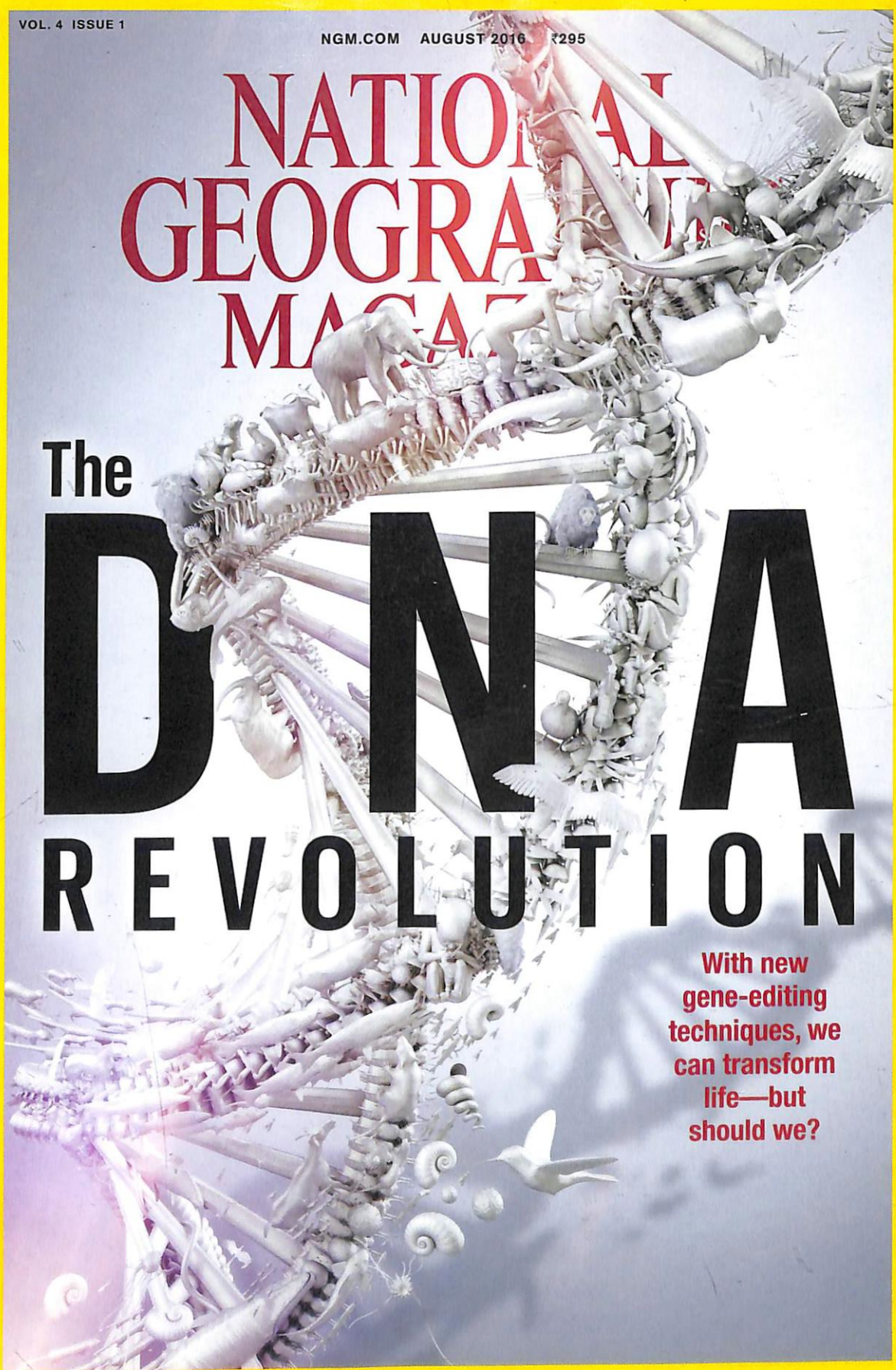


# NATIONAL GEOGRAPHIC MAGAZINE

The

# DNA REVOLUTION

With new  
gene-editing  
techniques, we  
can transform  
life—but  
should we?





NATIONAL  
GEOGRAPHIC



AUGUST 2016 • VOL. 4 • NO. 1

124

## The Shipwreck Shark

Once the terror of the seas, oceanic whitetips have all but vanished.

By Glenn Hodges

Photographs by Brian Skerry

Oceanic whitetips slice through the water near the Bahamas' Cat Island, believed to be one of the last havens for large numbers of the sharks.

44

## DNA Revolution

Scientists now have a new tool to alter the DNA of living organisms. Should they use it?

By Michael Specter

Photographs by Greg Girard

70

## Science vs. Mosquitoes

Mosquitoes spread some of the world's most dangerous diseases—and we still don't know how to stop them.

By Cynthia Gorney

74

## Pandas Gone Wild

The Chinese know how to breed giant pandas. To release them in the wild requires protecting habitat as well as the bears.

By Jennifer S. Holland

Photographs by Ami Vitale

100

## To the Last Drop

The Ogallala aquifer feeds a multibillion-dollar farm industry. What happens when the water is gone?

By Laura Parker

Photographs by Randy Olson

## 138 Proof | Net Worth

An artist makes scientific portraits of birds.

By Christy Ullrich Barcus

Photographs by Todd Forsgren

**On the Cover** DNA is in every living thing, and scientists have learned to edit it. "We now have a power over species of all kinds that we never thought possible," says law professor Hank Greely. Art by Bose Collins

**Corrections and Clarifications** Go to [ngm.com/corrections](http://ngm.com/corrections).



The confluence of the Colorado and Little Colorado Rivers, an area considered sacred to Native Americans, is under consideration as the site of a billion-dollar development project.

## 112 Losing the Canyon

An attempt to hike the length of the Grand Canyon reveals the commercial interests threatening it.  
*By Kevin Fedarko Photographs by Pete McBride*

## 48

### A Cure in Sight

Medical advances offer an end to blindness for some, yet many still suffer from preventable loss of sight.

*By David Dobbs  
Photographs by Brent Stirton*

## 72

### Heat Wave

Was the Pacific's deadly warm water just part of a natural cycle or a sign of a bigger change?

*By Craig Welch  
Photographs by Paul Nicklen*

## 94

### Back in Fashion

Fur is popular again, but humane treatment of the animals remains a challenge.

*By Richard Conniff  
Photographs by Paolo Marchetti*

## 136 Proof | Backstage at the Big Top

For Vietnamese circus performers, daily life means focus, hard work, and dedication.

*Story and Photographs by Christian Rodriguez*

**On the Cover** Thirty-nine million people—about one in 200—are blind, but scientists are working to help them see. *Photo by David Liittschwager*

**Corrections and Clarifications** Go to [ngm.com/corrections](http://ngm.com/corrections).



NATIONAL  
GEOGRAPHIC



OCTOBER 2016 • VOL. 4 • NO. 3

40

### The New Europeans

The continent's latest great migration is roiling its politics, testing its tolerance, and challenging its cultural identities.

By Robert Kunzig  
Photographs by Robin Hammond

96

### Deadly Trade

What happens to rhinos if an alleged trafficker and a rancher undo South Africa's ban on selling horns?

By Bryan Christy  
Photographs by Brent Stirton

122

### Here Comes the Wave

The first American passenger ship to Cuba in nearly 40 years signals a new era in the relationship between once Cold War adversaries.

By Cynthia Gorney  
Photographs by David Guttenfelder

### 136 Proof | Snow Monkeys

The personalities of Japanese macaques emerge as they warm up in hot water.

Story and Photographs by Jasper Doest

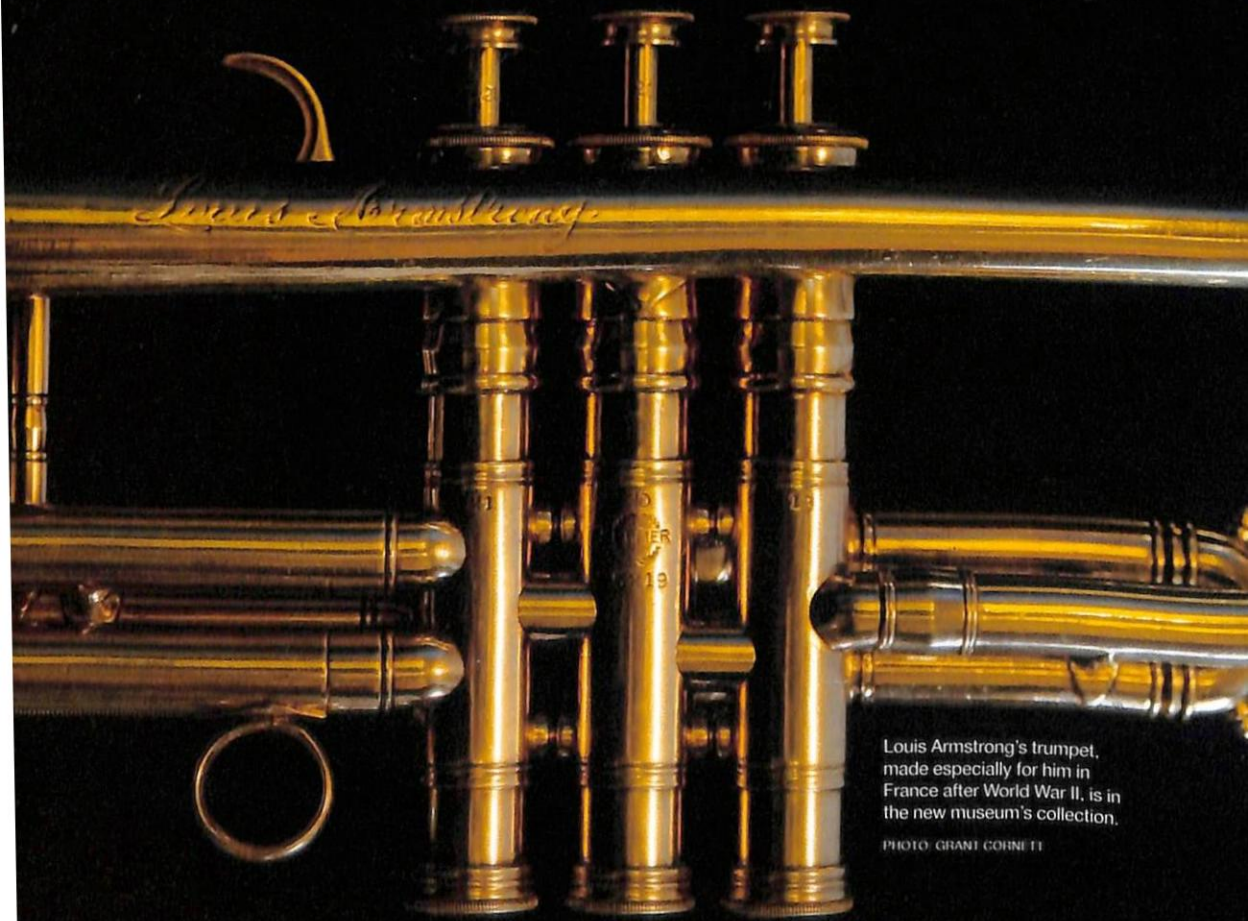
**On the Cover** The number of refugees arriving in Europe is growing. But immigrants have long played a key role in the history of the continent.  
Photo by Robin Hammond

**Corrections and Clarifications** Go to [ngm.com/corrections](http://ngm.com/corrections).

## 72 I, Too, Am America

The newest Smithsonian museum takes an unflinching look at African-American history.

By Michele Norris Photographs by Grant Cornett and Radcliffe Royce



Louis Armstrong's trumpet, made especially for him in France after World War II, is in the new museum's collection.

PHOTO: GRANT CORNETT



See video of the camouflage tricks and getaway moves of octopuses—like this southern keeled octopus—at [natgeo.com/octopus](http://natgeo.com/octopus).

## 66 The Power of Eight

Octopuses appear as alien as any extraterrestrial, yet seem strangely akin to humans.  
By Olivia Judson Photographs by David Liittschwager

## 36

### The Race to the Red Planet

Humankind's next big mission is Mars. But how long until we get there?

By Joel Achenbach  
Photographs by Phillip Toledano, Robert Clark, Max Angler-Hellweg, and Mark Thiessen

## 84

### Fragile Peace

Sri Lanka is beginning to reckon with the aftermath of a brutal civil war: tens of thousands homeless, tens of thousands still missing.

By Robert Draper  
Photographs by Ami Vitale

## 106

### Changing Cuba: The Caribbean's Crown Jewels

Gardens of the Queen, Cuba's sprawling marine preserve, is an oceanic Eden in tourism's path.

Story and Photographs by David Doubilet and Jennifer Hayes

## 118 Proof | Consecrated in Mexico

Behind convent walls, cloistered nuns pray, work—and even play volleyball.

Story and Photographs by Marcela Taboada

**On the Cover** The four images in this composite were captured on October 4, 2014, by India's Mars Orbiter Mission probe, circling at an altitude of about 47,650 miles. Image: Indian Space Research Organisation

**Corrections and Clarifications** Go to [ngm.com/corrections](http://ngm.com/corrections)

# CONTENTS

DECEMBER 2016 • VOL. 4 • NO. 5 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

## DEPARTMENTS

### 3 QUESTIONS

Emily Briere is packing time capsules for Mars

### VISIONS

### EXPLORE

Basic Instincts, Jackfruit, Santas, Field Notes

### STARTALK

A Q&A with Andy Weir, author of *The Martian*



**On the Cover** St. Catherine swoons after receiving the stigmata in this 1526 fresco by Giovanni Antonio Bazzi at the Basilica Catheriniana San Domenico in Siena, Italy. Pilgrims visit her shrine in search of cures.  
*Leansage/Corbis via Getty Images*

**Corrections and Clarifications**  
Go to [ngm.com/corrections](http://ngm.com/corrections)

## FEATURES

# 108 | THE PUTIN GENERATION

Young Russians – like those below, celebrating the school year's end – grew up after the Soviet Union fell and Vladimir Putin came to power. Where will they take their country?

By Julia Ioffe Photographs by Gerd Ludwig



### 42 | MIND OVER MATTER

Scientists are discovering how belief – through placebos, rituals, and mystical experiences – can affect the way we heal.

By Erik Vance  
Photographs by Erika Larsen

### 88 | ORANGUTANS AT RISK

Researchers are gaining vital insights into the private lives of orangutans, but the elusive red apes face a precarious future.

By Mel White  
Photographs by Tim Laman

### 68 | THE PARKS OF TOMORROW

America's national parks will always be beautiful, but a warming climate forces us to accept that they can't be frozen in time.

By Michelle Nijhuis  
Photographs by Keith Ladzinski

### 134 | WHERE DREAMS LIVE ON

A half-abandoned research station in Tanzania is alive with the hopes and memories of those who worked there.

By Jeremy Berlin  
Photographs by Evgenia Arbugaeva

## CONTENTS

### ELSEWHERE

#### TELEVISION

##### WHO SURVIVES IN THE SAVAGE KINGDOM?

The battles among warring clans play out like *Game of Thrones*—but the royal families are Africa's lions, leopards, hyenas, and more. The miniseries *Savage Kingdom* premieres on December 19 at 10 p.m. on National Geographic channel and Nat Geo WILD.



#### TELEVISION

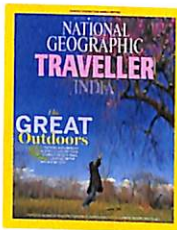
##### WINTER WONDERLAND

The arrival of winter ushers in a new pattern of life for animals. There is a story of hardship, endurance, and beauty as they adapt to challenges and live and thrive through the cold months. Watch the series every Saturday and Sunday at 6 p.m. on Nat Geo Wild.



#### TELEVISION

##### THE COVERSOT CHALLENGE



Watch 16 photographers from across India go head to head to capture the perfect image. The winner of Nat Geo Covershot will feature their work on the cover of

*National Geographic Traveller India*. The series premieres on December 17 on National Geographic channel.

#### NATIONAL GEOGRAPHIC BOOKS

##### JUST HOW SUGGESTIBLE IS THE HUMAN BRAIN?

Science writer Erik Vance examines the power of belief to influence us, in this issue's cover story — and in his new book, *Suggestible You: The Curious Science of Your Brain's Ability to Deceive, Transform, and Heal*. Available wherever books are sold and at [shop.nationalgeographic.com](http://shop.nationalgeographic.com).

#### VIRTUAL REALITY AND VIDEO

##### GLIMPSES OF LIFE AMONG THE ORANGUTANS OF BORNEO

See how orangutans contend with threats to their habitats and existence, in an exclusive virtual-reality experience. Then watch the compelling story of an orangutan mother raising her baby, in a National Geographic video. Both are online at [ngm.com/Dec2016](http://ngm.com/Dec2016).

#### NATIONAL GEOGRAPHIC TRAVEL

##### THE HAPPY PLACES ISSUE

Read about why everybody loves Goa, what makes Copenhagen a city of cheer, drumming and dancing in Trinidad, and 11 experiences that provide and a complete mental and physical reboot. Find the issue on news stands, or read it online at [www.natgeotraveller.in](http://www.natgeotraveller.in).

VOL. 4 ISSUE 6

MAKING A MAN | THE SCIENCE OF GENDER | AMERICAN GIRL

NGM.COM JANUARY 2017 ₹295

# NATIONAL GEOGRAPHIC MAGAZINE

SPECIAL ISSUE

# GENDER REVOLUTION

‘The best thing about being a girl is,  
now I don’t have to pretend  
to be a boy.’



# | CONTENTS

JANUARY 2017 • VOL. 4 • NO. 6 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

---

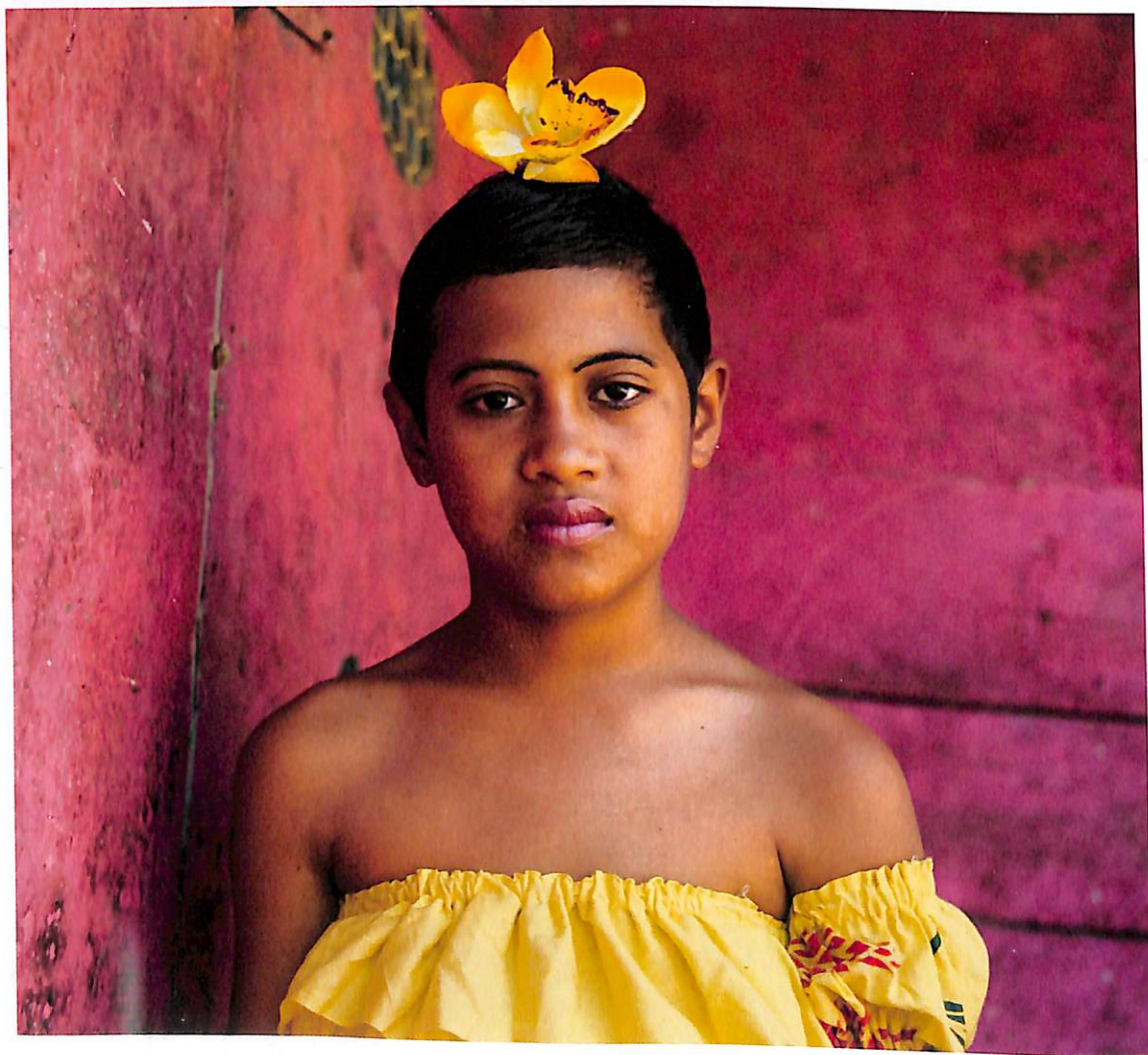
THE GENDER ISSUE

---

Can science help us navigate the shifting landscape of gender identity? Mandy (below) identifies as *fa'afafine*, a third gender in Samoa.

By Robin Marantz Henig  
Photographs by Lynn Johnson

## 54 | RETHINKING GENDER



## CONTENTS

### 36 | I AM NINE YEARS OLD

National Geographic traveled to 80 homes on four continents to ask kids how gender affects their lives. The answers from this diverse group of children were astute and revealing.

By Eve Conant

Photographs by Robin Hammond



### 78 | MAKING A MAN

In traditional cultures the path to manhood is marked with ceremonial rites of passage. But in societies moving away from strict gender roles, boys have to find their own ways to become men.

By Chip Brown

Photographs by Pete Muller



### 102 | AMERICAN GIRL

In some ways it's easier to be an American girl these days: Although beauty still rules, people are more accepting of differences. In another way it's worse: Everything plays out on social media.

By Tina Rosenberg

Photographs by Kitra Cahana



### 120 | DANGEROUS LIVES OF GIRLS

In Sierra Leone, wracked by civil war and Ebola, nearly half of girls marry before 18, and many become mothers by 19. Yet even in this troubled land, some girls find a way to rise.

By Alexis Okeowo

Photographs by Stephanie Sinclair



### 142 | EQUALITY

Author Anne-Marie Slaughter urges us to aim for a world where gender is neither an advantage nor an impediment.

**On the Cover** Youth interviewed for this issue on gender include Avery Jackson, a transgender girl living in Kansas City, Missouri.  
Photo by Robin Hammond

**Corrections and Clarifications** Go to [ngm.com/corrections](http://ngm.com/corrections).

## CONTENTS

### ELSEWHERE

#### TELEVISION

##### **ANIMAL FIGHT CLUB**

This is what happens when wild animals turn on their own kind in order to wage deadly wars. From bears to tigers, and even the humble shrew, fierce battles rage among species around the globe. New season premieres on National Geographic on January 9 at 7 p.m.



#### TELEVISION

##### **NO MAN LEFT BEHIND**

Being trapped behind enemy lines is every soldier's worst nightmare: a situation they all train for, few experience, and even fewer live through. These are stories of real life war heroes who survived to tell their tales. Premiering on National Geographic on January 20 at 10 p.m.

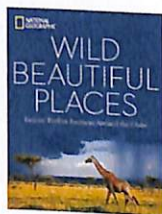


PHOTO: ANDREA IZZOTTI (BEARS), NATIONAL GEOGRAPHIC CHANNELS/CHARLIE SPERRING (SOLDIER)

#### TELEVISION

##### **INDIA UNLOCKED**

India is filled with incredible stories of the country's diversity that challenge boundaries in many ways. Discover various facets of history, culture, wildlife, science, and technology across the length and breadth of India with this special series. Starting from January 2 on National Geographic every Monday-Friday at 9 p.m.



#### BOOKS

##### **PICTURE PERFECT**

Travel to spectacular sites with *Wild, Beautiful Places*, available at [shopng.com](http://shopng.com) or wherever books are sold.

#### NATIONAL GEOGRAPHIC TRAVEL

##### **WHERE TO GO IN 2017**

From Seoul to Malta, Colombia to Canada, read all about the 20 must-see destinations of 2017. Explore Madhya Pradesh's tiger terrain and the geological goldmine that is Ladakh. Find the magazine on news stands, or read it online at [www.natgeotraveller.in](http://www.natgeotraveller.in).

#### TELEVISION

##### **WORLD'S DANGEROUS ANIMALS**

These are the most brutal creatures on earth that incite fear and terror in other animals and humans. Born in the wild, they have evolved to adapt to their harsh environment. They often collide with man and his world in their struggle to survive. Premiering on Nat Geo Wild on January 9 at 8 p.m.

# | CONTENTS

FEBRUARY 2017 • VOL. 4 • NO. 7 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

---

## DEPARTMENTS

---

### 3 QUESTIONS

Sebastian Junger on the impacts of war

---

### VISIONS

---

### EXPLORE

What and how we eat

---

---

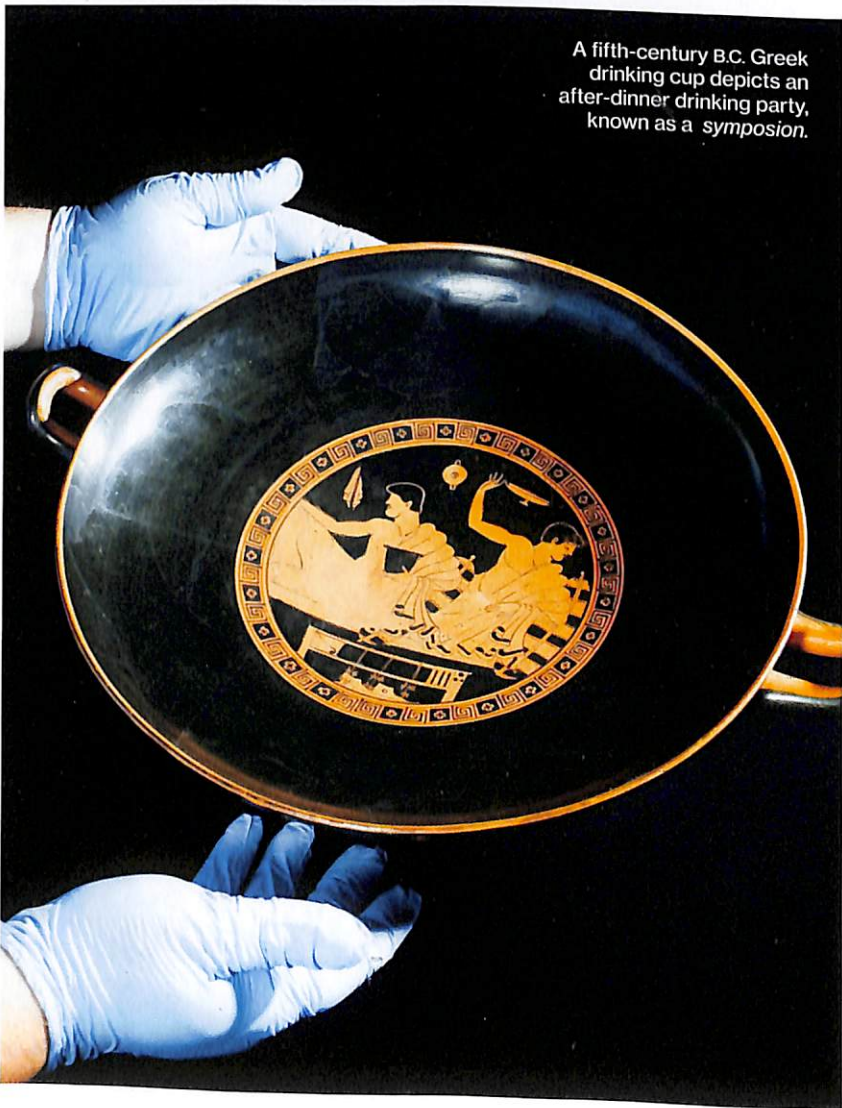
## FEATURES

# 30 | A 9,000-YEAR LOVE AFFAIR

Alcohol is one of the most universally produced and enjoyed substances in history, and it has helped shape who we are.

By Andrew Curry Photographs by Brian Finke

A fifth-century B.C. Greek drinking cup depicts an after-dinner drinking party, known as a *symposion*.



---

### On the Cover

Beer and other alcoholic beverages are "important to human culture" and have been for thousands of years, says biomolecular archaeologist Patrick McGovern.

Photo by Brian Finke

### Corrections and Clarifications

Go to [ngm.com/corrections](http://ngm.com/corrections).

## CONTENTS

---

### 52 | SAVING THE SEAS

President Barack Obama added more than 850,000 square miles of ocean to America's network of protected seas. There's more to do.

*By Cynthia Barnett Photographs by Brian Skerry*



### 76 | LIFE AFTER LOSS

Societies can impose new burdens and limits on women after their husbands die.

*By Cynthia Gorney  
Photographs by Amy Toensing*



### 100 | SHADOW CATS

Small cats – like the marbled cat below – are skilled at avoiding notice. But they're beginning to draw the attention of conservationists and researchers.

*By Christine Dell'Amore Photographs by Joel Sartore*



### 116 | MODERN AMAZONIA

In the jungle today, real people face the clash of tribal lore and modern lure.

*Story and Photographs by Yann Gross*



# CONTENTS

## ELSEWHERE

### TELEVISION

#### DEADLY JAWS

Watch how the most lethal predators use their inbuilt arsenal of weapons – their jaws and claws – to hunt, survive, and rule in the wild. From the dolphin armies of the ocean to the desert's most poisonous reptiles, discover the stealth, speed, deception, and weaponry of Africa's deadliest. Premiering on National Geographic on January 30 at 11 p.m.

### BOOKS

#### SEE THE U.S.A. THROUGH OUR PHOTO ARCHIVES



A skier gazes across the Rocky Mountains in a 1953 photo by Charles Grover. It's just one of dozens of archetypal photographs in the new book *The United States of America: A Pictorial History of the USA Through the National Geographic Archives*. Art book publisher Taschen mined the magazine's archives to create a one-of-a-kind portrait of the United States. The two-volume set is available at [shopng.com](http://shopng.com) or wherever books are sold.

### TELEVISION

#### MACHINE IMPOSSIBLE

Tech buff Mischa Pollack joins forces with designer Max McMurdo on a journey to discover the world's most ingenious machines. They also take on a challenge to create a gadget that will change the future. Premiering on National Geographic on February 24 at 10 p.m.

### NATGEO.COM INTERACTIVE

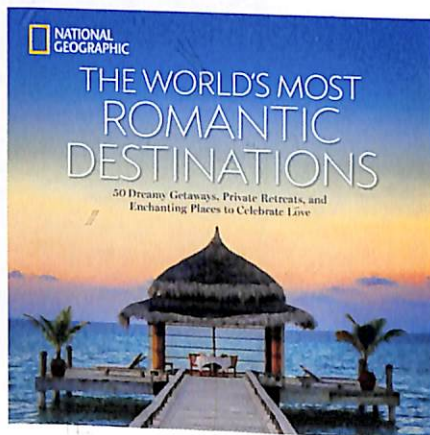
#### UNDERSEA 360° VIDEO

Plunge beneath the waves with *National Geographic* photographer Brian Skerry to explore Buck Island Reef National Monument in the Caribbean. Find the 360° video of this Virgin Islands reef and its remarkable creatures at [natgeo.com/buckisland](http://natgeo.com/buckisland).

### BOOKS

#### GETAWAYS FOR VALENTINES

From beaches and spas to an ocean-view restaurant in Big Sur, California, 50 great escapes beckon from the pages of National Geographic's *The World's Most Romantic Destinations*. Full of photos and travel tips, it's available at [shopng.com](http://shopng.com) or wherever books are sold.



### TELEVISION

#### THINK YOUR HOUSE CAT IS TAME? BETTER THINK AGAIN ...

Big Cat Week celebrates wild beasts that are beautiful, strong, and rapidly facing extinction. While these might be nature's fiercest felines, they also share lineage with today's domestic cats. Watch their epic survival games and get closer to these magnificent beasts. Premiering on National Geographic and Nat Geo Wild on February 27 at 7 p.m.

**Subscriptions** For subscriptions in India call 022-4918881/2/3/4. For online subscriptions log on to [www.getnationalgeographic.com](http://www.getnationalgeographic.com)

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code. | Copyright © 2016 National Geographic Partners, LLC | All rights reserved. National Geographic and Yellow Border: Registered Trademarks \* Marcas Registradas. National Geographic assumes no responsibility for unsolicited materials.

Disclaimer: Reproduction in whole or part without written permission is strictly prohibited. We do our best to research and fact-check all articles but errors may creep in inadvertently. All information is correct at the time of going to press but are subject to change. All opinions expressed by writers are their own and not necessarily those of National Geographic. We do not allow advertising to influence our editorial choices. All maps used in the magazine, including those of India, are for illustrative purposes only.

Printed and published by Mr. Anuraag Agarwal on behalf of Amar Chitra Katha Pvt. Ltd. Printed at Manpal Technologies Ltd., Plot no 2/a, Shivalli Village, Industrial Area, Manpal-576104 and Published at Amar Chitra Katha Private Ltd., Unit No. 201 & 202, Sumer Plaza, 2nd Floor, Marol Maroshi Road, Andheri (East), Mumbai - 400 059  
Editor: Ms. Niloufer Venkatraman.

# | CONTENTS

MARCH 2017 • VOL. 4 • NO. 8 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

---

## DEPARTMENTS

---

### VISIONS

---

#### EXPLORE

Kite-skiing on ice, the mating habits of tree frogs, and a monastery's hidden texts

---

---

## FEATURES

---

# 54 | THE WISDOM OF TREES

Every tree tells a story. Some are beyond eloquent: the apple tree that illustrated the law of gravity, the pear tree that survived 9/11, pines that can live more than 5,000 years.

*By Cathy Newman Photographs by Diane Cook and Len Jenshel*



The centuries-old Wedding Oak near San Saba, Texas, is named for the many nuptials that have been held under it.

---

### 24 | NEW VISIONS OF THE VIKINGS

How Scandinavian farmers became Europe's scourge.

*By Heather Pringle  
Photographs by Robert Clark  
and David Guttenfelder*

---

### 72 | A SEA'S FADING BOUNTY

Politics and exploitation put a great fishery at risk.

*By Rachael Bale  
Photographs by Adam Dean*

---

### 84 | A FIGHT TO SURVIVE

Crested black macaques have many enemies.

*By Jennifer S. Holland  
Photographs by Stefano Unterthiner*

---

### 102 | DARK STAR: INTO THE DEEP

An expedition plumbs the depths of what may be the Everest of the underground.

*By Mark Synnott  
Photographs by Robbie Shone*

---

### 118 | METROPOLIS

The world's megacities are a swirl of 21st-century energy and humanity.

*Story and Photographs by Martin Roemers*

---

**On the Cover** A Scandinavian warrior chief from the late 10th century is ready for battle. The headgear he wears is based on the only complete Viking metal helmet known to survive.  
*Art by Fernando G. Baptista*

**Corrections and Clarifications**  
Go to [natgeo.com/corrections](http://natgeo.com/corrections).

# CONTENTS

## ELSEWHERE

### TELEVISION

#### INSIDE TIRUMALA TIRUPATI

National Geographic's hour-long documentary will delve into Tirumala Tirupati temple's mythological relevance, legends, architecture, kitchens, and the latest technological advances. Premiering on National Geographic on March 27 at 9 p.m.

### TELEVISION

#### NAT GEO GOLD

Follow a bunch of 20 American survivalists as they travel to the world's most remote regions and adapt to the harshest terrains. Watch hand-picked survival shows all this month at 10 p.m. on Nat Geo Gold.

### STOP-MOTION VIDEO

#### JOIN THE VOYAGES OF A VIKING SHIPBUILDER

In a video adventure rooted in Norse mythology and fashioned entirely of handmade paper art, a Viking master builder constructs a ship, then pilots it on raids to take loot and slaves. See it at [ngm.com/Mar2017](http://ngm.com/Mar2017).



360-degree video

#### EXPERIENCE A BATTLE WITH VIKING WARRIORS

Armed with swords and axes, armor-clad reenactors at a Viking festival in Wolin, Poland, launch an offensive against the Slavs – and you can be part of it. Find our immersive 360° film at [natgeo.com/vikings360](http://natgeo.com/vikings360).

### TELEVISION

#### REPTILE KINGS

Prepare for an ultimate encounter with the world's fiercest and most adaptable creatures and their amazing stories. Premiering on Nat Geo Wild on March 20 at 8 p.m.



### BOOKS

#### CANINE LESSONS

In *Cesar Millan's Lessons From the Pack: Stories of the Dogs Who Changed My Life*, the Dog Whisperer shares life lessons he's learned from dogs. Available at [shopng.com](http://shopng.com) and wherever books are sold.

### NAT GEO WILD YOUTUBE CHANNEL

#### SEE NEW WILDLIFE VIDEOS

Nat Geo WILD looks at surprising animals found in our own backyards in a new digital series, *Untamed With Filipe DeAndrade*, airing on YouTube March 14.

### TELEVISION

#### MISSION CRITICAL

Travel with Nat Geo photographers to the far corners of the globe to save species and make way for a more sustainable planet. Every Sunday at 7 p.m. on Nat Geo Wild.

**Subscriptions** For subscriptions in India call 022-49188881/2/3/4. For online subscriptions log on to [www.getnationalgeographic.com](http://www.getnationalgeographic.com)

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code. | Copyright © 2016 National Geographic Partners, LLC | All rights reserved. National Geographic and Yellow Border: Registered Trademarks \* Marcas Registradas. National Geographic assumes no responsibility for unsolicited materials.

Disclaimer: Reproduction in whole or part without written permission is strictly prohibited. We do our best to research and fact-check all articles but errors may creep in inadvertently. All information is correct at the time of going to press but are subject to change. All opinions expressed by writers are their own and not necessarily those of National Geographic. We do not allow advertising to influence our editorial choices. All maps used in the magazine, including those of India, are for illustrative purposes only.  
Printed and published by Mr. Anuraag Agarwal on behalf of Amar Chitra Katha Pvt. Ltd. Printed at Manipal Technologies Ltd., Plot No. 2/a, Shivalli Village, Industrial Area, Manipal-576104 and Published at Amar Chitra Katha Private Ltd., Unit No. 201 & 202, Sumier Plaza, 2nd Floor, Marol Maroshi Road, Andheri (East), Mumbai - 400 059  
Editor: Ms. Niloufer Venkatraman.



# CONTENTS

APRIL 2017 • VOL. 4 • NO. 9 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

---

## FRONT

### 3 QUESTIONS

Geoffrey Rush on playing the "great part" of Einstein

### VISIONS

### EXPLORE: WATER

In the water: fish, trash, signs of stress. Out of water: people worldwide.

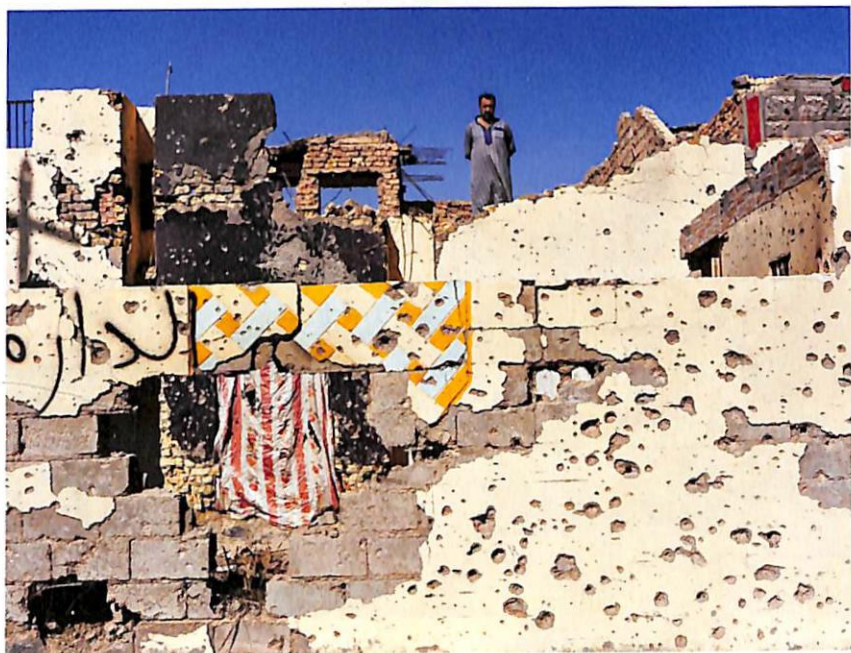
---

## FEATURES

# 62 | LIFE AFTER ISIS

As Iraqi and coalition forces moved to retake Mosul in 2016, fleeing Iraqis told harrowing stories of the Islamic State's brutal reign.

By James Verini Photographs by Moises Saman



---

**On the Cover** From Stone Age hunter-gatherers to today's high-tech pioneers, humans increasingly have taken evolution into our own hands. Where will our species go next?

Illustration by Owen Freeman

### Corrections and Clarifications

Go to [natgeo.com/corrections](http://natgeo.com/corrections).

---

## 28 | CLIMATE CHANGE: 7 THINGS YOU NEED TO KNOW

The scientific facts about threats to the planet and how to mitigate them.

---

## 90 | GRASS-EATING MONKEYS OF ETHIOPIA

A community aims to shield habitat that geladas need.

By Craig Welch  
Photographs by Jeffrey Kerby and Trevor Beck Frost

---

## 38 | BEYOND HUMAN

Are humans still evolving? Yes, under the influence of culture and technology.

By D. T. Max  
Illustrations by Owen Freeman

---

## 114 | RACING THE THAW

Alaska natives hope to rescue ancestral artifacts before the sea takes them.

By A. R. Williams  
Photographs by Erika Larsen

---

## 134 | TINY RUINS

Artists' miniature tableaux depict abandoned cities gone to seed.

By Jeremy Berlin  
Photographs by Lori Nix and Kathleen Gerber

# CONTENTS

## ELSEWHERE



### NATIONAL GEOGRAPHIC BOOKS

#### MEET THE PASSENGERS OF THE PHOTO ARK

The waxy monkey tree frog above is one of more than 6,000 animals immortalized in portraits by photographer Joel Sartore, who is circling the globe in his quest to photograph every species in captivity. See hundreds of Sartore's colorful subjects in his new book, *The Photo Ark: One Man's Quest to Document the World's Animals*, available at [shopng.com](http://shopng.com) or wherever books are sold.

### TELEVISION

#### AFRICA'S HUNTERS

Growing up is tough – harder still if you're a lion cub struggling to find his place in the pride. Tune in to *Africa's Hunters* to learn about the predators that inhabit the continent's wilderness. Premieres April 24 at 7 p.m. on National Geographic.

### NATIONAL GEOGRAPHIC BOOKS

#### TURN YOUR BAD DAY AROUND ...

...with 365 tales of other days that were worse. Michael Farquhar's *Bad Days in History*, now in paperback, lists "an instance of bad luck, epic misfortune, or unadulterated mayhem" for each day of the year. A grim April example: On the 20th in 1889, Adolf Hitler was born. *Bad Days* is available at [shopng.com](http://shopng.com) and wherever books are sold.

### NATIONAL GEOGRAPHIC KIDS

#### TALKING TRASH TO HELP THE PLANET

In time for Earth Day, April 22: *THIS BOOK STINKS!* a colorful look at the science of trash. For ages eight through 12, it covers topics from composting to clever uses of rubbish. Available at [shopng.com](http://shopng.com) and wherever books are sold.

### TELEVISION

#### GENIUS

*Genius* tells the dramatic story of Albert Einstein. Starring award-winning actors Geoffrey Rush and Emily Watson, the 10-episode series charts Einstein's transition from a rebellious student to a patent clerk and eventually, the scientist who unlocked the mysteries of the atom and the universe. The first episode is directed by Academy Award-winning Director Ron Howard. Series premieres April 26 on National Geographic and airs every Wednesday at 10 p.m.



### NATGEO.COM VIDEO

#### A DAY IN THE LIFE OF A GELADA MONKEY

From the high cliffs above East Africa's Great Rift Valley to the misty plateau of Guassa, "bleeding heart" monkeys play, search for food, and explore the Ethiopian Highlands. See the video at [ngm.com/Apr2017](http://ngm.com/Apr2017).

**Subscriptions** For subscriptions in India call 022-49188881/2/3/4. For online subscriptions log on to [www.getnationalgeographic.com](http://www.getnationalgeographic.com)

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code. | Copyright © 2016 National Geographic Partners, LLC | All rights reserved. National Geographic and Yellow Border: Registered Trademarks \* Marcas Registradas. National Geographic assumes no responsibility for unsolicited materials.

Disclaimer: Reproduction in whole or part without written permission is strictly prohibited. We do our best to research and fact-check all articles but errors may creep in inadvertently. All information is correct at the time of going to press but are subject to change. All opinions expressed by writers are their own and not necessarily those of National Geographic. We do not allow advertising to influence our editorial choices. All maps used in the magazine, including those of India, are for illustrative purposes only.

Printed and published by Mr. Anuraag Agarwal on behalf of Amar Chitra Katha Pvt. Ltd. Printed at Manjiv Technologies Ltd., Plot no 2/a, Shivaji Village, Industrial Area, Manjiv-676104 and Published at Amar Chitra Katha Private Ltd., Unit No. 201 & 202, Sumer Plaza, 2nd Floor, Marul Maroshi Road, Andheri (East), Mumbai - 400 059

Editor: Ms. Niloufer Venkatraman.

PHOTOS: JOEL SARTORE, PHOTO ARK (FROG); NATIONAL GEOGRAPHIC/DUSAN MARTINECK

# CONTENTS

MAY 2017 • VOL. 4 • NO. 10 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

*Madhu*  
*22/06/17*  
**SUBSCRIBED**

## FRONT

### 3 QUESTIONS

Scientist **Lee Berger** on his almost human finds

### EXPLORE

Innovation: 3-D models, human cyberconductors

## FEATURES

# 98 | WHOSE MOORS ARE THEY?

Scotland has lost more than 25 percent of its heather moorland since World War II. For what's left of this signature landscape, the future is clouded by debates about class, culture, and nature.

*By Cathy Newman, Photographs by Jim Richardson*



**On the Cover** Albert Einstein revolutionized our understanding of how the universe works. More than 60 years after his death, we're just beginning to understand how minds like his work. *Illustration by Tomer Hanuka*

**Corrections and Clarifications**  
Go to [natgeo.com/corrections](http://natgeo.com/corrections).

### 26 | WHO IS A GENIUS?

Science explores why some exceptional minds soar above mere brilliance.

*By Claudia Kalb, Photographs by Paolo Woods*

### 76 | THE BURNING HEART OF AFRICA

Is failure the fate of the Central African Republic?

*By Peter Gwin, Photographs by Marcus Bleasdale*

### 52 | AKHENATEN

King Tut's dad, and Egypt's first revolutionary, is still a symbol of change.

*By Peter Hessler, Photographs by Rena Effendi*

### 122 | UNITED IN PROTEST

For indigenous people, rebelling against a pipeline is also uniting nations.

*By Saul Elbein, Photographs by Erika Larsen*

# CONTENTS

## ELSEWHERE



### TELEVISION

#### EINSTEIN THROUGH THE AGES, IN *GENIUS* ON NATIONAL GEOGRAPHIC

Actor-musician Johnny Flynn (far left) and Academy Award winner Geoffrey Rush both portray Albert Einstein in *Genius*, a 10-part series based on Walter Isaacson's acclaimed biography of the brilliant scientist. Wed 10 p.m. on National Geographic.

### TELEVISION

#### UNDERWATER KILLERS

Up close and personal with the fiercest predators in our oceans. Meet the sharp-toothed barracuda, piranha and other marine assassins that are masters of their craft. Premieres 1st May on Nat Geo Wild, 8 p.m.

### TELEVISION

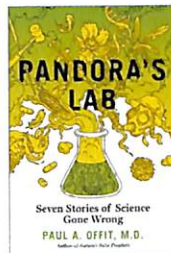
#### WATER: THE REAL STORY

Water is our planet's most precious commodity, but thanks to climate change and rising population, it's a fast depleting resource. We take a closer look at local heroes who are setting an example with their efforts to preserve and consciously use water in India. Premieres on 12th May on National Geographic, Fri-Sat 10 p.m.

### BOOKS

#### BWARE OF BAD SCIENCE

What happens when ideas billed as "scientific truths" are false? In *Pandora's Lab: Seven Stories of Science Gone Wrong*, physician Paul Offit distinguishes facts from fiction. The book is available at [shopng.com](http://shopng.com) and wherever books are sold.



**Subscriptions** For subscriptions in India call 022-49188881/2/3/4. For online subscriptions log on to [www.getnationalgeographic.com](http://www.getnationalgeographic.com)

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code. | Copyright © 2016 National Geographic Partners, LLC | All rights reserved. National Geographic and Yellow Border: Registered Trademarks \* Marcas Registradas. National Geographic assumes no responsibility for unsolicited materials.

Disclaimer: Reproduction in whole or part without written permission is strictly prohibited. We do our best to research and fact-check all articles but errors may creep in inadvertently. All information is correct at the time of going to press but are subject to change. All opinions expressed by writers are their own and not necessarily those of National Geographic. We do not allow advertising to influence our editorial choices. All maps used in the magazine, including those of India, are for illustrative purposes only.  
Printed and published by Mr. Anurag Agarwal on behalf of Amar Chitra Katha Pvt. Ltd. Printed at Manipl Technologies Ltd., Plot no 2/a, Shivalli Village, Industrial Area, Manipl-576104 and Published at Amar Chitra Katha Private Ltd., Unit No. 201 & 202, Sumer Plaza, 2nd Floor, Marol Maroshi Road, Andheri (East), Mumbai - 400 059  
Editor: Mr. Shreevatsa Nevatia.

# CONTENTS

JUNE 2017 • VOL. 4 • NO. 11 • OFFICIAL JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY

## FRONT

### VISIONS

#### EXPLORE

Diverse comics, animal hacks, ocean conservation

#### STARTALK

Neuroscientist and TV star Mayim Bialik on the status of women in STEM fields.



## FEATURES

### 88 | CARVED BY LAVA

Centuries of eruptions have created hidden networks of caves under Hawaii's volcanoes. Below, lava flows out of one of the underground passageways into the sea.

By Joshua Foer, Photographs by Carsten Peter



**On the Cover** A polygraph allows its operator to compare a person's physiological responses – such as changes in breathing, blood pressure, or pulse – when telling the truth versus lying. Originally introduced in 1921, these instruments may help indicate when people lie, but scientists are still exploring the question of why people lie.  
*National Geographic photo illustration*

**Corrections and Clarifications**  
Go to [natgeo.com/corrections](http://natgeo.com/corrections).

#### 26 | WHY WE LIE

In the age of social media, separating truth from lies may be harder than ever.

By Yudhijit Bhattacharjee  
Photographs by Dan Winters

#### 102 | TURNED TO STONE

A Canadian mine yields one of the world's best preserved dinosaurs.

By Michael Greshko  
Photographs by Robert Clark

#### 48 | THE PERILS OF PALE

In Tanzania people with albinism are attacked for their body parts.

By Susan Ager, Photographs by Stephanie Sinclair

#### 114 | A STATE OF GRIEF

Death rituals have become a cathartic part of daily life in the Philippines.

By Aurora Almendral  
Photographs by Adam Dean

#### 70 | LIFE IN THE BALANCE

Climate change threatens animals of the Galápagos.

By Christopher Solomon  
Photographs by Thomas P. Peschak

#### 120 | THE SIDE EFFECT

Entrepreneurs sell medicine on Haiti's streets.

By Arnaud Robert  
Photographs by Paolo Woods and Gabriele Galimberti

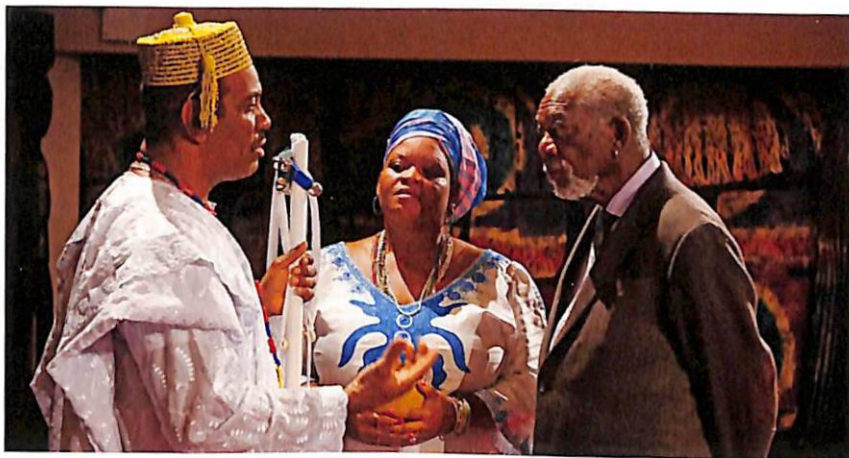
## CONTENTS

### ELSEWHERE

#### TELEVISION

### THE STORY OF GOD WITH MORGAN FREEMAN

American actor Morgan Freeman is back with a second season that takes viewers on a quest to understand the connections between the world's major religions. At a time of increasing religious divisions around the planet, *The Story of God* seeks to find common ground. Airs from June 8 on National Geographic, Thursdays 10 p.m.



#### TELEVISION

### SCIENCE OF STUPID

This show takes spectacular and painful user-generated clips and combines them with cold hard science. Using animation and slo-mo cinematography, host Manish Paul explains the science behind their failures. Airs from June 26 on National Geographic, Monday to Wednesday 8 p.m.

#### TELEVISION

### INDIA'S MEGA KITCHENS

*India's Mega Kitchens* is back with its new season, featuring some of the grandest kitchens in the country. On the list is Amritsar's Golden Temple and the kitchen of Lijjat Papad in Mumbai that has been empowering women to break the shackles of poverty since 1959. This show explores how these mega kitchens work. Airs from June 19 on National Geographic, Mondays 9 p.m.



#### BOOKS

### ANIMAL PARENTING TO WARM THE HEART

Two books full of inspiring stories and portraits of animal families are the perfect way to celebrate Mother's Day and Father's Day. *The Wisdom of Moms: Love and Lessons From the Animal Kingdom* and *Amazing Dads: Love and Lessons From the Animal Kingdom* are available wherever books are sold, and at [shopng.com/books](http://shopng.com/books).

**Subscriptions** For subscriptions in India call 022-49188881/2/3/4. For online subscriptions log on to [www.getnationalgeographic.com](http://www.getnationalgeographic.com)

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code. | Copyright © 2016 National Geographic Partners, LLC. All rights reserved. National Geographic and Yellow Border: Registered Trademarks \* Marcas Registradas. National Geographic assumes no responsibility for unsolicited materials.

Disclaimer: Reproduction in whole or part without written permission is strictly prohibited. We do our best to research and fact-check all articles but errors may creep in inadvertently. All information is correct at the time of going to press but are subject to change. All opinions expressed by writers are their own and not necessarily those of National Geographic. We do not allow advertising to influence our editorial choices. All maps used in the magazine, including those of India, are for illustrative purposes only.

Printed and published by Mr. Anuraag Agarwal on behalf of Amar Chitra Katha Pvt. Ltd. Printed at Manipal Technologies Ltd., Plot no 2/a, Shivalli Village, Industrial Area, Manipal-576104 and Published at Amar Chitra Katha Private Ltd., Unit No. 201 & 202, Sumer Plaza, 2nd Floor, Marol Maroshi Road, Andheri (East), Mumbai - 400 059  
Editor: Mr. Shreevatsa Nevatia