grow to 20 feet long. During the two weeks I'm in the bush, two people are eaten by salties, a seven-year-old girl and a nine-year-old boy. I express my grief about this to Batumbil, but she remains unperturbed. These things happen.

Ganyin and I reach a hill. A sacred hill, he says. This is where the trees for didgeridoos grow. He taps on the trunk of a stringybark. Hollow. The Yolngu claim that didgeridoos were invented in Arnhem Land; they call them *yidaki*. Ganyin is an expert player, the best I hear in Matamata.

We emerge from the bush at a pristine crescent of beach. Not a footprint. We continue to a natural jetty of black rocks, pimpled with oysters. Ganyin smashes some open, and we slurp them on the half shell. Then Ganyin hurls his spear. A huge crab is skewered. We scramble over to the mangrove forest, where Ganyin breaks off a root and digs his finger inside the soft maroon wood. He pulls out a thick white worm about a foot long. He holds it up and squeezes it, and a muddy brown paste is ejected from the bottom. He hands the worm to me. "Eat it," he says, eyes alight. I do. Not bad, like a salty calamari.

"Let's go before the dingoes smell us," he says. So we turn back. On the way he shows me a flower whose bloom indicates the start of stingray-hunting season. His heroes, he mentions, are Bruce Lee and Muhammad Ali. He insists he could never live in a town. "Too boring. Bad food." He says there is nothing better in the world than hunting for your own meals. "Even when I have white hair," he says, "I will still be a hunter." He is already teaching his son to hunt. Ganyin insists he will learn all the Yolngu ways, he will become an encyclopedia. They will dance for ten days at his funeral.

We arrive at Matamata and cook the crab over a fire and brew tea. Sunset pinks the sky; we slap at the sand flies. Ganyin picks splinters and bits of seashell out of the bottom of his feet with the tip of a scissor. The Land Cruiser arrives loaded with jerry cans of gas—tomorrow we will return to the water and catch more turtle. Ganyin brings out his didgeridoo. It's decorated only with a few stripes of colored duct tape.

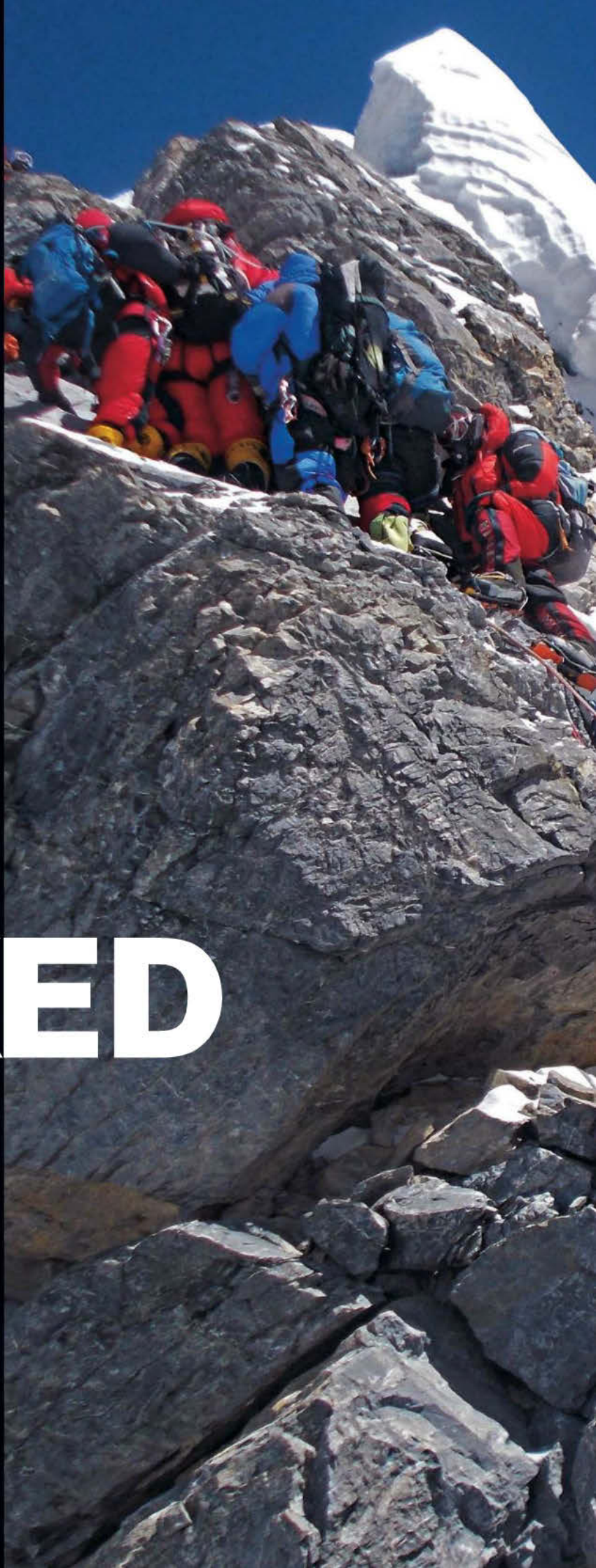
He takes a plastic chair, turns it on its side, and sits cross-legged in front of it. He places the end of the didgeridoo against the seat of the chair, shuts his eyes, and billows his cheeks. Music leaps from the instrument, and the plastic chair creates a warbling reverberation, the pitch rising and falling. I walk through Matamata, and the stars wink on, and the sound of Ganyin's playing fills the night. □

THE NEW AGE OF EXPLORATION

MAXED OUT

ON EVEREST

How to Fix the Mess at the Top of the World



Traffic chokes the Hillary Step on May 19, 2012. Some climbers spent as long as two hours at this 40-foot rock wall below the summit, losing body heat. Even so, 234 people reached the top on this day. Four climbers died.

SUBIN THAKURI, UTMOST ADVENTURE TREKKING

A crowd of climbers slog up the Lhotse Face, heading toward Camp IV, last stop before the summit. Loose regulations and a boom in commercial guiding over the past two decades have made Everest far more accessible to experts and novices alike.

ANDY BARDON

By Mark Jenkins

An hour above high camp on the Southeast Ridge of Everest, Panuru Sherpa and I passed the first body. The dead climber was on his side, as if napping in the snow, his head half covered by the hood of his parka, goose down blowing from holes torn in his insulated pants. Ten minutes later we stepped around another body, her torso shrouded in a Canadian flag, an abandoned oxygen bottle holding down the flapping fabric.

Trudging nose to butt up the ropes that had been fixed to the steep slope, Panuru and I were wedged between strangers above us and below us. The day before, at Camp III, our team had been part of a small group. But when we woke up this morning, we were stunned to see an endless line of climbers passing near our tents.

Now, bumper to bumper at 27,000 feet, we were forced to move at exactly the same speed as everyone else, regardless of strength or ability. In the swirling darkness before midnight, I gazed up at the string of lights, climbers' headlamps, rising into the black sky. Above me were more than a hundred slow-moving climbers. In one rocky section at least 20 people were attached to a single ratty rope anchored by a single badly bent picket pounded into the ice. If the picket popped, the rope or carabiner would instantly snap from the weight of two dozen falling climbers, and they would all cartwheel down the face to their death.

Panuru, the lead Sherpa of our team, and I unclipped from the lines, swerved out into open ice, and began soloing—for experienced mountaineers, a safer option. Twenty minutes later, another corpse. Still attached to the line of ropes, he was sitting in the snow, frozen solid as stone, his face black, his eyes wide open.

Several hours later, before the Hillary Step, a 40-foot wall of rock and the last obstacle before the summit, we passed yet another corpse. His stubbly face was gray, his mouth open as if moaning from the pain of death.

Later I would learn the names of these four climbers: Chinese Ha Wenyi, who was 55; Nepali-Canadian Shriya Shah-Klorfine, 33;

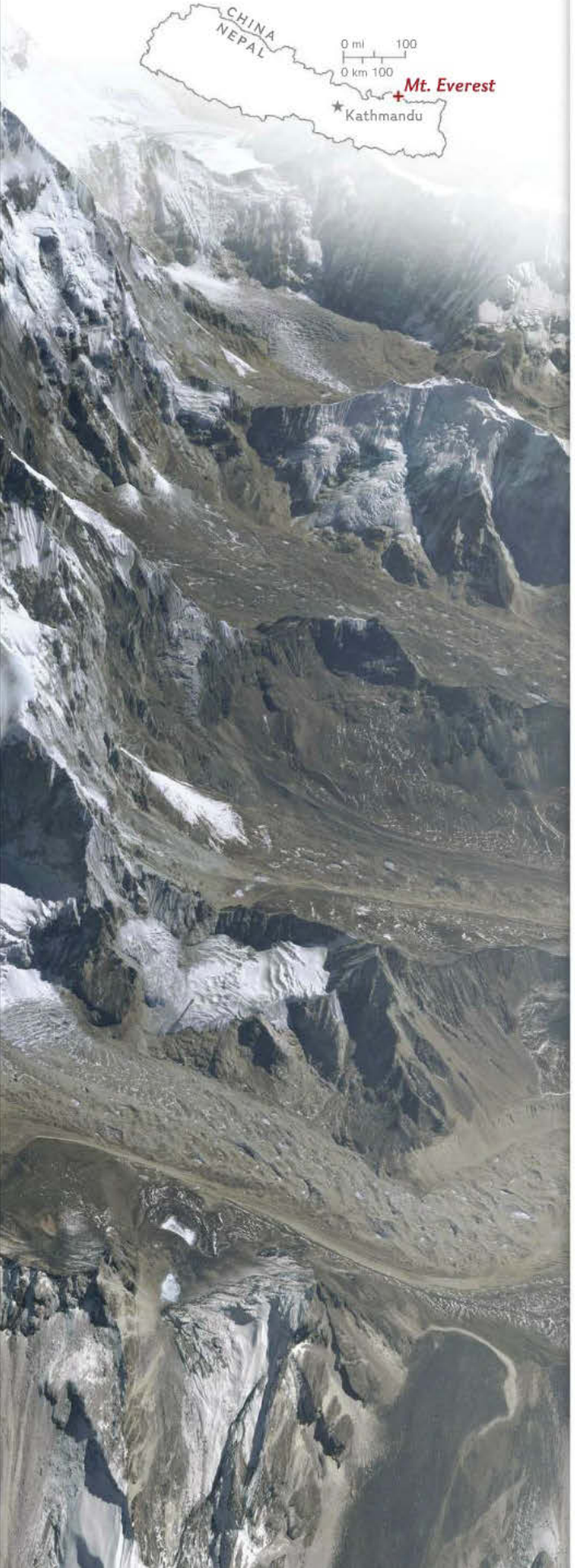
THE NEW AGE OF EXPLORATION is a yearlong series of articles celebrating *National Geographic* at 125.

National Geographic joined forces with The North Face, the Mayo Clinic, and Montana State University in spring 2012 to sponsor an expedition in honor of the 50th anniversary of the first American ascent of Everest.

Team member Hilaree O'Neill steps across a bridge of aluminum ladders lashed together above a crevasse in the Khumbu Icefall. Considered one of the most unpredictable hazards on Everest, the icefall is an ever shifting labyrinth of loose, jagged blocks.

ANDY BARDON


MOUNT EVEREST SUMMIT
29,035 ft (8,850 m)
HILLARY STEP
28,776 ft (8,771 m)
LHOTSE
27,940 ft
(8,516 m)
STANDARD ROUTES
South Col/Southeast Ridge (Nepal)
North Col/Northeast Ridge (China)
Expedition member death
Local staff death
Bottlenecks above the South Col
CAMP IV
25,938 ft
7,906 m
Southeast Ridge
DEATH ZONE
8,000 m
South Col
Lhotse Face
Northeast Ridge
North Ridge
North Face
Southwest Face
North Col
West Ridge
CAMP III
23,484 ft
7,158 m
Bottlenecks
7,000 m
NUPTSE
25,791 ft
(7,861 m)
Deaths on other routes since 1921
CHINA (TIBET)
NEPAL
West Shoulder
CAMP II
21,240 ft
6,474 m
Western Cwm
Rongbuk Glacier
Lho La
CAMP I
19,800 ft
6,035 m
Khumbu Icefall
Khumbu Glacier
North
BASE CAMP
17,290 ft
5,270 m
Deaths below Base Camp or at unknown location
CAUSE OF DEATH
On all routes since first recorded climber deaths in 1921
Exhaustion 18
Altitude sickness 17
Crevasse/ icefall collapse 6
Exposure/ frostbite 25
Other 23
Avalanche 18
Fall 50
Expedition members 157
Local staff 83
7
18
1
12
30
15
RECORDED ASCENTS AND DEATHS AS OF MARCH 21, 2013
SCALE VARIES IN THIS PERSPECTIVE. THE STANDARD SOUTH COL–SOUTHEAST RIDGE ROUTE IS APPROXIMATELY 9 MILES (14.5 KILOMETERS) LONG.

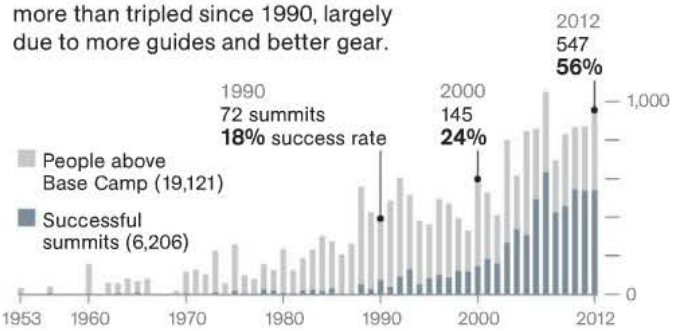


EVEREST OVERRUN

More than half of all climbers now reach the top, despite the hazards of overcrowding.

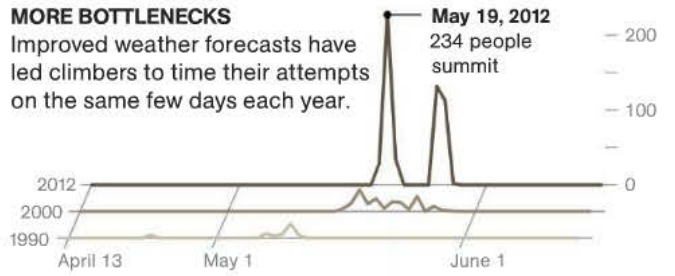
TAMING THE MOUNTAIN

The success rate of climbers has more than tripled since 1990, largely due to more guides and better gear.



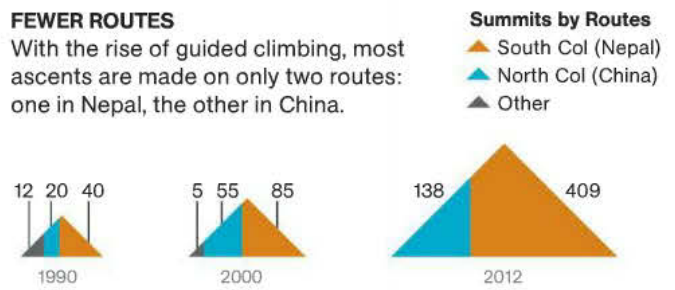
MORE BOTTLENECKS

Improved weather forecasts have led climbers to time their attempts on the same few days each year.



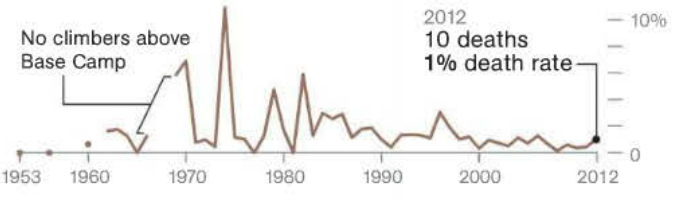
FEWER ROUTES

With the rise of guided climbing, most ascents are made on only two routes: one in Nepal, the other in China.



NO RISE IN MORTALITY

Despite the recent boom in the number of climbers, the death rate has not increased.



MARTIN GAMACHE AND MATTHEW TWOMBLY, NGM STAFF; MESA SCHUMACHER

SOURCES: GERMAN AEROSPACE CENTER; RAYMOND B. HUEY, UNIVERSITY OF WASHINGTON; RICHARD SALISBURY, HIMALAYAN DATABASE

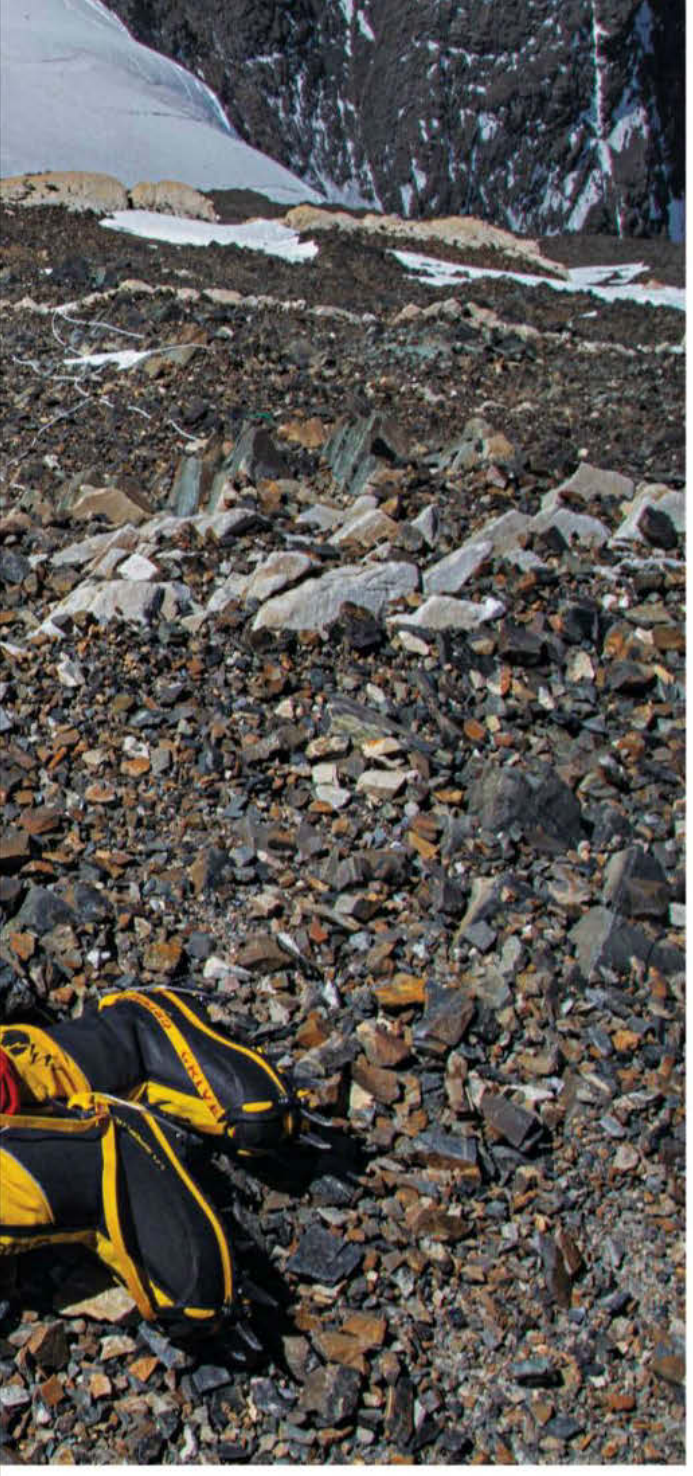
Climbers descend through the Khumbu Icefall after spending time higher up on the mountain to acclimatize. This part of the icefall is known as the Popcorn Section, because that's what its jumbled (and jumbo) blocks of ice resemble.

ANDY BARDON

South Korean Song Won-bin, 44; and German Eberhard Schaaf, 61. As I cramponed past their icy corpses on my own descent from the summit, I thought of the shattering sorrow their families and friends would experience when they heard the news. I too had lost friends to the mountains. Exactly why these individuals died still wasn't clear. However, many recent deaths on Everest have been attributed to a dangerous lack of experience. Without enough training at high altitude, some climbers are unable to judge their own stamina and don't know when to turn around and call it quits. "Only half the people here have the experience to climb this mountain," Panuru told me. "The half without experience are the most likely to die." Too often, it's not the mountain's harshness that kills climbers but their own hubris.

HOW DIFFERENT IT WAS 50 years ago when, on May 1, 1963, James Whittaker, accompanied only by Sherpa Nawang Gombu, became the first American to reach the summit of the world. "Big Jim" did it by climbing the Southeast Ridge, the same route pioneered in 1953 by the peerless New Zealander Edmund Hillary and Sherpa

KRISTOFFER ERICKSON



As I cramponed past their icy corpses on my own descent from the summit, I thought of the shattering sorrow their families and friends would experience when they heard the news.

Climbers file past the body of Shriya Shah-Klorfine, a 33-year-old Nepali Canadian who died on May 19. Shah-Klorfine collapsed during her descent from the summit.

Tenzing Norgay. Whittaker had climbed Mount McKinley a few years before, and it was Gombu's third trip to Everest. Three weeks after Whittaker and Gombu's ascent, in an unprecedented act of boldness, teammates Tom Hornbein and Willi Unsoeld clawed their way up a completely new route, the West Ridge. (The two men had been teammates on the 1960 American Pakistan Karakoram Expedition.) On that same day Barry Bishop and Lute Jerstad made the second American ascent of the Southeast Ridge. The two teams managed to meet below the summit, but by then it was dark, and they were forced to bivouac at 28,000 feet—a risky, last-ditch option never before attempted. Without tents, sleeping bags, stoves, Sherpas, oxygen, water, or food, they weren't expected to survive.

"God, they were lucky," says Whittaker. "If there had been any wind, they would have all perished. It would have been horrible."

All four men lived—although Unsoeld and Bishop lost 19 toes between them. And despite

---

Mark Jenkins contributed to the new National Geographic book The Call of Everest: The History, Science, and Future of the World's Tallest Peak.

Hundreds of climbers converge at Base Camp on the Nepali side of Everest. The crowded, colorful temporary village offers up hot bucket showers, Internet access, and fresh baked goods.

ANJIN HERNDON

There will always be people who want to climb the world's tallest peak, because there's more to being on Everest than getting hemmed in by crowds or confronted by heaps of trash.

the death two months earlier of Wyoming climber John "Jake" Breitenbach in an accident in the Khumbu Icefall, the 1963 American expedition became a tale of heroic success, the moon shot of mountaineering.

Our team was on Everest to mark the anniversary of that expedition. Yet as we witnessed, the mountain has become an icon for everything that is wrong with climbing. Unlike in 1963, when only six people reached the top, in the spring of 2012 more than 500 mobbed the summit. When I arrived at the apex on May 25, it was so crowded I couldn't find a place to stand. Meanwhile, down below at the Hillary Step the lines were so long that some people going up waited more than two hours, shivering, growing weak—this even though the weather was excellent. If these throngs of climbers had been caught in a storm, as others were in 1996, the death toll could have been staggering.

Everest has always been a trophy, but now that almost 4,000 people have reached its summit, some more than once, the feat means less than it did a half century ago. Today roughly 90 percent of the climbers on Everest are guided clients, many without basic climbing skills. Having paid $30,000 to $120,000 to be on the mountain, too many callowly expect to reach the summit. A significant number do, but under appalling conditions. The two standard routes, the Northeast Ridge and the Southeast Ridge, are not only dangerously crowded but also disgustingly polluted, with garbage leaking out of the glaciers and pyramids of human excrement befouling the high camps. And then there are the deaths. Besides the four climbers who perished on the Southeast Ridge, six others lost their lives in 2012, including three Sherpas.

Clearly the world's highest peak is broken. But if you talk to the people who know it best, they'll tell you it's not beyond repair.

RUSSELL BRICE, 60, runs Himalayan Experience, the largest and most sophisticated guiding operation on Everest. Himex, as it's known, has led 17 expeditions to Everest, on both the Nepal side and the China side. Brice, a Kiwi transplanted to Chamonix, France, is famous for running a tight ship. Every climber and Sherpa on a Himex team is issued a radio and is required to check in every day. Each is also required to wear an avalanche transceiver, a helmet, a harness, and crampons and to attach themselves to safety lines. (During the spring 2012 season a Sherpa from another team failed to clip the safety lines and fell to his death in a crevasse.) To avoid getting into trouble, clients must keep pace or turn around.

Despite the relatively large size of Brice's teams—as many as 30 clients matched with 30 Sherpas—they leave a small footprint on the mountain, removing all of their excrement and rubbish, a practice not followed by most teams. Cleanup efforts by the Sagarmatha Pollution Control Committee, a sort of Everest city council, have improved conditions at Base Camp (human waste goes into barrels that are later removed), but they haven't had much impact higher on the mountain. Camp II, at 21,240

The 2012 Everest expedition was funded in part by your National Geographic Society membership. View the team's blog, video, and Instagram photos at **ngm.nationalgeographic.com/everest.**

feet, is particularly disgusting. Camp IV is little better, the tattered skeletons of abandoned tents snapping in the wind.

"We can manage the numbers if all the operators talk to each other," Brice insists. "It's all about good communication."

If only it were that simple. There are other factors at work. One, ironically, is improved weather forecasting. Lack of information once led expeditions to attempt the summit whenever their team members were ready. Today, with hyperaccurate satellite forecasts, all teams know exactly when a weather window will open up, and they often go for the top on the same days.

Another factor: Low-budget outfitters don't always have the staff, knowledge, or proper equipment to keep their clients safe if something goes wrong. The cheaper operators often employ fewer Sherpas, and those they do hire sometimes lack experience. "All of the clients who died on Everest this past year went with low-budget, less experienced operators," says Willie Benegas, 44, an Argentine-American high-altitude guide and co-owner, with his brother Damian, of Benegas Brothers Expeditions, which has led 11 trips to Everest. Besides holding Nepalese outfitters to the same standards as international ones, the brothers say, Nepal's Ministry of Culture, Tourism and Civil Aviation, which regulates climbing on Everest, should promote better education for Sherpas so they can perform their duties as well as international guides.

To prevent crowding on the mountain, some have proposed limiting not only the total number of permits per season but also the size of each team—to no more than ten clients per team. Others are skeptical.

"That will not happen," says New Zealander Guy Cotter, 50, owner of Adventure Consultants, which has led 19 expeditions to Everest. "Everest is big business for Nepal, and they will never turn down the money." In Nepal, a country of nearly 30 million, one in four citizens lives in poverty. The country itself is in limbo. A ten-year civil war between Maoists and government loyalists ended in 2006. The monarchy was later dissolved and a coalition government created, but the past seven years have been deeply troubled, with belligerent political parties operating under an interim constitution. The political system is "so corrupt and so feckless," Kunda Dixit, editor of the *Nepali Times,* has said, "that not having a government is actually beneficial, because there is no one to make all those mistakes."

Expeditions on the mountain spent almost $12 million in Nepal in the spring of 2012, according to Ang Tshering Sherpa, owner of Asian Trekking. The ministry took in more than $3 million in permit fees from climbers on 30 foreign expeditions. "You have to remember, Nepal is almost a failed state," Cotter

Six ways to repair Everest

FEWER PERMITS To limit the total number of climbers and Sherpas on the mountain

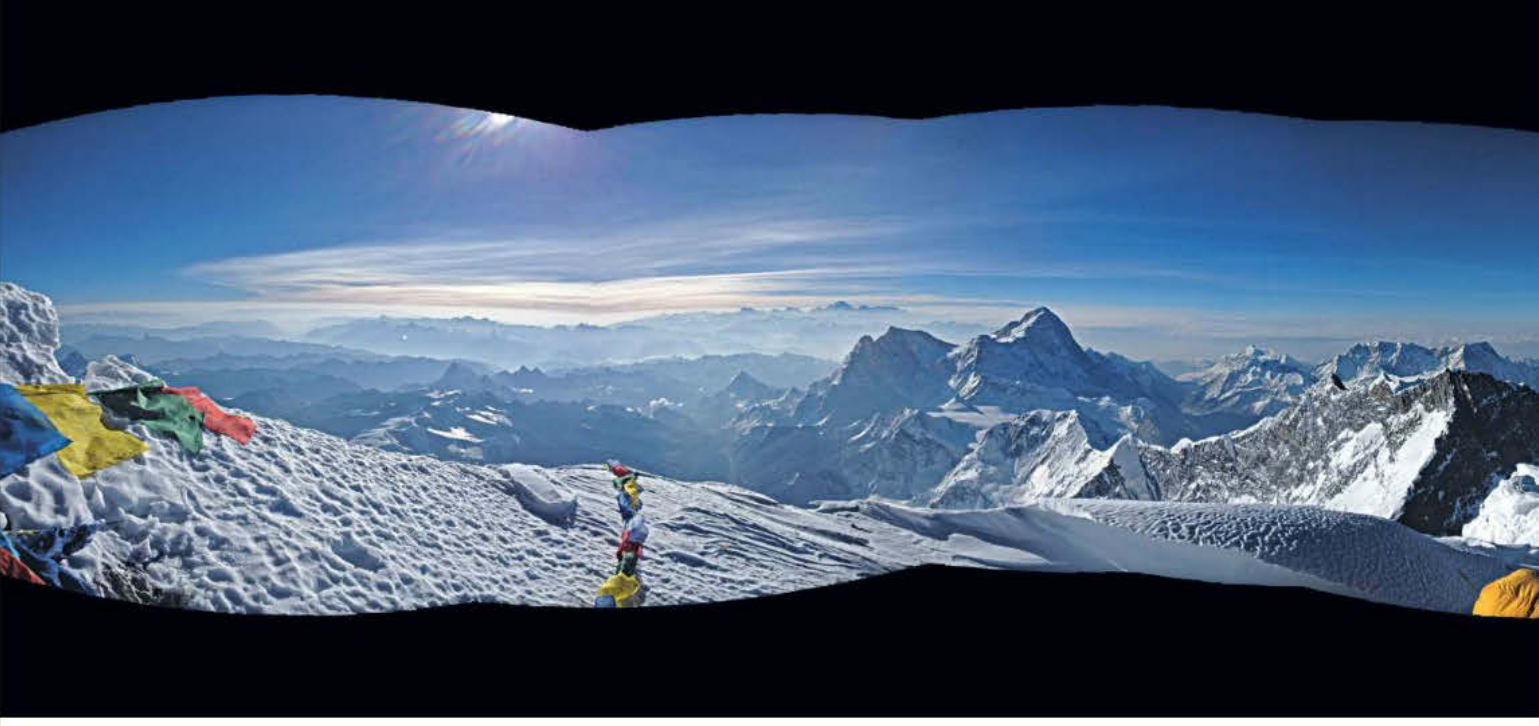
SMALLER TEAMS To reduce dangerous traffic jams on the standard Southeast Ridge route

CERTIFY OUTFITTERS To make sure that they meet acceptable standards of safety and mountain knowledge

REQUIRE EXPERIENCE To ensure that climbers and Sherpas are prepared for high-altitude challenges

LEAVE NO TRACE To remove human waste and garbage from the mountain, with penalties for noncompliance

REMOVE BODIES To show respect not only for the dead but also for the living, who encounter corpses on main routes



says. "More government intervention would only encourage more corruption." Dave Hahn, a high-altitude guide whose 14 Everest summits are an American record, agrees. Expecting the Nepalese government to institute solutions isn't realistic, he says. "Everest operators must come together to self-regulate the situation."

"The ministry is an expansive, dysfunctional bureaucracy," says Conrad Anker, 50, who led the National Geographic-supported expedition in 2012. "Of the $3 million generated in permit fees each year, only a small amount makes it back to the mountain." (The ministry was repeatedly contacted for this article but declined to comment.)

The so-called liaison officer system is a perfect example of this dysfunction, Anker says. Every Everest team is assigned a government liaison officer, or LO, who is paid by the team and is supposed to make sure regulations are followed. But none of the LOs actually go up the mountain. "Most don't even stay in Base Camp," Anker says. "They go back down where it's warm." LOs should be replaced, he argues, by climbing rangers with the knowledge, ability, and desire to patrol the mountain and enforce regulations. Everest also needs a permanent search-and-rescue team: "Eight Sherpas and four Western guides, all paid through the ministry," he says. "This would make the mountain safer."

A decade ago Anker, with his wife, Jenni, founded the Khumbu Climbing Center (KCC) in the village of Phortse to improve the mountaineering skills of Sherpas and thereby increase the safety margin for everyone on Everest. Many of the center's 700-plus graduates are now working for outfitters on the mountain. The Sherpas, after all, are the ones who perform most of the rescues. Danuru Sherpa, a KCC graduate who has summited Everest 14 times, told me he has dragged at least five people off the mountain to save their lives.

"One of the obvious problems is that clients don't respect the knowledge and experience of Sherpas," Anker says. The Sherpas are, in a way, partly to blame. Most of them are Tibetan Buddhists whose culture and religious principles discourage confrontation. "Clients sometimes disregard their advice and die," Anker says. "Last year was a case in point. We're trying to help the Sherpas become more assertive."

Modern technology, which is already ubiquitous on Everest—everyone at Base Camp has access to a cell phone or the Internet—could also make the mountain safer. In a meeting with the ministry last summer Anker proposed something new: identification cards issued with every climbing permit.

"The Everest ID would contain data that could save the life of a climber or Sherpa," Anker explains. It would have the climber's photo, of course, but more important, a QR code—a type of bar code. "Scanned with a smartphone by an Everest climbing ranger, the QR code would reveal all pertinent information—age, experience, health history, allergies, insurance,

family, emergency phone numbers, everything."

Anker said the Kathmandu bureaucrats sat there looking at him with blank faces. "I even got out my phone and showed them how it would work," he says. "It's 2012. This isn't difficult. It's just like a ski pass."

DESPITE ALL THE PROBLEMS on the mountain, Everest still stands alone. There will always be people who want to climb the world's tallest peak, because there's more to being on Everest than getting hemmed in by crowds or confronted by heaps of trash. The mountain is so high and so indifferent it calls upon every climber, at one time or another, to rise to his or her better self.

There is also beauty on Everest. I'll never forget the breathtaking view from our perch at Camp III, clouds roiling up the Western Cwm like a slow-motion reverse avalanche. Or the visceral relief of a cup of scalding soup at Camp IV. Or the crunch of my crampons in the crystalline labyrinth of the Khumbu Icefall just above Base Camp. I'll treasure the memory of climbing with friends on the mountain. I committed my life to them, and they committed their lives to me.

Such moments are the reasons climbers keep coming back to Everest. It's not simply about reaching the summit but about showing respect for the mountain and enjoying the journey. Now it's up to us to restore a sense of sanity to the top of the world. ▯

Team member Emily Harrington used an iPhone to create this stitched photo from the summit (top) and an Instagram self-portrait. Earlier she had struggled with a respiratory infection. "The entire journey was a mental battle," she said, "a fight to keep walking."

Check out an interactive graphic on how people have died on Everest, an Instagram image gallery, and more on our digital editions.

EMILY HARRINGTON (BOTH)

Headlamps trace a path to the summit a few hours before dawn. Without tighter safety rules, climbers will continue to face more hazards on the mountain than altitude and the elements. "The most dangerous thing about Everest," said one guide, "is everyone else who's trying to climb it."

KRISTOFFER ERICKSON

The Rebirth of Gorongosa

Biologist E. O. Wilson takes a close look at a famed park in Mozambique. Recovering from civil war, it faces a new challenge: Settlers are deforesting its sacred mountain.

On his first trip to Gorongosa (and Africa), Wilson uses an experienced nose to identify a foam grasshopper. It's named for the smelly, poisonous foam it emits.

Local boys collect frogs and dragonflies around Murombodzi waterfall on Mount Gorongosa during a 2011 bioblitz—a two-hour sampling of its wildlife.

NYMPH, PROBABLY STINKBUG (PENTATOMIDAE)

MOUSE (MURINAE)

FLAP-NECKED CHAMELEON *(CHAMAELEO DILEPIS)*

WHIRLIGIG BEETLE (*DINEUTES* SP.)

An amazing array of small species lives in the grasslands and forests of Goron-gosa. Big game animals are only now being restored, after being nearly wiped out by poaching and civil war.

SAVANNA GRASSHOPPER (*ACRIDA* SP.)

SPIROBOLID MILLIPEDE

BROWN-HOODED KINGFISHER *(HALCYON ALBIVENTRIS)*

KATYDID *(ENYALIOPSIS PETERSI)*

FRESHWATER CRAB *(POTAMONAUTES* SP.)

SYLVAN KATYDID *(ZABALIUS OPHTHALMICUS)*

SPECTACLED WEAVER *(PLOCEUS OCULARIS)*

BABOON SPIDER (*AUGACEPHALUS* SP.)

FREE-TAILED BATS (*TADARIA* SP.)

CARPENTER BEE (*XYLOCOPA* SP.)

COMMON RIVER FROG *(AMIETIA ANGOLENSIS)*

PURPLE-BANDED SUNBIRD *(NECTARINIA BIFASCIATA)*

By Edward O. Wilson

Photographs by Joel Sartore

In the summer monsoon season of late November to mid-March, the rain clouds ride the trade winds of the Indian Ocean west into Mozambique. Crossing the coast, they refresh the *miombo* woodlands of the Cheringoma Plateau, then the savanna and floodplain grasslands of the Great Rift Valley. Finally they run aground on the slopes of Mount Gorongosa, where they release great torrents of rain, like a benediction.

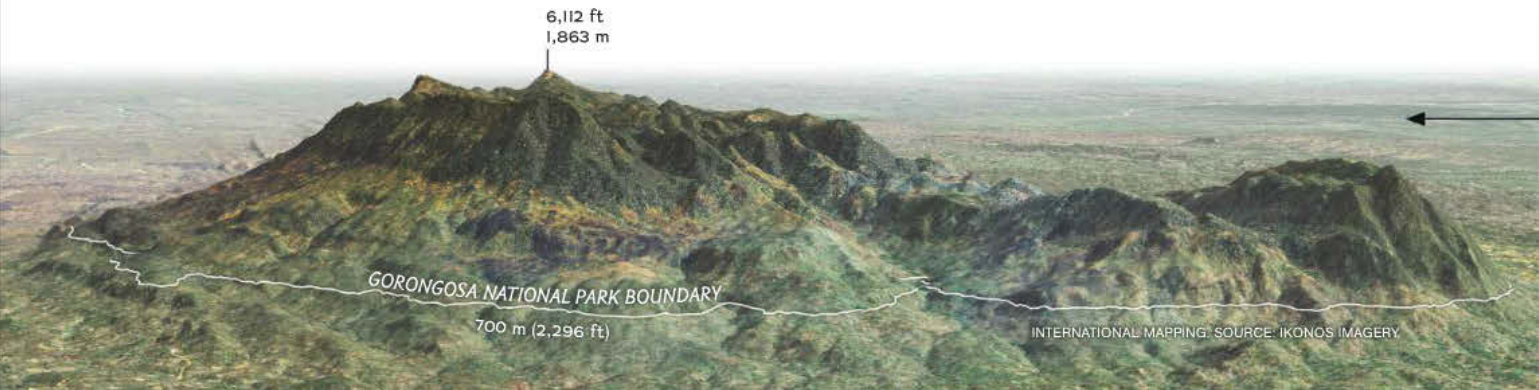
The Gorongosa massif, which reaches a height of 6,112 feet, captures more than six feet of rainfall a year. That is enough to support a lush rain forest on the summit—and to the east, in the Rift Valley, a park that was once one of the richest wildlife refuges in the world. Before Mozambique's civil war ravaged it, Gorongosa National Park was roamed by elephants, African buffalo, hippopotamuses, lions, warthogs, and more than a dozen species of antelope. Now some of those animals are coming back, thanks largely to Greg Carr, an American businessman and philanthropist who is leading a project to restore Gorongosa. In 2010 the park marked a milestone: Mozambique's government fixed an error made at its creation, expanding its boundaries to include Mount Gorongosa, source of its life-sustaining rivers.

In the summer of 2011, I went to Gorongosa to support Carr's efforts and also to work on my new digital textbook for high school biology. The park is an excellent place to convey the high stakes and the excitement of doing wildlife biology today. The summit rain forest on Mount Gorongosa, about 29 square miles in extent, is an ecological island in a sea of savanna and grassland. It is hard to get to, and so it has remained largely unexplored by biologists. Ants, my own specialty, were entirely a blank on the map when I arrived. For a naturalist there is no more powerful magnet than an unexplored island. When I visited Mount Gorongosa, on my first trip to Africa, I felt highly charged with the prospect of surprise and discovery.

DURING MY STAY at the park my assistant was Tonga Torcida, a young man born on Mount Gorongosa. He was one of the first of his village to graduate from high school, not a mean feat, since schooling past the seventh grade requires tuition and a uniform that few local families can afford. While we were together, Torcida learned that he would receive a scholarship to attend a Tanzanian college. Speaking four languages and working off his intimate knowledge of Gorongosa, he plans to be a wildlife biologist.

Torcida told me a creation story of his people, and why they consider Mount Gorongosa sacred. In early times, he said, God lived with his people on the mountain. Humans were giants then and not afraid to ask God for special favors. In a drought they would say, Bring us water. The Creator, growing tired of their constant importuning, moved his residence up to heaven. Still the giant people persisted, reaching up from the mountain. At last, to put them in their place, God decided to make them small. Thereafter life became a great deal more difficult—and so it has been to this day. I told Torcida that this folklore and the moral lesson embedded in it sounded very much like parts of the Old Testament.

Gorongosa certainly suffered a precipitous fall from grace. Three years after Mozambique



Mount Gorongosa

Rising to 6,112 feet, more than half a mile above the Mozambique plain, the mountain is a rain-catching island in a dry sea. In December 2010 the terrain above 700 meters (2,296 feet) was added to Gorongosa National Park. The park is struggling to save the remains of the summit forest—a biological haven and water source for the whole region.

GORONGOSA NATIONAL PARK BOUNDARY
700 m
2,296 ft

Reforestation efforts
The park has hired local people to plant millions of seedlings, mostly along degraded riverbanks.

New farmland
Locals grow corn, potatoes, and other crops on cleared land.

Rain forest
Monsoon mists sustain a moist evergreen forest. More than a third of it has been cut in the past decade.

Settlements and camps
Farmers are moving upslope, clearing forest as they go. Up to 7,000 people live on the mountain.

Other land cover
Grasslands and sparse woodlands support diverse species—and a growing number of settlers' goats.

MOUNT GORONGOSA
6,112 ft
1,863 m

Muera
Chitunga
Murombodzi waterfall
Site of 2011 bioblitz
Nhandué
Vunduzi
Nhandare

700 m

18°15′S
18°30′
34°E

0 mi 2
0 km 2

A satellite image from 2010 shows Mount Gorongosa from the southwest, with its dark green summit forest.

VIEWPOINT AT LEFT

DATA OUTSIDE THE PARK BOUNDARY ONLY PARTIALLY AVAILABLE.

VIRGINIA W. MASON, NGM STAFF
SOURCE: PARQUE NACIONAL DA GORONGOSA

won its independence from Portugal in 1975, a civil war broke out and raged for 17 years. The park, which had been established by the colonial government in 1960, became a battleground. Its headquarters and tourist facilities were destroyed. Roving soldiers, hungry for food as well as for ivory they could trade for weapons in South Africa, killed many of the large animals. After peace accords were signed, but before order could be restored at Gorongosa, commercial poachers killed an even larger number of animals, peddling the meat at nearby markets. In the end, nearly all the big game species were gone or nearly gone. Only the crocodiles, quick to slide down muddy banks into the safety of the rivers, escaped with little harm.

The clearance of big game had important environmental consequences. Where zebra herds no longer grazed, grass and woody shrubs thickened, and lightning-strike wildfires became more threatening. With no elephants knocking over trees to feed on the branches, some forests increased in density. With the scat and carcasses of big game severely reduced, the population of some scavengers fell sharply.

Yet the ecological base of vegetation and small animals, including the myriad species of insects and other invertebrates, remained largely intact. Gorongosa Park contains a great variety of habitats—besides the valley grasslands and the mountain's several vegetation zones, it includes forested plateaus and limestone gorges—and even today it supports tremendous biodiversity. In the whole of the park, 398 bird species (of which about 250 are residents), 122 mammals, 34 reptiles, and 43 amphibians have been found. Probably tens of thousands of species of insects, arachnids, and other invertebrates await discovery.

FOR A DECADE following the end of the civil war, while a new, democratic Mozambique established itself, Gorongosa remained in ruins. Meanwhile, Greg Carr had gotten interested in the country and was looking for a way to help; after making his fortune in voice mail and Internet services, he had turned to philanthropy. In 2004 the government of Mozambique and Carr agreed that he would help plan the park's restoration. Carr has since done much more: He has undertaken to restore Gorongosa himself, largely at his own expense, and has made it his full-time occupation. Mozambique's Ministry of Tourism has entered into a long-term partnership with him to manage and develop the park.

Today, after less than a decade, Gorongosa is well on its way to recovery. Large animals, including African buffalo and elephants, have

Harvard biologist E. O. Wilson has written 28 books and won two Pulitzer Prizes. Longtime contributor Joel Sartore has photographed on every continent.

Teams of miners with a government permit dig for gold. They're about a mile outside Gorongosa Park—but within the watershed that sustains it. The future of the park depends on finding sustainable livelihoods for the people who live in the area.

been imported from nearby South Africa and are multiplying rapidly. Eland and zebra are next. Though still well below their prewar maximum, herds of grazers and browsers swarm once more across the savanna and grassland. Ecological balance is returning with the megafauna, and so are visitors from Europe and North America. Excellent facilities have been built at the central Chitengo Camp and at explorer camps in the interior. At Chitengo a bullet-pocked concrete slab has been preserved as a war memorial.

The accomplishments of Greg Carr's team and of the people of Mozambique are impressive. But restoring a damaged park is much harder than creating a new one, and Gorongosa—especially its mountain—is far from being out of danger. During the civil war, as marauding soldiers invaded the mountain, subsistence farmers began to clear little plots up the slope. The taboo of the sacred mountain was largely forgotten. In time the farmers reached the summit rain forest and began to fell the tall trees and convert the moist, fertile ground into corn and potato fields. In the past decade the area of original rain forest has been reduced by more than a third.

The retreat of the forest already means that fewer species of plants and animals, some likely endemic, can survive. The complete removal of

Blue waxbills—awake or dozing off—are a common sight in Gorongosa's dry, bushy grasslands. So far, nearly 400 bird species have been documented in the park.

the forest, which at the current rate of destruction might easily occur within ten years, would be catastrophic for the entire park. The mountain's ability to capture, hold, and gradually release monsoon rainwater would be gone. The water would then run off quickly, and the moisture supplied to the rest of the park would be rendered seasonal instead of year-round. In the face of the new aridity, life in and around the park would be less sustainable for both wildlife and people.

Now that the mountain is part of it, the park has the authority to secure the forest perimeter. The forest won't be truly secure, though, until those who are destroying it are given alternatives. Tourism is part of Carr's answer, but he has also hired teams to create numerous nurseries to grow seedlings of the rain forest trees and begin the decades-long, perhaps centuries-long process of returning the forest to its original area. The park is creating schools and health clinics for local people at the base of the mountain, below the rain forest. Finally, a center for scientific research and education is planned for the Chitengo Camp. The emphasis will be on the environment inside the park and on the preservation of its biodiversity.

TO SAMPLE THE CURRENT biodiversity on Mount Gorongosa, Greg Carr and I decided to hold a "bioblitz" there and to engage the community living on its lower slopes. We asked Tonga Torcida to help organize the event and to recruit local children as our helpers. Bioblitzes are counts of species found and identified in a restricted area over a fixed period of time, usually 24 hours. They follow simple rules: Participants search within a set radius around a focal point, assisted by local naturalists who are familiar with one or more groups of organisms and can identify the species discovered. The first bioblitz I helped organize was at Concord, Massachusetts, in the summer of 1998, with Walden Pond as the focus. Naturalists came from all over New England. The effort was so successful and well publicized that similar events have since been conducted all over the United States (including two in New York City's Central Park) and in at least 18 other countries.

This one took place at an elevation of around 3,700 feet on Mount Gorongosa, just below the lower fringe of rain forest. Bending to logistic necessity in this remote place—I had to get there by helicopter—we limited the time to two hours, and I served as the sole expert. I was able to identify most of the insects and spiders to their taxonomic families (such as millipedes of the family Julidae, rove beetles of the family Staphylinidae, and of course, ants, which all belong to the family Formicidae). For some specimens I had to guess.

The event was a melee of scurrying and shouting. The children, ranging from four or five to

Naturalists for a day, dozens of children who live on Mount Gorongosa bring Wilson sandwich bags full of specimens to identify during the bioblitz. Mostly they find insects. "On the mountain, the big stuff is gone," says photographer Joel Sartore.

about twelve years old, proved remarkably gifted hunters. They were eager to hear what I had to say about their discoveries. Torcida translated our talk back and forth, and at the end of the two hours I counted a total of 60 species, belonging to 39 families in 13 orders.

We found strange insects and arthropods, most very small. There were a lot of Hymenoptera (the order that includes ants, bees, and wasps), Coleoptera (beetles), and Diptera (flies). Though we saw surprisingly few ants per se, one species was identified as a rarely seen driver ant *(Dorylus bequaerti)*. We also spotted a few birds, reptiles, amphibians, and one mouse.

To most of the public the word "wildlife" primarily means mammals and birds, which have suffered heavily on Mount Gorongosa. People yearn to see large wild animals, and I am no exception. But wildlife also includes the little things that run the world—the insects and other invertebrates that form the foundation of ecosystems on the land. So Gorongosa did not disappoint me. On the contrary it fulfilled all the yearnings for adventure and discovery I have felt since my boyhood, when I was the age of my helpers on Mount Gorongosa and was venturing into the forests of Alabama and Florida with a net, spade, and collecting jars. □

In the pale light of the midnight sun, a minke whale is butchered on the deck of the Jan Bjørn, *one of the few whaling boats still working the waters off Norway's Lofoten Islands.*

In Norway a maverick way of life is ending.

Last of the Viking Whalers

Earning a living from the sea is risky business—one reason most of Lofoten's young people opt out. A rare

exception is Raymond Nilsen, 34, one of the few young men from his island to take up fishing in recent decades.

By Roff Smith
Photographs by Marcus Bleasdale

The Lofoten Islands in the far north of Norway have always been a world apart, a peninsula-like chain of wild, craggy shards jutting into the Norwegian Sea above the Arctic Circle. In Norse folklore Lofoten's long spine of mountains were said to be the haunts of trolls and Valkyries—maidens who conducted slain warriors to Valhalla—and its fjords provided dramatic backdrops to some of the grandest of the Viking sagas.

On this bright summer morning, a small wooden boat putters across the glassy expanse of the Vestfjorden, its wake rippling the mirror-perfect reflections of the surrounding mountains. The boat's skipper, 69-year-old Jan Bjørn Kristiansen, has been sailing these waters for more than 50 years, the past 40 of them in the same weather-beaten vessel, which by no coincidence is also called *Jan Bjørn*. The name is fitting, for man and boat have much in common: Both are tough, seasoned whalers, quintessentially Norwegian—stubborn, practical, strongly built—and both bear the scars of much hard work at sea.

Over the course of the summer whaling season, Kristiansen will harpoon perhaps 30 or 40 minke whales, butcher their carcasses on deck, and sell the meat dockside to local seafood merchants along the coast. Despite an international moratorium on commercial whaling, Norwegians like Kristiansen persist in hunting minke whales—though for practical reasons they do so only in Norway's domestic waters.

In his five decades as a whaler, Kristiansen has weathered many a storm, both at sea and on land. He lived through the dangerous years of the eco-wars, when activists sabotaged and sank a number of Lofoten whaleboats. And he survived a horrific shipboard accident a few years ago when his harpoon cannon backfired, nearly killing him and leaving him with a mangled left hand. He was back hunting whales the following season.

But as he steers toward an old whaling station on this calm midsummer morning, Kristiansen sees not just his own long career drawing to a close, but also an entire way of life. His eponymous boat is one of only 20 that came out to hunt this season—a far cry from the nearly 200 whalers that worked northern Norway's coastal waters in the late 1950s, when Kristiansen was getting his first taste of whaling as a deckhand.

A slab of whale meat is lowered into the hold by Marius Hanssen, who is responding to a signal from whaler Jan Bjørn Kristiansen. "Whaling has been my life," says Kristiansen, who started as a deckhand in 1958. For Hanssen, a psychology student at the University of Tromsø, it's a summer job.

It isn't a scarcity of whales that is bringing down the curtain, or even the complicated politics of whaling. It's something far more prosaic and inexorable: Norwegian kids, even those who grow up in the seafaring stronghold of Lofoten, simply don't want to become whalers anymore. Nor do they want to brave storm-tossed winter seas to net fortunes in cod, as their forebears have done for centuries. Instead, they aspire to land safer, salaried jobs in distant cities or with the offshore oil industry, and they have been leaving their island communities in droves.

There is irony in this turn of events. For most of its history, Lofoten exerted a gravitational

Raymond Nilsen and his father, Eilert, butcher a minke whale aboard the Nordfangst—*Norwegian for* Northern Catch. *Over a typical summer whaling season they catch 20 to 30 minkes. In winter they fish for cod.*

pull on the young and ambitious. In his 1921 coming-of-age classic *The Last of the Vikings,* Norwegian novelist Johan Bojer described the legendary island chain as "a land in the Arctic Ocean that all the boys along the coast dreamed of visiting some day, a land where exploits were performed, fortunes were made, and where fishermen sailed in a race with Death."

For a few gold rush months each year, millions of Atlantic cod migrate south from the Barents Sea to spawn among the reefs and shoals of Lofoten. Fishermen have been flocking here to cash in on the bonanza for more than a thousand years. In addition to sitting astride one of the world's richest fisheries, these islands are also blessed with a near-perfect climate for drying fish in the open air to make stockfish. This durable, highly nutritious cod jerky sustained the Vikings on their long voyages and became Norway's most lucrative export during the Middle Ages.

The immense wealth of the dried cod trade, and the possibility that jackpot riches might await any man with a boat, courage, and a bit of luck, lured fortune seekers by the thousands. Grainy photographs from the 1930s show Lofoten's harbors jammed with boats. Nowadays factory trawlers from the big seafood companies down south do the work of many boats, netting and processing a high percentage of the catch. Small family-owned boats that brought their catches to local merchants and kept the Lofoten villages alive have become endangered species.

The cod are still there, still running in the millions, still a lucrative business. But as the older fishermen sell out and retire, seafood companies snap up their quotas for big money. Even the sons of fishermen who want to carry on the family business may find their paths blocked by the cost of buying a boat and a quota—typically three-quarters of a million dollars.

"Banks don't want to lend you that kind of money when you're my age," says 22-year-old Odd Helge Isaksen, who nevertheless is determined to follow in the Lofoten tradition and become a fisherman. A resident of Røst, a close-knit island community located at the heart of the Lofoten cod banks, Isaksen is making his way into the business the hard way, in an open boat hauling in cod one by one on handlines, in much the way his Viking forebears did a thousand years ago. Such dedication is rare. In the past ten years only Isaksen and one other young man on Røst decided to pursue fishing as a career.

"I'm one of the new Vikings," he jokes one bitterly cold winter evening as he motors into the harbor after a long day at sea. Coming in hours after the rest of the fleet returned, his boat is laden to the gunwales with hundreds of pounds of cod. Black Sabbath is blaring on his iPod as he steers his boat with one hand and updates his Facebook account on his mobile phone with the other.

"My friends from school think it's kind of funny that I decided to become a fisherman," Isaksen says. "But they sure are impressed with the money I'm making."

COMPARED WITH Lofoten's cod industry and its thousand-year history, commercial whaling was a latecomer. "Whaling from boats was unknown in my grandfather's day," recalls Oddvar Berntsen, now 83 and the last surviving resident of his fishing village. "The boats were just too small. Occasionally the villagers might kill a whale from shore if it came in close, but this was looked upon as opportunistic, done for food."

When commercial whaling finally arrived in Norway, it did so with a bang—literally. In the 1860s a Norwegian shipping and whaling magnate named Svend Foyn devised the grenade-tipped harpoon. It was a game changer, thrusting Norway to the fore of the world's whaling nations.

Norway's fishermen, however, blamed the new industry for poor catches during the 1870s, since whales were believed to drive schools of fish closer to shore, where fishermen in small boats could catch them. After a series of bitter disputes between fishermen and whalers, Norway

---

Writer Roff Smith holds a degree in Norse literature. Photographer Marcus Bleasdale has won numerous awards for his coverage of human rights issues.

Norway's Sea Change

In the defiant spirit of the Vikings, Norwegian whalers continue hunting minke whales in their domestic waters, despite an international moratorium. But social and economic forces may soon put an end to the controversial practice. Among the Lofoten and Vesterålen Islands north of the Arctic Circle, fishing communities are dying as young people leave in droves to pursue other lives.

Oil and gas account for 23 percent of Norway's gross domestic product. The industry wants access to Lofoten's waters, but to protect cod spawning areas, the government has so far refused.

VIRGINIA W. MASON, NGM STAFF
SOURCES: NORWEGIAN PETROLEUM INSTITUTE; NORWEGIAN COASTAL ADMINISTRATION

Rich in natural beauty, Skrova boasted the highest percentage of millionaires in all Norway as recently as 1980,

thanks to its thriving fish factories and whaling station. All but one factory has since closed.

Children at a coming-of-age ceremony on Røst play in the endless summer sunshine—but their days on the island are limited: Teens must move away to attend the regional high school.

With the North Atlantic minke whale population at 130,000, Norway's catch is considered highly sustainable. It's the whalers who are headed for extinction.

Lured to Lofoten by the lucrative winter cod run, hundreds of fishing vessels clog Henningsvær harbor in 1951. Today a wharf hand at a fish factory on Røst (right) prepares to unload the catch from a much smaller fishing fleet. Factory trawlers and large seafood companies have put many family-owned operations out of business.

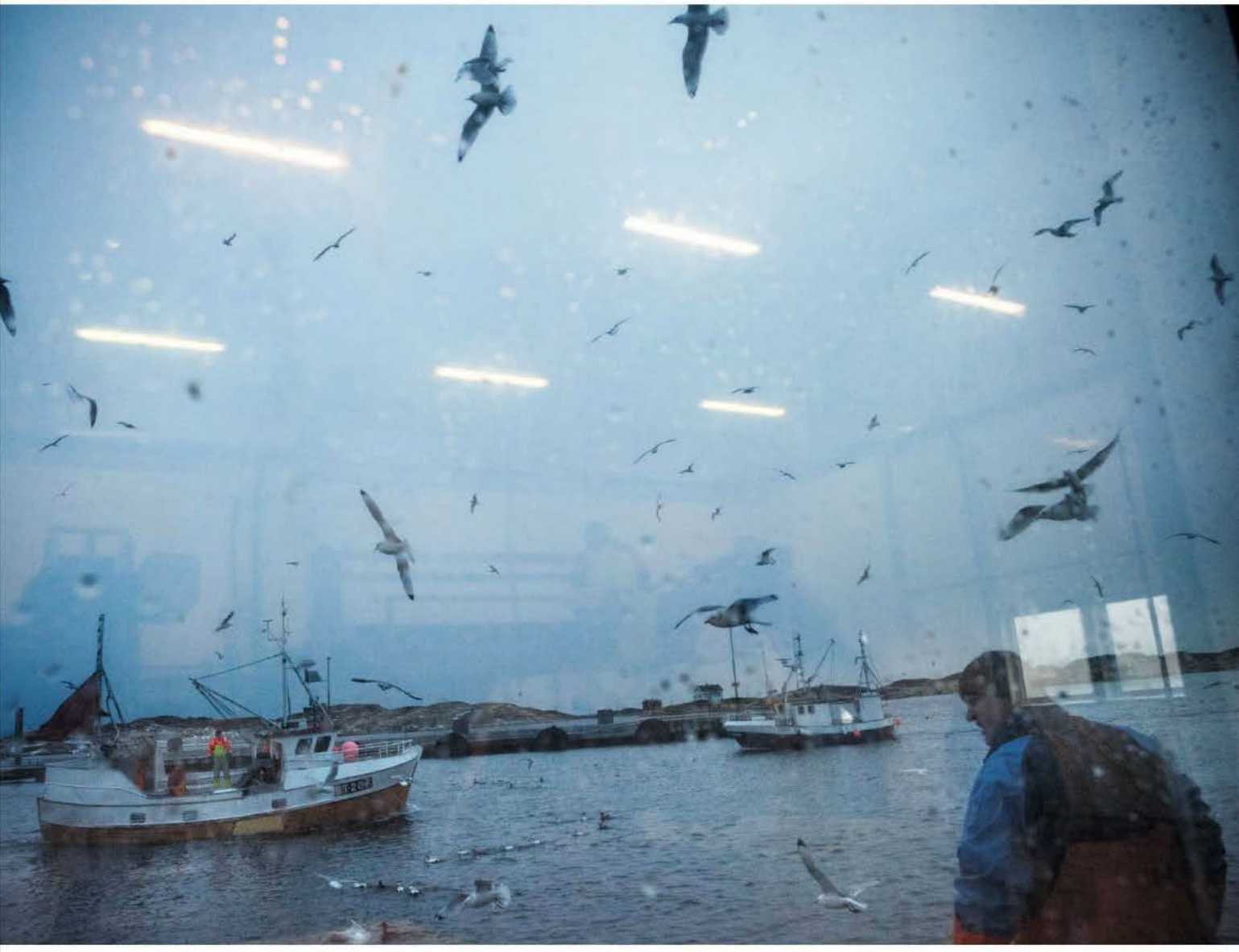
SVERRE A. BØRRETZEN, NTB SCANPIX (ABOVE)

became the first nation to ban whaling in its territorial waters, declaring a ten-year moratorium in 1904. From then on, Norway's commercial whalers sought their quarry in the wider North Atlantic and in the rich waters of the Antarctic.

About the same time, the Lofoten fishing fleet began shifting from sail to engine. With their newfound mobility, some fishermen took up whaling as an additional means of putting food on the table—no small consideration later on during the Great Depression, when both cash and meat were scarce.

The banner year for Lofoten's whalers came in 1958, when 192 boats caught 4,741 minke whales. But change was already in the wind. By 1973, the year Kristiansen bought his boat, the number of whalers had dropped by nearly half. The number has continued falling ever since.

The reasons are more economic and social



than ecological. The cost of hunting whales is high, and returns are low. Although fashionable restaurants in Oslo still offer whale steak, many Norwegian grocery shoppers regard the rich red meat as Depression-era food, or as eco-unfriendly, or perhaps worse still, as a novelty cuisine for tourists. And because of a variety of factors—including restrictions imposed by the Convention on International Trade in Endangered Species (CITES)—there is little export market. So although Norway's government sets an annual quota of 1,286 minke whales, in practice whalers take far fewer (only 533 in 2011).

Even some of Norway's green groups, staunchly opposed to whaling on principle, are content these days to maintain a deathwatch for a way of life they expect to disappear within a generation. They can afford to wait it out. With the North Atlantic minke whale population estimated at a healthy 130,000 animals, Norway's modest annual catch is considered highly sustainable. It's the whalers who are headed for extinction.

THE DEMISE OF WHALING and the consolidation of the cod industry are changing the face of Lofoten, and nowhere is that change more glaring than at Skrova. A generation ago this was a thriving fishing port with no fewer than eight factories working overtime to process cod, herring, and other fish. Fishing and whaling were booming then, and Skrova was the place to be. By the early 1980s the tiny community was deemed to have the highest percentage of millionaires in all of Norway. Wealthy factory owners and fishermen liked to take their ease on a dockside bench, which bemused locals christened *millionærbænken,* the millionaires' bench.

The old bench is still there, weathered and

Laboring around the clock, migrant workers set out thousands of cod to dry and age on wooden racks that

sprawl by the acre over Røst. Dried cod is Norway's oldest major export, dating back to Norse times.

Skrova's most significant export these days isn't salmon or whale; rather, it's children who must leave home to attend high school.

Russian tourists pose in the prow of a replica longship at the Lofotr Viking Museum on Vestvågøy. Jobs in tourism and the oil industry appeal to local young people more than traditional livelihoods tied to land and sea. On Røst an abandoned sheep hut (right) testifies to the changing times.

worn, but most of the millionaires who sat on it were put out of business long ago by the seafood companies down south and their fleets of factory ships. All but one of Skrova's fish factories have closed, the most recent in 2000. With the loss of jobs, the island's population has dwindled to about 150 full-time residents.

Only Ellingsen's, an old family-run seafood company, remains in business. It's still prosperous, nowadays turning out 12,000 tons a year of its own locally farmed salmon and, for a few weeks each summer, buying whale meat from the handful of whalers who still work these waters.

"To be honest, whale meat isn't really commercial for us anymore," says 42-year-old Ulf Christian Ellingsen, the third generation of his family to run the company.

"We continue to buy it mainly out of respect for tradition and our old roots. My grandfather

started this business in 1947 primarily as a whale meat buyer. We'd like to keep that going for as long as we can."

Skrova's most significant export these days isn't salmon or whale but the precious cargo that leaves on the passenger ferry to Svolvær every autumn—a small clutch of schoolchildren who have outgrown the island's tiny community school and are obliged to pack their bags and leave home to attend the regional high school. For most of them, this introduction into the larger world is the start of a whole new life, one that leads away from Skrova.

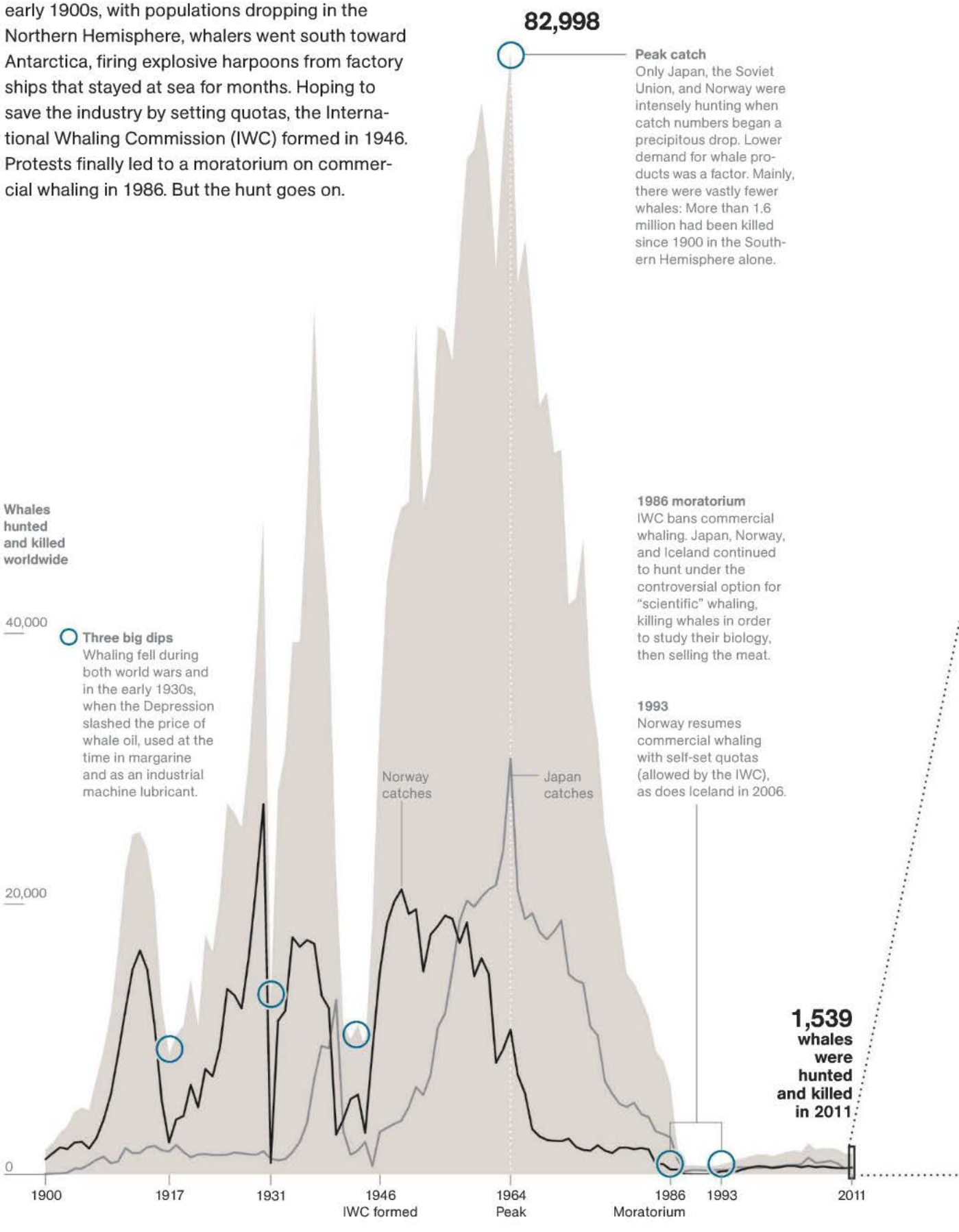
The five teenagers who depart Skrova this autumn will be followed by two more next year and another three the year after. And with no youngsters entering school at the other end of the line, the island's already critically small community school looks set to shrink still further. "We need to get more young families moving in here," says Ellingsen, whose own daughter, Aurora, is among this autumn's group of teenage émigrés who are moving to Svolvær to continue their education.

"I'd like to come back and retire here someday when I'm old," says 17-year-old June Kristin Hauvik, whose mother has worked in the Ellingsen fish factory for 35 years. For now, though, June Kristin is following in the footsteps of her two older sisters, both of whom are leading successful urban lives, one a doctor, the other a lawyer, worlds away from the sleepy island where they grew up. On this bright autumn afternoon, June Kristin and the other departing teenagers board the ferry and set off into the future, past the old millionaires' bench, out beyond the headlands and into the wide open waters, where everything seems possible. □

With dreams of studying film, 16-year-old Aurora Ellingsen will soon leave Skrova to attend the regional high school, the first step in a journey that will likely take her far from her parents and her island roots.

Hunting Whales

Whales barely survived the 20th century. In the early 1900s, with populations dropping in the Northern Hemisphere, whalers went south toward Antarctica, firing explosive harpoons from factory ships that stayed at sea for months. Hoping to save the industry by setting quotas, the International Whaling Commission (IWC) formed in 1946. Protests finally led to a moratorium on commercial whaling in 1986. But the hunt goes on.



ÁLVARO VALIÑO AND TONY SCHICK. SOURCES: CHERRY ALLISON, INTERNATIONAL WHALING COMMISSION; PHILLIP CLAPHAM AND YULIA IVASHCHENKO, NATIONAL MARINE MAMMAL LABORATORY, SEATTLE

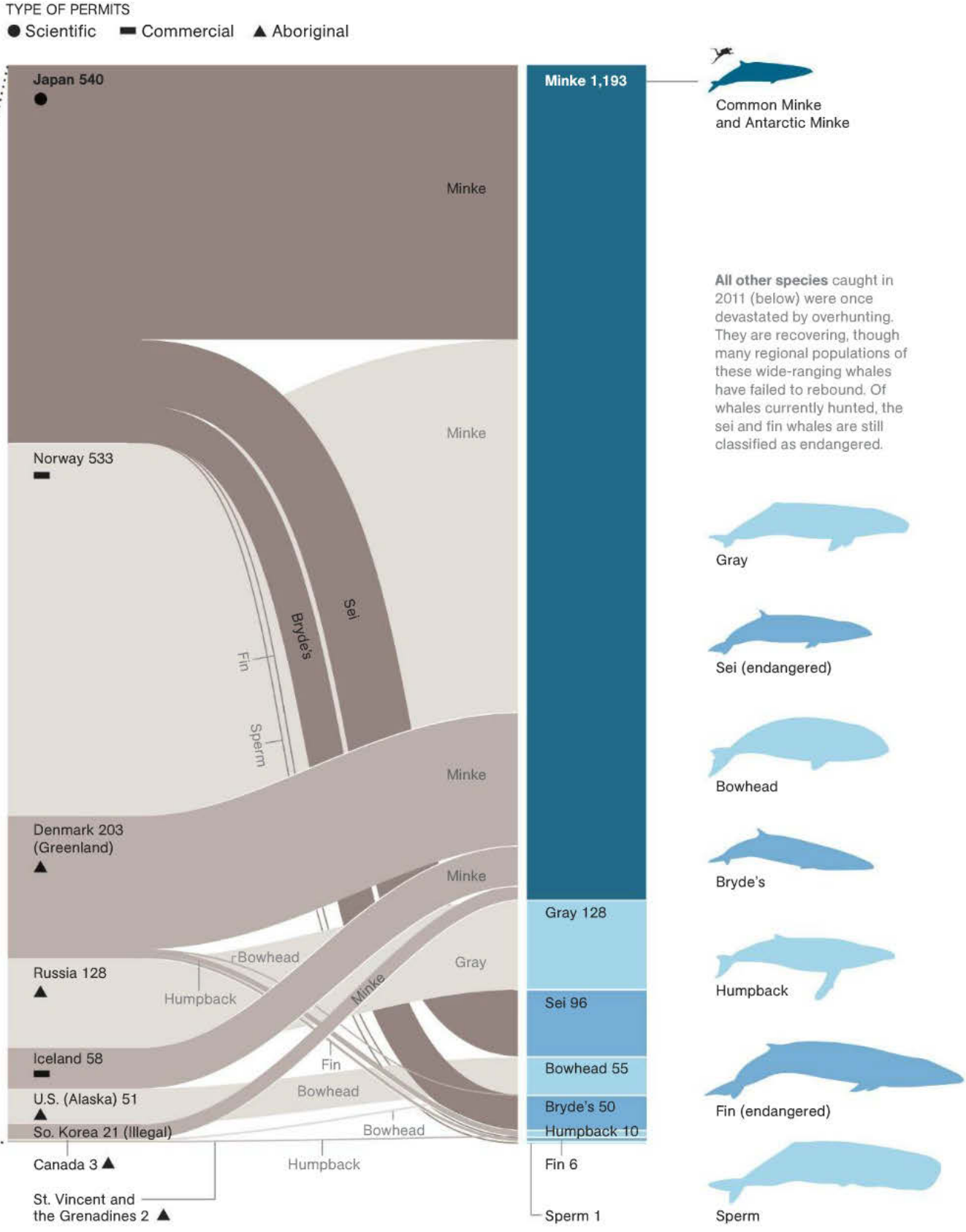
Today's whale catch

2011 totals by country

Cultures that eat whale meat account for all of today's catch. Traditional Arctic hunters in Greenland, Russia, the U.S., and Canada take a small number. Caribbean islanders with a whaling history are also given a quota.

By species

Minke whales are the top catch because they're still globally abundant. Their relatively small size once made them less desirable, so their numbers remained high. Accidental catches in fishing nets are a concern.



NG CONNECT

Every month this page features our staff picks of National Geographic Society products and events. For more go to nglive.org.

NATIONAL GEOGRAPHIC ON TV

Life Below Zero

These are not your standard living conditions. When it's winter in remote parts of Alaska, survival is the name of the game. For some, that means total self-sufficiency despite below-freezing temperatures and pure isolation. This month on the National Geographic Channel, see what it takes—building sleds, hunting caribou, brewing beer at home—to make it through this harsh land's coldest days.

APP

NATIONAL GEOGRAPHIC ON THE IPHONE Reimagined for a new platform, *National Geographic* magazine is now available on the iPhone. The mobile edition features easy navigation, daily updates, and audio recordings of stories. Look for it in the App Store.

TRIP

GALÁPAGOS ISLANDS Home to giant tortoises, iguanas, and countless birds, the Galápagos are a haven for nature lovers and adventurers. Go to ngexpeditions.com/galapagos for details on trips to the islands with our naturalists, special departures for families and photographers, and a six-day extension in Peru.

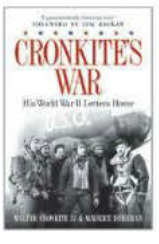
EXHIBIT

BEYOND THE STORY Each year photographers make thousands of images for *National Geographic,* but only a fraction are published. See unpublished work, including a portrait (right) for the 2012 "Twins" story, at the National Geographic Museum. Visit ngmuseum.org.

MAP

ADVENTURE MAPS These durable maps highlight can't-miss destinations for active international travelers. Find all of our Adventure Maps, including a new Nepal edition, at shopng.com.

Book of the Month



Cronkite's War *Walter Cronkite IV and Maurice Isserman* Before Walter Cronkite was a television anchorman, he was a print journalist covering World War II. His letters home—selected by his grandson Walter Cronkite IV and Hamilton College historian Maurice Isserman—chronicle the war through the eyes of a young reporter writing to his beloved wife, Betsy. Available now ($28).

PHOTOS: PATRICK CUMMINGS, BBC (TOP); GARY BREWER, NATIONAL GEOGRAPHIC STOCK (GALÁPAGOS); MARTIN SCHOELLER (PORTRAIT)

Deep Cover

Putting Academy Award winner James Cameron underwater on our cover this month called for a little Hollywood magic. "We have to show science is exciting," he says.

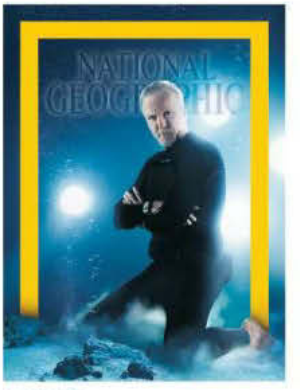
The National Geographic explorer-in-residence really was submerged—but inside a giant water tank at a soundstage he uses in Manhattan Beach, California (two 40-foot models of the *Titanic,* both seaworthy and wrecked versions, sat nearby).

Sand, plants, and bubbles were added to the image to create the illusion of Cameron on the seafloor, a place well-known to the director of *Titanic* and *The Abyss.*

Photographer Marco Grob (above, with camera) had just two hours to make the portrait before his subject had to leave to catch a flight for Australia. So Cameron, whose solo dive into the Mariana Trench, the deepest part of the ocean, is featured in this issue, donned a wet suit and went to work. He was a pro at holding his breath: "I was sometimes concerned," admits Grob. "I'd knock on the window and say, 'Hey, come up.'" *—Margaret G. Zackowitz*

▲ BEFORE

This is the unretouched image of James Cameron by Marco Grob that appears on our cover.



▲ AFTER

This is the same image, modified to give the illusion of Cameron undersea.

PHOTO (TOP): BILL MARR, NGM STAFF

A Cool Welcome

Flags, birds, a boat, and an arch made from bales of codfish greeted Crown Prince Gustav during his 1887 visit to the Norwegian port of Hammerfest, one of the northernmost towns in the world. "The entire town is built of timber," claim notes that came with this photo.

All that wood would prove to be a problem. In 1890 the town was destroyed by fire. Then the rebuilt Hammerfest was burned down again in 1945—this time on Hitler's orders—as occupying Nazi forces fled a Soviet advance. Thousands were left homeless. Many rode out the winter in local caves.

Yet Hammerfest rose from the ashes once more. Today some 10,000 people call it home, and maritime pursuits are still the overarching industry.

—Margaret G. Zackowitz

Flashback Archive Find all the photos at **ngm.com.**

PHOTO: CHARLES HARRIS PHELPS, NATIONAL GEOGRAPHIC STOCK

NATIONAL GEOGRAPHIC (ISSN 0027-9358) PUBLISHED MONTHLY BY THE NATIONAL GEOGRAPHIC SOCIETY, 1145 17TH ST. NW, WASHINGTON, DC 20036. ONE YEAR MEMBERSHIP: $39.00 U.S. DELIVERY, $45.00 TO CANADA, $51.00 TO INTERNATIONAL ADDRESSES. SINGLE ISSUE: $7.00 U.S. DELIVERY, $10.00 CANADA, $15.00 INTERNATIONAL. (ALL PRICES IN U.S. FUNDS; INCLUDES SHIPPING AND HANDLING.) PERIODICALS POSTAGE PAID AT WASHINGTON, DC, AND ADDITIONAL MAILING OFFICES. POSTMASTER: SEND ADDRESS CHANGES TO NATIONAL GEOGRAPHIC, PO BOX 62130, TAMPA, FL 33662. IN CANADA, AGREEMENT NUMBER 40063649, RETURN UNDELIVERABLE ADDRESSES TO NATIONAL GEOGRAPHIC, PO BOX 4412 STN. A, TORONTO, ONTARIO M5W 3W2. UNITED KINGDOM NEWSSTAND PRICE £4.99. REPR. EN FRANCE: EMD FRANCE SA, BP 1029, 59011 LILLE CEDEX; TEL. 320.300.302; CPPAP 0715U89037; DIRECTEUR PUBLICATION: D. TASSINARI DIR. RESP. ITALY; RAPP IMD SRL, VIA G. DA VELATE 11, 20162 MILANO; AUT. TRIB. MI 258 26/5/84 POSTE ITALIANE SPA; SPED. ABB. POST. DL 353/2003 (CONV L.27/02/2004 N.46) ART 1 C. 1 DCB MILANO STAMPA QUAD/GRAPHICS, MARTINSBURG, WV 25401. MEMBERS: IF THE POSTAL SERVICE ALERTS US THAT YOUR MAGAZINE IS UNDELIVERABLE, WE HAVE NO FURTHER OBLIGATION UNLESS WE RECEIVE A CORRECTED ADDRESS WITHIN TWO YEARS.

BUNDLE YOUR HOME AND AUTO TOGETHER
AND YOU COULD SAVE A BUNDLE.
I THINK THAT'S A HAIKU.

IF YOU ASK ME, SAVING MONEY SHOULD BE AS EASY AS BUNDLING.

Insure your home and auto together and you could be saving in no time. You can even get a quote for both at once. Doesn't get much simpler than that! Bundling to help you save more. Now that's Progressive.

1.800.PROGRESSIVE | PROGRESSIVE.COM

THE ALL-NEW ACCORD HAS EARNED A LOT OF RECOGNITION.

Car and Driver[1]
2013 10Best

KBB.com 2013 10 Best Family Cars[4]

"The Accord is the most-durable, longest-lasting car in its class." – Polk[7]

A 2013 Edmunds.com Top Recommended[SM] sedan under $25,000[2]

NHTSA 5-Star Overall Rating[5]

2013 IIHS *TOP SAFETY PICK+*

KBB.com 2013 Best Resale Value Awards: Best Mid-Size Car[3]

2013 ALG Residual Value Award – Midsize Car[6]

Cars.com/*USA Today*
Midsize Sedan Showdown Winner

Like

BUT THE GREATEST RECOGNITION WE COULD EVER EARN IS YOURS.

The All-New Honda Accord
facebook.com/hondaaccord

[1]*Car and Driver*, January 2013. [2]For more information, visit Edmunds.com. Edmunds and the Edmunds.com logo are registered trademarks of Edmunds.com, Inc. [3]Vehicle's projected resale value is specific to the 2013 model year. For more information, visit Kelley Blue Book's KBB.com. Kelley Blue Book is a registered trademark of Kelley Blue Book Co., Inc. [4]For more information, visit KBB.com. Kelley Blue Book is a registered trademark of Kelley Blue Book Co., Inc. [5]Based on frontal crash, side crash and rollover categories. Government 5-Star Safety Ratings are part of NHTSA's New Car Assessment Program (www.SaferCar.gov). Model tested with standard side airbags (SABs). Vehicles tested under the new program cannot be compared to MY10 and earlier vehicles. [6]ALG is the industry benchmark for residual values and depreciation data, www.alg.com. [7]Durability based on longevity. Longevity based on Polk U.S. vehicles in operation registration statistics 1998–2010 for Accord and competing models.