100 PAGES

Sanctuary ASIA

Vol. XXXVII No. 12, December 2017

₹100

The Good Fight

The Sanctuary Wildlife Awards 2017

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Printed & Published by SHASHI KUMAR on behalf of SANCTUARY NATURE FOUNDATION, Printed at SILVERPOINT PRESS PVT. LTD., A-403, TTC Industrial Area, Near Antony Motors, Mahape, Navi Mumbai – 400 709 and Published from SANCTUARY NATURE FOUNDATION, 602, Maker Chambers V, Nariman Point, Mumbai – 400 021.
Editor: Randhir Sahgal (Bittu Sahgal)

SAURABH SAWANT/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

In Connoor, a cicada nymph emerges from its moult to transform into an adult with wings. The rear lighting that the photographer employed using a torch illuminates the magical process of metamorphosis. Cicadas spend most of their lives underground, emerging in cycles of 13 to 17 years, depending on the species.

Joanna Van Gruisen has lived in India since 1981. She was a wildlife filmmaker and photographer and is now co-partner of The Sarai at Toria.

A masters in wildlife science from the Wildlife Institute of India, Senior Research Fellow Stotra is pursuing his doctoral study on lion social behaviour. He has been studying lions for the last five years since his postgraduate days.

Divya has a PhD from Rutgers, the State University of New Jersey, USA, and specialises in marine conservation and fisheries management. Alongside her research on sharks, she is currently working to encourage sustainably sourced seafood through an initiative called InSeason Fish.

The guiding force that shapes the mission of the E. O. Wilson Biodiversity Foundation, E. O. Wilson has been a pioneer in spearheading efforts to preserve and protect the biodiversity of this planet.

Sanctuary ASIA

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December 2017

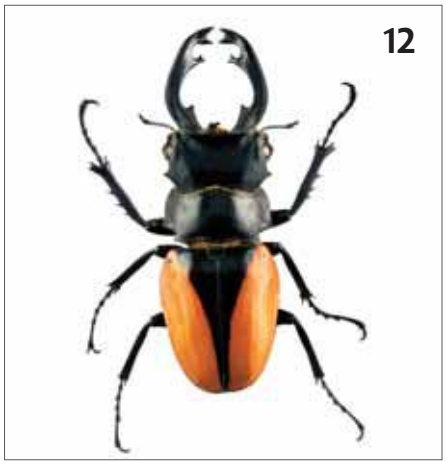
ON THE COVER

This subadult tiger was caught mid-stride in Ranthambhore by the photographer as it mock-charged its sibling in play behaviour that is so vital to its future when conflicts over territories, mates or the protection of young ones become real life or death issues. Sanctuary's Lifetime Service Awardee 2017 Valmik Thapar says "Saving tigers is possible. For this, working with local people is essential. Discussing issues with all is vital, but only in a climate of change and change at the very core of our entire system. For the future of tigers, the Forest Department will have to share power and enter new partnerships with humility of purpose and mission."

Photographer: Jaisal Singh

22. The Good Fight
"*Do not think of today's failures, but of the success that may come tomorrow.*" – Helen Keller, *The Story of My Life*
When Nature's narrative turns despairing, these individuals bring us stories of hope, inspire us to be resilient and remind us that it is a planet worth fighting for. *Sanctuary* is committed to honouring these trailblazers, year after year, for we believe they drive the change we need.

NEWS



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Ramanujam takes us on a rollicking jaunt across the Eastern Ghats in this witty recollection of a vertebrate survey he and his team undertook between 2011-2012.

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52 Fifty-Fifty In the Anthropocene, it is vital that we do not crush non-human life underfoot on the planet that we neither fully understand, nor are intelligent enough to manage. Yet we are directly causing our only home to wither. One the world's greatest biologists and thinkers, **E. O. Wilson,** asks us to collectively assign half of our planet to nature's care. This, he rationally and passionately advocates, is vital to saving life on Planet Earth from extinction.

72 Being My Father's Daughter Following in her father, Dr. Y. V. Jhala's footsteps, **Harshini Jhala** recounts a childhood spent in the wilds with him as he studied wild species. Recognising that things are bleaker today, she is ever more determined to carry forward her father's legacy.

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IN OUR HANDS

The fingers clutching this tree branch in Valparai look startlingly familiar. Hold your own hand out. Now compare the shape, the nails, the joints... all fashioned by the same designer that gifted us our own grasping tools – nails and all.

The hand on this page belongs to a lion-tailed macaque *Macaca silenus*, found nowhere else but India's Western Ghats. Handsome beyond description, this monkey from Valparai has much more going for it than mere good looks.

Way back in the 1970s, before ordinary people were even aware of the looming threat of climate change, all-time greats such as Sathish Chandran Nair, Dr. Sálim Ali, M. K. Prasad, Romulus Whitaker, M. Krishnan, Sugatha Kumari and a host of others were (unwittingly) working to solve today's climate crisis. Their partner-in-arms was this Old World primate that became the symbol of a powerful national resistance movement against destructive large dams. In the process, Silent Valley, one of the world's most precious moist evergreen forests was saved from death by drowning.

Then, as now, the primate on this page obeys an instruction that clever human primates still cannot wrap their heads around... that it's far more sensible to adapt to nature than try and coerce it to obey human diktats.

So there we have it. An uncomplicated lesson from a less clever, but better-adapted primate who actually accepts without debate the wisdom Shakespeare delivered through *Julius Ceasar*: "The fault, dear Brutus, is not in our stars, but in ourselves."

Bittu Sahgal

Photographer: K. Hari Prasad/Entry-Sanctuary Wildlife Photography Awards 2017
Details: Camera: Nikon D500, Nikon 300 mm. f/4.0,
Shutter speed: 1/125 sec., Aperture: f/4, ISO: 640, Focal length: 300 mm.
Date: August 17, 2017, 3:57 p.m.

WORLD SCAN

COURTESY: WCS INDONESIA

Forty-one white cockatoos were seized from four individuals suspected of smuggling birds to North Sulawesi in Indonesia.

ELEPHANT TROPHY BAN REVERSED

U.S. President Donald Trump prompted a global outcry from conservationists and animal rights activists last month when the U.S. Fish and Wildlife Service announced that they would lift the ban on import of elephant trophies from Zimbabwe and Zambia to the U.S. In 2014, the former U.S. President Barack Obama had banned the import. But in a meeting between the U.S. federal agency and officials of the Tanzanian government,trophies from elephants that were 'legally hunted' between January 21, 2016, and December 31, 2018, in Zimbabwe and Zambia were suddenly allowed to be imported. Fortunately, a public outcry forced Trump to reconsider the move, but the battle has by no means been won. The U.S. Fish and Wildlife Service had earlier put out a notice defending their disastrous move by stating that legal and controlled trophy-hunting would only end up benefitting the animals by bringing in revenues for the protection and conservation of wildlife and their habitats. That we know from African elephant and lion population collapses is a wholly-failed strategy.

ONLY 30 SUMATRAN RHINOS LEFT?

Though the latest estimates claim the numbers of the Sumatran rhinos to be close to a hundred, the truth is far from that according to experts. Unlike the Javan rhinos whose populations are well tracked and documented through extensive camera-trapping exercises, Sumatran rhinos present a more difficult scenario to study and photograph because of their elusive behaviour and inaccessible terrain. Experts say it is more likely that the number of Sumatran rhinos in the wild hover around 30. We know of four distinct Sumatran rhino populations: 1. Way Kambas National Park in southern Sumatra. 2. The Bukit Barisan Selatan National Park in the western coast of southern Sumatra. 3. The Leuser wilderness of Aceh, northern Sumatra. 4. Kalimantan in Borneo. Over the years, their population has declined from 400-800 individuals in 1986 to under 400 in 1996 and a precarious 275 in 2008.

SMUGGLED BIRDS SEIZED IN INDONESIA

Forty-one white cockatoos and 84 Eclectus Parrots, which are legally protected under Indonesian law, were seized from four suspected smugglers arrested in a raid conducted by the South Halmahera Police supported by Wildlife Conservation Society's (WCS) Wildlife Crime Unit (WCU) and the Ministry of Environment and Forestry. The arrests took place on November 13, 2017, and evidence including cell phones, bird cages and paralon pipes was seized. The birds were found in appalling conditions, packed tightly in pipes that were illegally being transported to North Sulawesi, a key transit region for the illegal wildlife trade. Batam Island and Philippines are other routes from where wildlife contraband reaches black markets in the Middle East, other Asian countries and Europe. The suspects face prison terms of up to five years, plus a fine of 100 million rupiah.

LEMUR MEAT ON THE MENU

A report published in *Mongabay* reveals that the meat of some of the world's most endangered vertebrates, lemurs, is still available in restaurants in Madagascar. Tireless efforts to staunch this bushmeat trade of lemurs is failing as hunters manage not just to kill but easily sell the meat. Bushmeat is not the only problem. Wealthy urbanites have begun to demand lemur meat too and this is what is driving the trade based on demands from unscrupulous restaurateurs. A majority of the illegal hunts occur outside Protected Areas. "I was a little bit shocked (to know) that there are still some Malagasy restaurants that serve lemurs, said Lando Andrianandrasana, Project Manager of the Duke Lemur Centre. He suggested that only insiders are offered the meat and that some kind of passwords are used to indicate that they want lemurs served on their plates.

CRUSHED UNDERFOOT

The next time you tread on drylands such as deserts, be careful of what you step on for you could be destroying the small, yet, highly rich and critical world of biocrusts! Yes, dryland floors are covered with cryptic patterns and formations, barely two or five centimetres high. These are made up of a throbbing variety of microscopic lifeforms including mosses, lichens and cyanobacteria. As a colony, they live in dry soils, spread their roots and blossom where plants can't survive. Unbeknown to most, the biocrust shapes and sustains desert ecosystems. They bind the soil preventing soil runoffs in the event of rain and flood, trap water and nitrogen from the air thus adding to soil moisture and fertility. They also sequester carbon. Unfortunately, these hardy biocrusts or biological soil crusts, are in as much danger from climate change, as all other living things on our beleaguered planet. Such drylands comprise almost a third of the planet's surface and these ecosystems cannot survive without biocrusts. Harbouring some of the oldest known lifeforms on Earth, biocrusts have survived every challenge thrown at them since life on land began. Now, they are wilting at the hands of climate change and because *Homo sapiens*, for all her intelligence, has no idea what is being crushed underfoot.

INDIA SCAN

BHAVNA SHARMA/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

The fourth tiger estimation exercise will be conducted by the National Tiger Conservation Authority in two sq. km. grids, instead of the four sq. km. grids, to ensure greater accuracy.

NGT NOTICE TO KEN-BETWA PROJECT

The National Green Tribunal (NGT) has issued a notice to the Centre and two state governments on clearances granted to the Rs 1,800-crore Ken-Betwa river linking project, which if completed will impact forests and wildlife in the region. The Ministry of Environment and Forests, Water Resources Ministry and the governments of Uttar Pradesh and Madhya Pradesh, where the project is located, are expected to reply within two weeks. Lack of environmental and human impact assessment was cited as the reason to stay the project in environmentalist Himanshu Thakkar's plea, which the NGT heard. While the project is expected to provide drinking water to drought-prone regions in both states, 58.03 sq. km. of prime habitat in Madhya Pradesh's Panna Tiger Reserve will be lost in the first phase of the project. Warned by environmentalists to be ecologically disastrous, the project has been mired in controversy since it was mooted, and is now subject to a final order from the tribunal.

TIGER CENSUS TO BE MORE ACCURATE

In a bid to ensure greater accuracy, the National Tiger Conservation Authority (NTCA) will conduct the final phase of the All India Tiger Estimation in two sq. km. grids, instead of the earlier four sq. km. grids. NTCA officials told the *Times of India* that, "The new system will also accurately show the presence of even small carnivores. The gap between installing camera traps has been reduced to 25 days from the earlier 45 too." The Authority will require more camera traps to employ in the smaller grids, but it would not matter much as the period of withdrawing the cameras has been reduced, the officials added. Goa, Nagaland and Mizoram join the 18 states in which the estimation will be carried out, beginning in January 2018. This is the fourth tiger estimation exercise to be conducted by the NTCA after the pugmark estimation method was withdrawn in 2005. The first estimation conducted in 2006 showed the presence of 1,411 tigers followed by 1,706 tigers in 2010 and 2,226 tigers in 2014.

CITIZENS SUPPORT GROUP FORMED FOR MARINE LIFE

Independent researchers, marine life enthusiasts, officials of the Forest Department's Mangrove Cell, and volunteers of various NGOs have come together to extend their reach from turtles to all forms of marine life that are increasingly being stranded along Maharashtra's coastline. The group, called the Marine Respondents' team, aims to increase its network to interested citizens and fishermen so that they can reach the spot immediately when a stranding occurs. Ketaki Jog, a 30-year-old ecologist who studies marine ecosystems and is part of the group said, "We know that sperm whales exist around our coastline because of a stranding that happened at Revdanda, Alibaug, in 2015. Collecting and studying tissue samples of these animals will help in understanding why these strandings are occurring." Abhishek Jamalabad, a researcher and a member of the group, said, "I work in Karwar in southern Karnataka, where there is a similar network with people informing scientists of strandings. Then we reach the spot along with the Forest Department and other authorities to collect samples," and added that the Mumbai group is larger than most others in existence so far.

ARUNACHAL'S DEMWE PROJECT LOSES GREEN NOD

Forest clearance granted to the 1,750 MW Demwe hydel project in Arunachal Pradesh was suspended by the National Green Tribunal after two environmental activists from Assam challenged it. Bimal Gogoi and Rohit Choudhury said the clearance was granted on wrong and inadequate information of wildlife habitats, biodiversity-rich areas and ecologically and culturally sensitive areas submitted by the Arunachal Pradesh government. The tribunal in its October 24 order said the clearance was granted brushing aside views of the non-official members of the standing committee of the National Board for Wildlife. "Having constituted a statutory standing committee as per the provisions of the central enactment and in the absence of the method of decision to be taken by such a standing committee, we are of the view that either the chairperson, who happens to be the minister of state, should have given proper reason for rejecting the objection of a majority of the non-official members or the decision ought to have been arrived at based on the opinion of the majority of the members of the standing committee of National Board. In the absence of any acceptable reasons, we have no hesitation to hold that the decision of the minister as if it is the decision of the standing committee of NBWL, which forms the basis of granting of the FC (forest clearance) in this case under the *Forest (Conservation) Act*, 1980, is not sustainable in law," it said.

CLIMATE WATCH

MALENE THYSSEN, HTTP://COMMONS.WIKIMEDIA.ORG/WIKI/USER:MALENE

Rising temperatures and overfishing are leading to hazardous jellyfish blooms in seas across the world.

CLIMATE CHANGE DEADLY FOR HEALTH

Climate scientists have been crying hoarse for a long time, warning us of the changing climate and its impact. And now, the direct impact of this man-made phenomenon can be seen in the form of failing human health, air pollution and heatwaves that are taking a toll on millions every year. Air pollution, especially in New Delhi, largely due to burning of fossil fuels and agricultural waste grabbed headlines last month after the air quality index plummeted to dangerously low levels warranting a public health emergency to be declared. Respirable pollutants PM2.5 reached 999 in certain areas in the city when the safe levels are believed to be just 60. Particulate matter in such high concentrations suspended in the air we breathe can result in them lodging deep in our lungs. The World Meterological Organisation (WMO) announced that atmospheric carbon dioxide levels have reached an all-time high in three million years. Rise in global temperature and resultant heatwaves are very serious causes of worry as they allow for rapid transmission of deadly diseases such as dengue fever."Climate change is happening and it's a health issue today for millions worldwide," said Prof Anthony Costello of the World Health Organization to *The Guardian*.

JELLYFISH POPULATION EXPLODES

Overfishing is depleting our oceans of countless marine species, which play crucial roles in maintaining ecosystem equilibrium. These include predators (such as sharks and turtles), which prey on jellyfish, thereby keeping their population under control. With the decline of such predators, coupled with the rise in temperatures resulting in more acidic waters, jellyfish numbers are at an all time high, swarming coasts in several parts of the world. Jellyfish blooms cause a lot of damage, not only to the ecosystem, but also to the fishing industry. Jellyfish sting incidences among people that come in close proximity to these blooms are naturally on the rise. On a positive note, scientists are working to utilise the massive jellyfish bio mass as food for humans, as well as potentially using the sticky mucus they secrete to control the influx of microplastic into the seas.

INDIA HIGHLY VULNERABLE

An independent Germany-based environmental organisation, Germanwatch, recently released its latest global climate risk index (CRI), which pegged India as the sixth-most vulnerable country in the world to extreme weather episodes. Only Haiti, Zimbabwe, Fiji, Sri Lanka and Vietnam were stated to be more vulnerable in the face of climate change to events such as floods, extreme temperatures and heat (and cold) waves .The CRI is projected after analysis of the death toll per 100,000 individuals complemented by economic loss per unit of Gross Domestic Product (GDP) of the respective country based on the population and economic data acquired from the International Monetary Fund (IMF). India ranked fourth in the CRI 2016, with a loss of property worth $21 billion and 2,119 human lives. As per the data collected and analysed from 1997 to 2016, more than 5,00,000 lives have been lost to the tune of $3.16 trillion in financial losses due to more than 11,000 extreme weather events globally.

EUROPE BANS NEONICOTINOIDS?

Neonicotinoids are globally used as insecticides and recent studies have confirmed the detrimental effects they have on bees and various other insect populations around the world. Michael Gove, British Environment Secretary, emphasised the need to support the ban on the use of these chemicals proposed by the European Union in 2013. "The weight of evidence now shows that the risks neonicotinoids pose to our environment, particularly to bees and other pollinators, which play such a key part in our £100billion food industry, is greater than previously understood," he said. Significant field trials and analysis have gathered enough scientific evidence that suggest that neonicotinoids are hazardous to the world's bee populations. The decline in bee numbers has begun to affect crops as these natural pollinators are crucial for crop yields.

Well done WWF!

The appointment of Pavan Sukhdev as President of the WWF International Board spells good news for all of us who understand the turmoil at the tri-junction of biodiversity, economics and climate change. For more information visit http://wwf.panda.org. – Ed.

A Haven for Wildlife

SHIVARAM SUBRAMANIAM

The scope for wildlife tourism in India has never been quite as good as it is today. What is more, the sheer diversity of habitats and cultures makes it possible for India to offer myriad choices to potential visitors. Now is incredible India's opportunity to combine the strengths of both the tourism and wildlife sectors to the advantage of the wilderness and those who wish to celebrate the gifts of nature 'on site'.

INSECTDOM

A SANCTUARY NATURE FOUNDATION – BOMBAY NATURAL HISTORY SOCIETY PHOTOFEATURE

BY PURVA VARIYAR, KAUSTAV PATEL, GAURAV SHIRODKAR AND SANYAM GUPTA

The Sanctuary Nature Foundation and the Bombay Natural History Society (BNHS) have come together to work on a unique project that presents natural history in a way that tries to capture its intricate and detailed beauty through the art of photography.

We call it 'INSECTDOM'.

BNHS' incredible and diverse natural history museum is an inexhaustible repository of specimens, some of which are over a hundred years old. It is humbling to be surrounded by incredible specimens, each of them having played a role in adding to our knowledge of natural history, leading us a step further in understanding the intricate design of Nature.

Spellbinding collection of insects, arachnids, birds, reptiles, mammals that represent our wild natural heritage, collected and deposited by explorers and researchers since the time of the British Raj are housed here.

SPECIMEN FROM 1906, CEYLON (NOW SRI LANKA)

Lanternfly *Pyrops sp.*

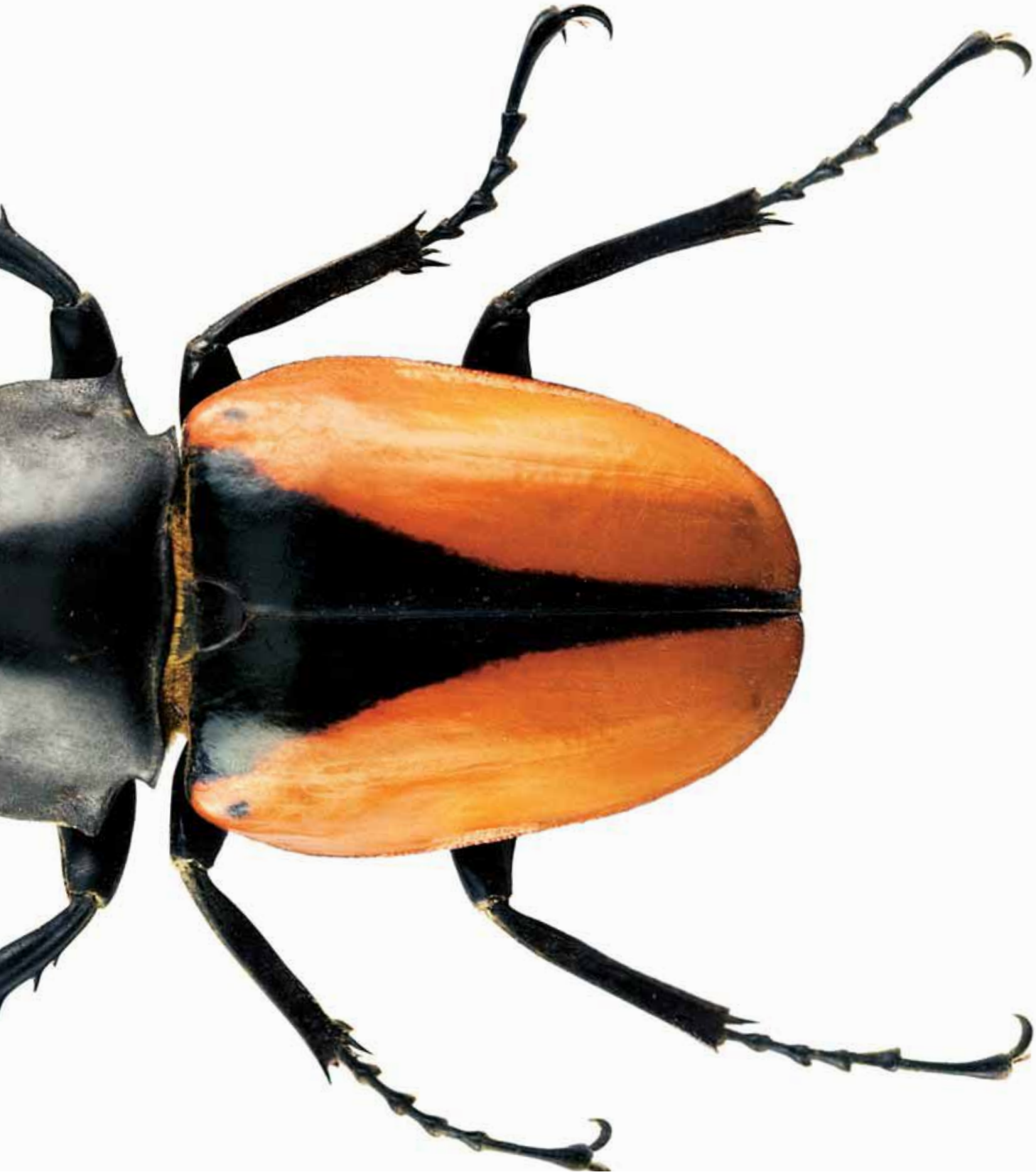
This stunning specimen of a meticulously-mounted lanternfly showcases the splendid intricate textures and patterns on its spread wings. Though the original colours of the insect have faded over the years, this time-worn individual still exudes astounding beauty.

Sanctuary and the BNHS decided to join strengths to rouse people's fascination, curiosity and sense of wonder towards Nature and the intelligent life it harbours.

What you see here are some stunning insect specimens, which we handpicked from the vast collection, some of which date back all the way to 1906! And understandably, these specimens have weathered the travails of time, wear and tear over the years. While some have managed to remain intact, thanks to the BNHS' efforts towards preservation, some have inevitably either lost parts of their limbs or have seen their wings withered and faded. Embracing these beautiful flaws, we present to you, some of the images from 'INSECTDOM'.

SPECIMEN FROM 1906, RANGOON (NOW YANGON), MYANMAR

Stag beetle *Odontolabis sp.*
With its fearsome pincer-like mandibles, this prehistoric-looking insect is easyily mistaken for a deadly carnivore. However, the adult stag beetle, like this hundred-year-old specimen secured from the forests of Rangoon, feeds on tree sap! Adults can grow up to 9-10 cm. in length.

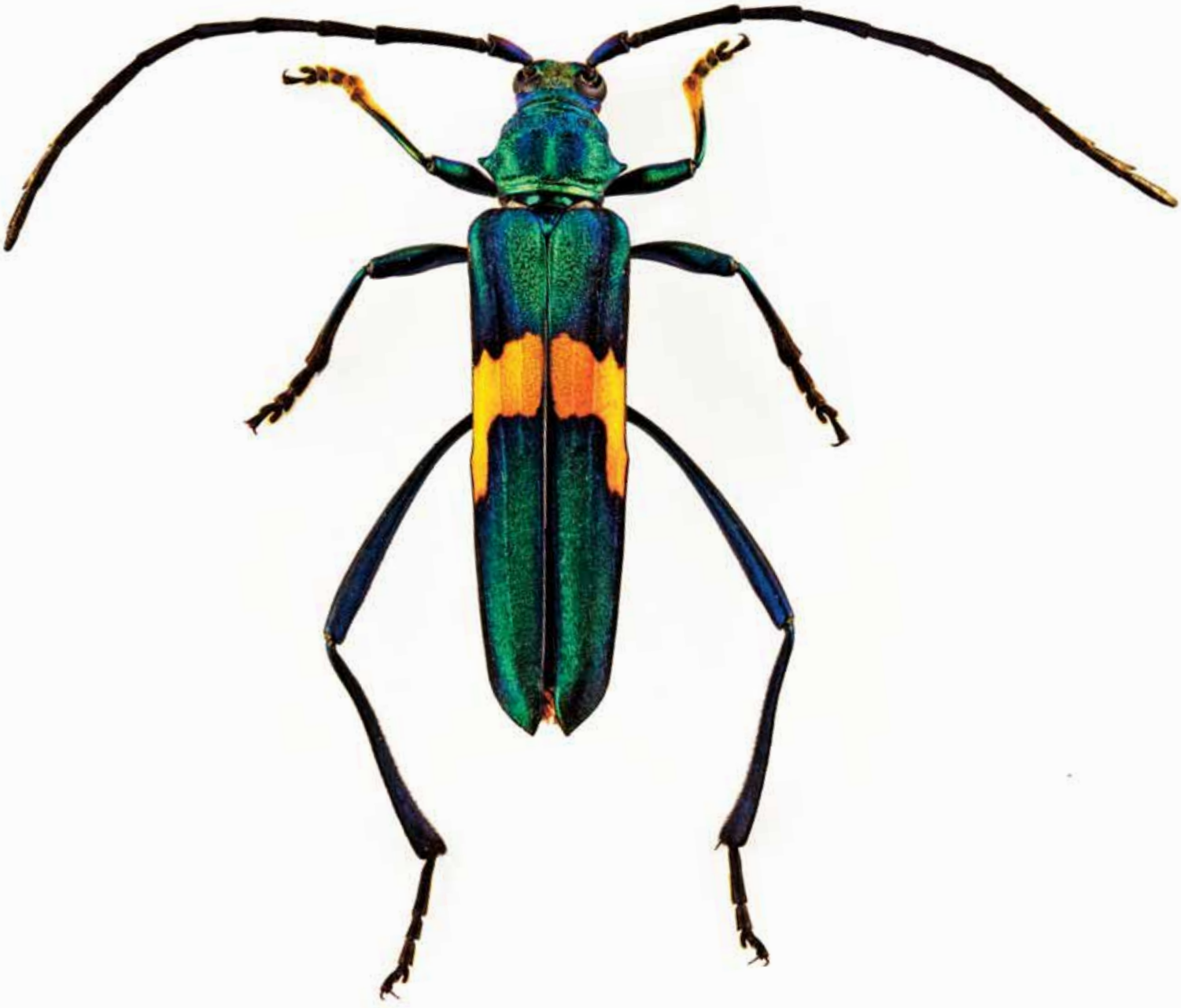


SPECIMEN FROM 1914, COORG, KARNATAKA

Lanternfly *Pyrops sp.*
The striking snout of this lanternfly, like that of a unicorn, can penetrate barks of trees to suck on the dewy tree sap within. This specimen was collected a century ago in the pristine, tropical wilderness of the Western Ghats.

DATE AND LOCATION UNKNOWN

Painted grasshopper *Poekilocerus pictus*
Isn't this painted grasshopper specimen a treat to the eyes? However, its conspicuous colouration holds more than just aesthetic value, it is indicative of the grasshopper's toxicity, acquired from feeding largely on chemical-rich milkweeds.



SPECIMEN FROM 2005, AMBOLI, MAHARASHTRA

Long-horned beetle *Polyzonus sp.*
This captivating longicorn specimen with its elongated antennae, still possesses the allure it must have had when it was alive. A longicorn in its larval stage bores through perishing trees, signifying a stage, where it is known as the round-headed borer.

SPECIMEN FROM 1974,
LOCATION UNKNOWN

Metallic wood boring beetle *Chrysochroa sp.*
The stannic sheen of this metallic wood borer's exoskeleton mesmerisingly glimmers even 40 years after it was collected. Commonly referred to as the jewel beetle, this iridescent beauty was popularly worn as jewellery in the Victorian era.

SPECIMEN FROM 1909,
BARAKHPUR, WEST BENGAL

Long-horned beetle *Rosalia formosa*

At the turn of the 20th century, this gorgeous orange-black insect skittered through the foliage in the tropical state of West Bengal before it was collected to be preserved and studied. The long-horned beetle's one fascinating characteristic is its long antennae that stretch far beyond its body length. However, for this particular specimen, the antennae have diminished over time to the length you see here.

HDFC

WITH YOU, RIGHT THROUGH

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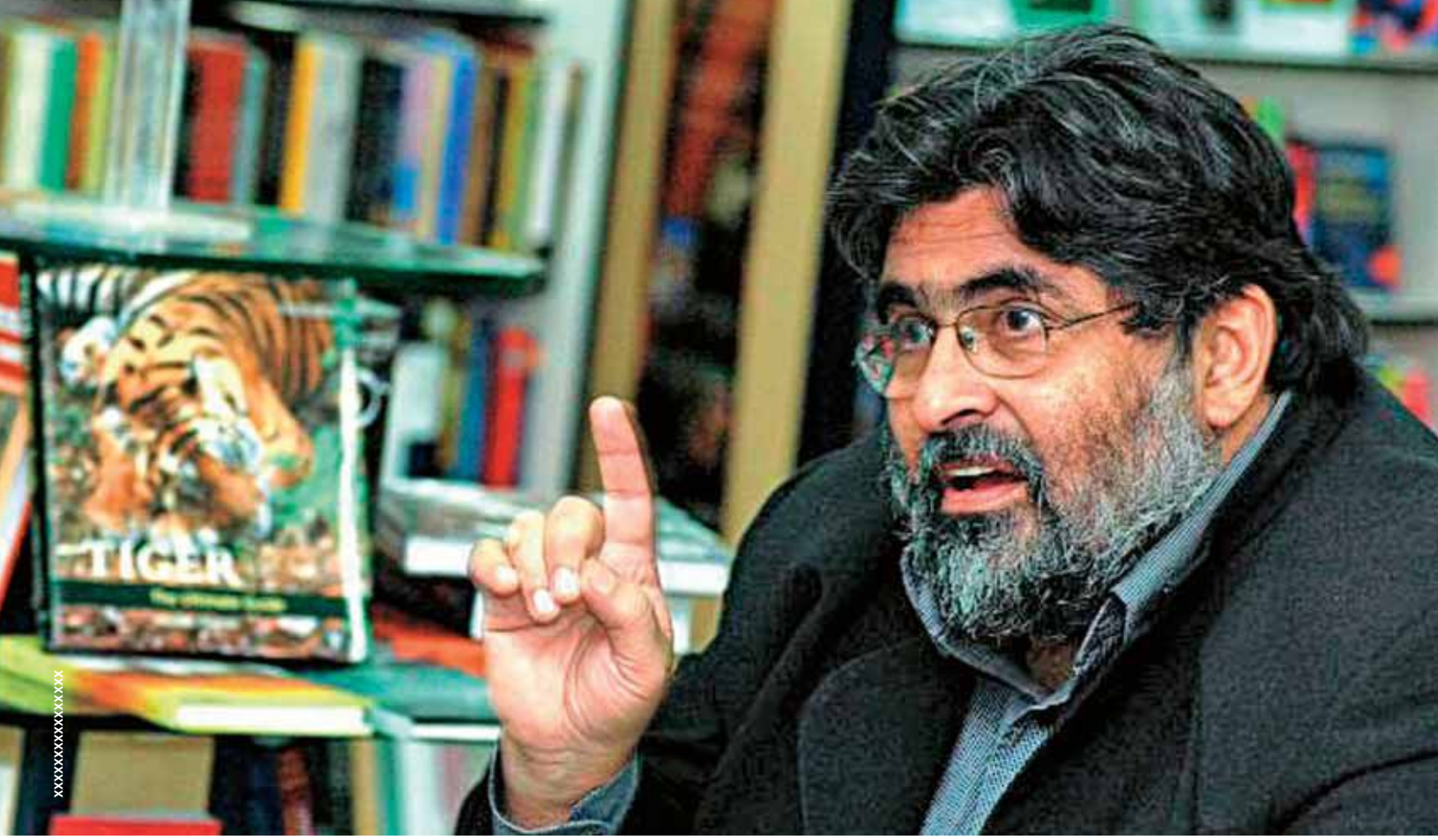
Churchgate, Mumbai 400 020. Tel.: 66316000, 22820282



THE GOOD FIGHT

THE SANCTUARY WILDLIFE AWARDS 2017

Supported by *DSP Blackrock* and *IndusInd Bank*

What an exquisite world we live in. Everyone knows, of course, that our planet faces threats, but what is heartening is the manner in which large numbers of bravehearts have begun to look upon protecting the species and habitats around us not as some kind of charity, but as the very purpose of their lives. Our superheroes come in different avatars – forest officials, policy influencers, lawyers, writers, educationists, activists, scientists, orators, artists and children. These are nature's spokespersons who are determined and committed to making their dreams come true... of leaving behind a planet that someday will not need protecting from our own kind. *The Sanctuary Nature Foundation* honours these inspiring dreamers and promises to support them every step of the way.

LIFETIME SERVICE AWARD

We were in search of a true hero – someone whose life's purpose and respect for nature could be held out as an inspiration to the youth of India.

VALMIK THAPAR

Tiger conservationist, author and wildlife protector

His formidable reputation and fierce demeanour match that of the world's most charismatic cat. A cat he's spent over four decades tracking and protecting. A cat whose story he has taken to the world. And so it is that when you say 'tiger conservation', scarce is the nature-lover who won't immediately think of Valmik Thapar.

Thapar's love affair with the tiger began in Ranthambhore in 1976, when as a young man he was taken under the wings of that other doyen of conservation – Fateh Singh Rathore. Together, mentor and protégé spent days, weeks, months and years tracking the fortunes of the park's tigers – recording rare behaviour, documenting unbelievable footage, and, most importantly, creating and implementing the management strategies that have made Ranthambhore the premier wildlife destination that it is today.

In 1988, even as Ranthambhore began to flourish, Thapar recognised the need to engage and uplift local communities, and thus founded the Ranthambhore Foundation, whose work he guided until 2000.

Erudite and articulate, Thapar has spent the past two decades leading conservation battles at every level imaginable. He has served on over

150 committees of both central and state governments, where his booming voice has never been quelled by either the sloth of bureaucracy, the greed of unethical government employees, or visionless politicians. His influence has been expansive, and though today he works almost exclusively in Rajasthan, with the state government, he has been instrumental in the revitalisation of other parks such as Maharashtra's beloved Tadoba-Andhari Tiger Reserve.

Thapar has also been vocal in eschewing the dogmatic view that all tourism is bad tourism, and is a leading proponent of innovative tourism that can benefit both parks and people. All this, he firmly believes, is only possible by knitting together a cross-sectoral group of like-minded people including scientists, activists, village leaders, forest officials, bureaucrats, politicians and the free press.

Author of 32 books, including four on Africa, presenter of 16 international documentary films, and an excellent orator, Valmik Thapar's gruff genius is what it took for India and the world to sit up and acknowledge the tiger's magnificence, its predicament, and the urgency for conservation.

And for this, we honour him.

WILDLIFE SERVICE AWARDS

We were in search of inspired wildlifers, forest employees, researchers, villagers... anyone currently involved with in situ nature conservation who have displayed extraordinary courage, dedication and determination and set high personal standards for others to follow.

JAYACHANDRAN S.

Fearless warrior, activist and visionary

A seasoned warhorse, Jayachandran S. has been at the forefront of the fight to save the Nilgiri and Sathyamangalam landscape in Tamil Nadu's Western Ghats for over three decades. It was in 1990 that he started the Tamil Nadu Green Movement and, ever since, this people-powered initiative has stemmed the onslaught of unscrupulous industries and the timber mafia on this global biodiversity hotspot.

Jayachandran has taken offenders to court with unwavering tenacity, opposing the construction of new roads such as the one along the Mettupalayam-Mulli-Ooty route in 1998-99; the widening of the Hasanur-Kollegal highway that runs through the Sathyamangalam Tiger Reserve and the Biligiri Rangaswamy Temple Tiger Reserve; and campaigning against encroachments to secure the Kalllar-Jakkanarai elephant corridor in the foothills of the Nilgiris. These early victories saved thousands of hectares of prime forest, home to rare and endemic species, from brutal devastation.

As the Honorary Secretary of Nilgiris Wildlife and Environment Association, in 2009, his critical intervention in an ongoing case against the unregulated mushrooming of tourism infrastructure in the Sigur elephant corridor helped put an end to encroachments and illegal constructions in the area for good. He was also involved in protesting against the potentially-destructive establishment of the Indian Neutrino Observatory at Singara, a crucial elephant habitat. Through his untiring work, fighting legal battles, advocating for environmental rights and conducting educational workshops, Jayachandran inspires youngsters to join him as volunteers, many of whom go on to pursue careers in conservation.

He is a scrappy fighter, yes. But he's also a solutions provider. By establishing a web of intelligence networks, he has been instrumental in helping the Kerala and Tamil Nadu Forest Departments bust poaching rackets, make seizures and apprehend hardened poachers. He has inspired many poachers to turn over a new leaf by surrendering their arms and ensuring alternate livelihood opportunities for them. Many of these ex-poachers today help the Forest Departments in blowing the cover on the modus operandi and operations of active wildlife criminals.

Jayachandran is a hero whose contributions it is impossible to justly chronicle. He is a man in whose steps we hope many more will follow.

And for this, we honour him.

KARTIK SHUKUL

Lawyer, committed activist and wilderness defender

He runs a commercial law practice, offers advice to several NGOs working in the field of wildlife protection and makes himself available to state Forest Departments, to raise the level of understanding of relevant laws at training institutes, conferences and often at strategy meetings where stacks of legal documents need to be interpreted to obtain higher rates of convictions. All this while he continues to indulge his love for wildlife photography, usually with a trip to the Bandhavgarh Tiger Reserve.

FACING PAGE: LIFETIME SERVICE AWARD *Erudite and articulate, Valmik Thapar has spent the past two decades leading conservation battles at every level imaginable. He has served on over 150 committees of both central and state governments.*

BELOW: WILDLIFE SERVICE AWARD *Jayachandran S. has been at the forefront of the fight to save the Nilgiri and Sathyamangalam landscape in Tamil Nadu's Western Ghats for over three decades.*

COURTESY: JAYACHANDRAN SHUNMUGANATHAN

COURTESY: ADV. KARTIK N. SHUKUL

COURTESY: NEHA SINHA

LEFT: WILDLIFE SERVICE AWARD *Incensed by how wildlife criminals have made a mockery of the law, Nagpur-based lawyer Kartik Shukul is not only putting poachers and traders behind bars, he's also keeping them there with his superb knowledge of the* Wild Life Protection Act, *1972.*
RIGHT: WILDLIFE SERVICE AWARD *Quitting her job, Neha Sinha took a swan dive into the world of conservation science, policy, law and governance and has used her penmanship to bolster many environmental projects and campaigns.*

A Nagpur-based lawyer, Shukul is stoically chipping away at the complacency that has thus far characterised the prosecution of dangerous wildlife criminals in India... those whose deeds have been equated with petty crimes for much too long. With his superb knowledge of the *Wild Life Protection Act,* 1972, and an incredible understanding of supporting precedents, Shukul is not only putting poachers and traders behind bars, he's also keeping them there!

Regularly appearing as a Special Counsel for the Maharashtra and Madhya Pradesh Forest Departments, this legal eagle has won an impressive number of convictions from the courts, including the cancellation of bail for 'Chacha', the notorious tiger skin trader whose crimes rival those of the late Sansar Chand. The landmark judgment that he was awarded in the case put an end to the era of 'automatic bail' for those accused of poaching and trade. Driven by his passion for nature and incensed by how wildlife criminals have made a mockery of the law, Shukul takes a no-holds barred approach to every case he accepts. He works with doctors, forensic examiners, the Forest Department and other colleagues to tear gaping holes in the cases of the defendants, making it near impossible for any judge to rule in their favour.

Shukul acknowledges the efforts of his team and associates in his success, specifically outlining the contributions of Pandurang Pakhale (see page 29), a Range Forest Officer of Maharashtra's Pench Tiger Reserve. Pakhale has arrested over a dozen tiger poachers, busted a pangolin poaching racket and fearlessly appeared in court time and again, in spite of the immense political pressure against him for upsetting the status quo. Battling false allegations and threats from the wildlife crime syndicate, he has kept both his morale and morals high. With his perseverance and Shukul's legal acumen, they have proved how effective the law can be if forest officials and lawyers work in tandem.

Despite the tedious rigours of his work, Shukul also manages to devote many hours every month to building capacity within members of the lower judiciary, police officers, Forest Department, and fellow lawyers by teaching them how to effectively wield his weapon of choice – the *Wild Life Protection Act.*

Kartik Shukul is a man of integrity and intelligence, whose resilience is taking out wildlife criminals one court case at a time.

And for this, we honour him.

NEHA SINHA

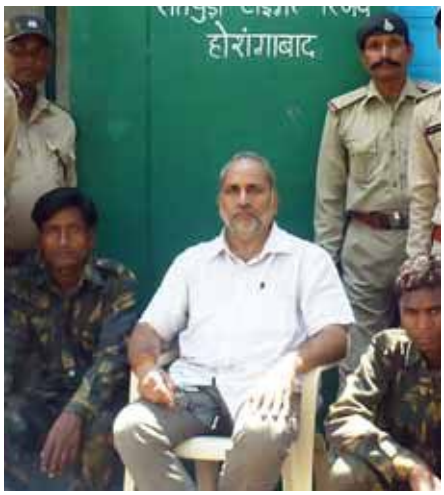
Bold commentator, talented writer, and environmentalist

The world needs strong yet sensitive, opinionated yet rational, determined yet appreciative women. And if there's anyone in India who fits the bill, it's Neha Sinha. She worked as a senior reporter/ environmental journalist for *The Indian Express*, but the call of the wild proved too strong to ignore and she soon jumped ship to conservation. Quitting her job, Sinha took a swan dive into the world of conservation science, policy, law and governance by getting selected for Oxford University's Masters of Science in Biodiversity, Conservation and Management on an INLAKS scholarship.

Her sweet voice is a powerful one that speaks in favour of threatened species and ecosystems. Working with the Bombay Natural History Society (BNHS) on policy and advocacy, her contributions have involved providing valuable inputs on amendments to the *Wild Life Protection Act*, 1972, *Wetland Rules* (2017), *Compensatory Afforestation Fund Act* (2016), and T. S. R. Subramanian High Level Committee to Review Environmental Laws (2015). She also represented BNHS while drafting the National Biodiversity Targets for the Government of India.

Amongst the many environmental projects and campaigns that she has bolstered, is the Amur Falcon Campaign in Nagaland – the biggest conservation success story of recent times. In this regard, she works on the ground in Nagaland and Manipur, creating awareness and education among local communities, as well as at the policy level through advocacy and environmental education programmes.

Using her knowledge, oratory skills and bold penmanship, Neha has trained hundreds of people, ranging from media, conservationists, citizens, forest



COURTESY: RAMESH PRATAP SINGH

ROKOHEBI KHOUTSU

LEFT: WILDLIFE SERVICE AWARD *After serving in the Indian Forestry Services for more than three decades, R. P. Singh has worked through every tangent of wildlife conservation required to enable the revival of some of India's most-visited tiger destinations.*
RIGHT: WILDLIFE SERVICE AWARD *Shashank Dalvi's interest in birds took him to the forests of Arunachal Pradesh, where he sharpened his skills as a professional bird guide and participated in bird and herpetofaunal surveys, and has evolved into a stellar naturalist and conservationist.*

guards to *Gond* tribals, in the basics of biodiversity, policy and advocacy. Her articles on the environment are regularly featured in publications like *the Economic and Political Weekly*, *The Hindu*, and *DailyO*, and she is also a Consulting Editor (Environment) for *The Wire* and a reviewer for *Current Science*.

Neha Sinha is a force to reckon with and, in her words, wants to put her 'gentle fury and absolute persistence' to good use. We have complete faith that her indomitable spirit will see her persevere through the dark stormy night of India's environmental crisis. She is a beacon of hope for all of us.

And for this, we honour her.

RAMESH PRATAP SINGH, IFS (RETIRED)

Field Director, devoted wildlife manager and staunch protector

Keeping our precious Protected Areas (PAs) inviolate is an undertaking that requires the highest level of commitment and dedication. After serving in the Indian Forestry Services for more than three decades, R. P. Singh has worked through every tangent of wildlife conservation required to enable the revival of some of India's most visited tiger destinations.

Singh began his administrative career as a Sub-Divisional Officer at Maharajpur, where the buffer zone of Kanha Tiger Reserve came under his jurisdiction. From there, he went from strength to strength, donning many a challenging hat, including that of Field Director of Satpura National Park, Field Director of Kanha Tiger Reserve, and Deputy Director of Bandhavgarh National Park. After a lifetime of managing wild habitats, he retired from the service as the Additional Principal Chief Conservator of Forest (Wildlife) and Head of the State Tiger Strike Force, Madhya Pradesh, in 2017.

His profound understanding of wildlife conservation, forest management, administration and law and his sensitivity to local communities, led to landmark developments across various Protected Areas. From voluntary relocations to wildlife crime control, Singh displayed exemplary management capability. He was involved in the first, successful translocation of the highly endangered barasingha from Kanha to Bori Sanctuary in Satpura Tiger Reserve, and methodically tackled every micro intervention such as ensuring healthy hard ground *sal* forests and swamp generation, which are the species' niche requirements.

Through his tenure as CCF and Field Director of Satpura National Park between 2011 and 2015, he successfully orchestrated the voluntary relocation of a staggering 37 villages from within the core of the tiger reserve. This helped alleviate biotic pressure on the park to a great extent, the strongest testimony to this being the reappearance of rare species in the area, such as the smooth coated otter, Indian grey wolf and honey badger.

As the head of M. P. Forest Department's State Tiger Strike Force, he oversaw the arrest of more than 200 wildlife criminals by implementing intense measures to combat poaching and trade. His valiant efforts have helped clamp down several major wildlife crime syndicates and their illegal operations in Madhya Pradesh.

R. P. Singh, in the pursuit of the preservation and protection of his beloved wilds, has left an indelible mark in India's history of forest management and conservation, inspiring a whole generation of young officers.

And for this, we honour him.

SHASHANK DALVI

Passionate ornithologist, adventure lover and unswerving protector

The curiosity that spurred Shashank Dalvi to wander the forests of the Sanjay Gandhi National Park alone as a boy, also won him the guidance of a battalion of Mumbai's eminent naturalists. By tailing these early mentors and absorbing every odd tidbit of information on the natural world, Shashank soon evolved into a stellar naturalist himself.

His interest in birds took him to the forests of Arunachal Pradesh, where he sharpened his skills as a professional bird guide and participated in bird and herpetofaunal surveys including the Eaglenest Biodiversity Project (which involved work on newly-discovered and re-discovered species of birds and reptiles).

After a B.Sc. in Zoology from Bhavan's College, Mumbai, Dalvi then cemented his reputation as a naturalist and scientist to watch out for by enrolling in WCS India and NCBS' celebrated M.Sc. in Wildlife

Biology and Conservation programme, and producing the first study to combine biogeography and genetics on bird fauna of Northeast India as part of his thesis on 'Role of Brahmaputra and hill ranges as a biogeographic barrier for avian fauna of Northeast India'.

In 2012, he was a member of the team that discovered the shocking Amur Falcon massacre in Doyang, Nagaland, which catalysed an international conservation movement the likes of which India has rarely seen. The team's findings were published in the journal *Science* and in 2013, Dalvi served as a core member of the Amur Falcon Conservation Project that successfully stopped the hunting of these exquisite migrating falcons by triggering high-level government support, patrolling and enforcement, community engagement and a comprehensive conservation education programme.

In 2015, Shashank completed the first Indian 'Big Year' for birds, which took him across remote corners of 20 states of India, and in 2016 he was part of the team to describe the Himalayan Forest Thrush, a new bird species to science, and only the fourth bird to be described from India since its independence. A self-professed 'bird nerd', his long-term goal is to pioneer a nation-wide conservation programme for birds outside Protected Areas.

His vast knowledge, commitment to science, and love for grueling expeditions has catapulted Dalvi into a league of his own.

And for this, we honour him.

GREEN TEACHER AWARD

We were in search of an individual with missionary zeal and a proven environmental track record, who set an example for other educators to follow.

K. S. SMITHA

Spirited educator, environmentalist and inspirational activist

Despite having grown up in the bustling city of Kolkata, Smitha's childhood memories are tinged with green. Smitha's father, a flora enthusiast, swore by green spaces and their home was a miniature sanctuary for an assortment of urban wildlife. Her father though, was not just gifted with a green thumb, but also the spirit of an activist, a legacy he passed on to his daughter. It was this atmosphere during her formative years that bestowed young Smitha with a sense of wonder that has lasted her all life long.

Smitha's passion for the wild coalesced with her love for children in 1997, the year she chose teaching as her profession. Ever since, Smitha has been an affable pied-piper, leading her students to the tunes of conservation. Having built a green army, she spares no opportunity in taking her regiments of future green activists out of the classroom to explore and marvel at the beauty of nature. In order to fulfill her fundamental agenda of connecting children with nature, she has created multiple nature clubs for her school.

COURTESY: SMITHA K. S

ABOVE: GREEN TEACHER AWARD *K. S. Smitha has been leading her students to the tunes of conservation and she spares no opportunity to take her students out of the classroom to explore and marvel at the beauty of nature.*

Smitha, along with her students, has even led an agitation against the city municipal corporation when it decided to bulldoze dozens of trees for a road-widening project. She petitioned, rallied and took concrete steps to stop the rampage.

With the inception of Kids for Tigers, Smitha became a school coordinator, proactively promoting the cause of tiger conservation. Known as 'The Tigress' of her school, she has spearheaded a number of nature programmes from 'Tiger Fests' to rallies, plantations and quizzes, ensuring a curriculum steeped in respect for the natural world. A woman of compassion and action, amongst her many initiatives was a campaign that supplied children living in villages around the Sundarbans Tiger Reserve with educational supplies. Through this project, she also succeeded in building a rare bond between city children and rural children. If nothing else, this undertaking is proof of Smitha's devotion, not only towards the environment but towards the children of tomorrow as well.

As myopic and gluttonous leaders squander away our natural resources for their individual agendas, Smitha has taken on the monumental task of raising an environmentally conscious generation. Always leading by example, her passion, even after 20 years of service, shines bright. Neither time, nor tragedy has fazed this determined green teacher. While the world talks about leaving a better planet for our kids, Smitha has been quietly nurturing better kids for our planet.

And for this, we honour her.

YOUNG NATURALIST AWARDS

We looked for young naturalists or conservationists, for whom the study and defense of nature is the purpose of life, whose actions speak louder than words and who inspire hope for the future.

JYOTI SHARMA

Nature lover, guide and future leader

Just 13 years old, Jyoti Sharma is breaking barriers and setting new horizons for young girls and boys everywhere. This spunky teenager is an eighth grade student from JSM Public School, Sawai Madhopur. But don't

be fooled by her 1.2 m. frame – her deep understanding and knowledge of Ranthambore's flora and fauna can give your average naturalist a run for his or her money.

A Kids for Tigers student, Jyoti has been an active participant of nature trails conducted by the programme coordinator Goverdhan Meena. Charmed by what the natural world has on offer in her glorious part of the world, she rapidly learnt all about the plants and animals regularly spotted along these trails. So fierce was her dedication, that in no time Jyoti took charge, leading students from her school into the fascinating world of nature. From assisting Goverdhan Meena to coordinating nature trails, Jyoti has become a local favourite. With her principal's support, she now conducts trails for other schools from the locality, some of which see attendance by teachers as well. With this, Jyoti has casually accomplished the feat of uniting children and adults over and for nature, a task that most conservationists struggle with for years!

A budding playwright, our youngest naturalist of the year also writes plays on conservation issues. The storehouse of talent that she is, she has won accolades for her oratory and writing skills. We await the day when Jyoti Sharma will stand at the frontline of conservation in India, but even now, we stand in awe of the charisma, knowledge and grit of this young gun.

And for this, we honour her.

VAISHALI RAWAT

Writer, conservation advocate changemaker

When she was 16, Vaishali Rawat saw two roads diverge in the yellow woods. Five years later, she stands inspired and proud, having traversed the road less taken.

Currently handling media, outreach and science communications for the Wildlife Conservation Society-India, Vaishali is taking conservation and wildlife issues to the masses through written and photo stories. Armed with a critical mind and a sharp pen, she has had articles featured in *Sanctuary Asia* and other publications like *Nature inFocus.*

Though her interest may lie in igniting minds through her words, her prowess extends well beyond. Through her time in college, Vaishali actively volunteered across different disciplines of conservation, gaining invaluable exposure and experience: she learned ecological fieldwork on carnivore occurance in the Kanha-Pench Landscape with the WCS; understood the basics of animal-handling at the Madras Crocodile Bank Trust (MCBT); and battled the soaring temperatures of the Thar Desert while participating in the annual survey of the Great Indian Bustard. When in the field, she engages with various stakeholders, scientists, forest guards and locals, gathering a wide array of perspectives, which have allowed her to form her own, unbiased views. She has been equally invested in the non-glamorous aspect of conservation advocacy, a lot of which includes tedious desk and paperwork. Through her journey, Vaishali has had her passion molded by accomplished conservation journalist, Prerna Singh Bindra. Under Prerna's mentorship, she has drafted stories on wildlife news and policies, served as the assistant editor of the journal *TigerLink* for three years, and delved into the nuances of natural resource management in India.

Early on, she learned that while there was increasing research on wildlife and conservation in India, very few efforts were being made to communicate its significance to the public. She pursued this work throughout her time at the UNESCO Centre of the Wildlife Institute of India, as well as through the education and awareness programmes at MCBT. As Vaishali's appreciation for India's staggering biodiversity grows with every new adventure, so does her discontentment with the underrepresentation of environmental issues in the mainstream media. Shoulders squared, she is striving to popularise conservation and create a groundswell of public support for the natural landscapes on which we all depend. A young woman of worth, we're certain that whenever she finds a fork in the road, she will choose the one less travelled.

And for this, we honour her.

GOVARDHAN MEENA

COURTESY: VAISHALI RAWAT

LEFT: YOUNG NATURALIST AWARD *Just thirteen years old, Jyoti Sharma conducts nature trails for students from the locality and is uniting children and adults for nature,*

RIGHT: YOUNG NATURALIST AWARD *As Vaishali Rawat's appreciation for India's staggering biodiversity grows with every new adventure, she is striving to popularise conservation and create a groundswell of public support for the natural landscapes on which we all depend.*

NIKIT SURVE

Leopard researcher, communicator and trend-setter

Nikit Surve is not your average city slicker. Drawn to the wild side from early on, in school he was inspired by an Environment Science teacher who told his class "Even if one of you goes out and does something for the environment I would be satisfied with my job".

While studying Zoology and Botany from St. Xaviers College, Mumbai, Nikit decided to put his theoretical knowledge to use and volunteer on various research projects. Thus, he found himself in the field, sometimes studying mega herbivore densities, including that of the gaur and the elephant, and at other times collecting tiger and leopard scat for DNA studies. It was during one such project, that Nikit encountered leopard biologist Dr. Vidya Athreya. Her work on the interaction between big cats and humans struck a chord with this young naturalist and in a flash of clarity he understood what he wanted to focus his energies on.

Emboldened by this recognition of his calling, Nikit went on to conduct the first-ever official, scientific census of leopards in the sprawling urban wilderness known as the Sanjay Gandhi National Park, as a part of his Master's dissertation for the Wildlife Institute of India. Using camera-traps to collect data, he calculated leopard-prey densities and also studied the big cat's feeding habits. Nikit then conducted similar studies in Tungareshwar Wildlife Sanctuary in Vasai and in Shimla, Himachal Pradesh along with his team members.

Apart from being an accomplished researcher, Nikit is also a fantastic communicator. "Other than conservation of course, my interests are walking, talking and reading," he laughs. He ingeniously marries these interests in the impactful awareness campaigns based on his research findings that he conducts in schools, colleges and even in the remote sugarcane fields of Maharashtra, where communities live cheek-by-jowl with big cats.

At 25, Nikit is a Research Associate with the Wildlife Conservation Society - India, and has already fulfilled his school teacher's dream, working with dedication and passion on a complex and burning conservation issue – that of sharing space with our wild cat neighbours. But even as he continues to observe, study and analyse human-leopard interactions, his dream remains humble: "All I want is for my friends and young people to act responsible and contribute to healing our environment".

And for this, we honour him.

WIND UNDER THE WINGS AWARD

We looked for an organisation that had enabled an employee, or had supported someone to defend nature by making resources available and by providing the intellectual space for them to follow their own green mission.

TONGAM RINA AND THE ARUNACHAL TIMES

Fearless writer, fighter and exemplar journalist

The Associate Editor of *The Arunachal Times*, Tongam Rina was shot outside her office in 2012. She had also had her office ransacked and received multiple death threats (before the ill-aimed bullet). When intimidation did not work, Tongam was shot in the hope that the bullets would silence her. Little did her attackers know, that the might of her pen would outweigh the barbarity of their sword.

Known for her incisive writing, Tongam has reported on issues concerning the environment, illegal activities in the name of development. Her articles cover the hydro-dollar mission and power generation surge set to ravage her state. She courageously called out the then Chief Minister for squandering the state's precious natural resources, by giving hydro-power leases en-masse to private corporate lobbies and public sector undertakings.

Through her column 'Ring-side View', she has shed light on the environmental unviability of the hydroprojects in Dibang Valley, Tawang and Siang basin. Tongam also became a voice of dissent through her extensive and honest reportage of the anti-dam protests that were held in 2016 in Tawang, where two protestors were killed and scores injured.

COURTESY: NIKIT SURVE

COURTESY: TONGAM RINA

LEFT: YOUNG NATURALIST AWARD *Nikit Surve conducted the first-ever official, scientific census of leopards in the Sanjay Gandhi National Park, as a part of his Master's dissertation for the Wildlife Institute of India.*
RIGHT: WIND UNDER THE WINGS AWARD *Tongam Rina was shot outside her office in 2012 in a bid to silence her. Known for her incisive writing, Tongam has reported on issues concerning the environment, illegal activities in the name of development and has become the voice of dissent.*

SPECIAL SANCTUARY TIGER AWARDS 2017

Unrelenting forest officers, persistent community members, brave foot soldiers

GOVARDHAN MEENA

RAJVEER SINGH RAJAWAT

Rajveer Singh is an unsung hero who has spent 26 years in service of protecting Rajasthan's Ranthambore National Park. He has played a pivotal role in helping the Forest Department arrest some of the most notorious poachers operating in and around the park. What is more, he has also aided the Ranthambhore wildlife staff in rescuing straying wild animals in dangerous situations. His critical help ended up rescuing 18 tigers, 21 leopards, 16 bears, 14 hyaenas, two pangolins and hundreds of other animals in different districts of Rajasthan. Even more heartening, he has been able to help improve the relationship of local communities with the Forest Department and is an example for every forest guard in India to follow.

And for this, we honour him.

COURTESY: TIGER WATCH

HANUMAN SINGH GURJAR

From monitoring straying tigers to keeping a vigilant eye on illegal activities, the breadth of his fieldwork is matched by his administration skills. Serving as the core commander of the Village Wildlife Volunteers, he has played a key role in establishing the programme, having trained as many as 50 volunteers to assist in the task of protecting Ranthambhore's invaluable wildlife. A strong bridge between the local community and forest officials, he has helped to sensitise close to 90 villages about the benefits of forest ecosystems under a programme organised by Tiger Watch. He exemplifies the virtues that we wish to see in all wilderness protectors. We salute his unwavering spirit.

And for this, we honour him.

COURTESY: PANDURANGPAKHALE

PANDURANG PAKHALE

An iron man of the Maharashtra Forest Department, he is presently posted at the Pench Tiger Reserve as a Range Forest Officer of East Pench Range. He is responsible for the arrest of more than a dozen tiger poachers. He has continued investigations despite strong protests and police complaints – the result of political clout and support of fish mafia for the poachers. His efforts paid off when the Honourable Bombay High Court, Nagpur bench rejected the bail plea of the poachers. For Pakhale, such face offs are not unusual. In January 2017, he took on pangolin traders and poachers whom he took to court and stood up to political leaders who demanded his arrest and transfer. He also busted monitor lizard poachers and arrested eight of them in June 2017.

In his short service of three years in the Forest Department, he has filed 14 Preliminary Offence Reports and booked 57 accused of wildlife crimes. His goal is simple and in his words, "I am simply protecting the forest and wildlife for the next generation including my 10-year-old daughter Dnyaneshwari."

And for this, we honour him.

Tongam has been an equally faithful ally to the Pakke Tiger Reserve in Arunachal. She authored a series of articles, reporting on illegal logging in and outside Pakke, which shook the bureaucracy out of their slumber. Empathising with the daily-wage front-line anti-poaching staff of the park, Tongam published front-page articles detailing their struggle. In fact, she fought alongside the staff to get their jobs regularised as per the directives given by the National Tiger Conservation Authority.

The tragedy of our times is that we must take sides. Tongam chose hers. A bullet, surgeries and an ongoing long recovery, this courageous journalist remains unstoppable. While we can only salute her spirit, here is what fellow conservationist and sister-in-arms, Nandini Velho had to say about her, "A colleague from the Pakke Tiger Reserve Forest Department called her '*khatarnak*'. Hers is exactly the kind of service we ought to honour at a time when voices are muzzled and people kneel when asked to bow." Tongam Rina is the lion-hearted woman from Arunachal Pradesh who refuses to give in.

And for this, we honour her.

VISHNUPRIYA SANKARARAMAN

Meet Shashank Dalvi

Naturalist, Conservationist, Scientist

This Sanctuary Wildlife Service Award 2017 winner's career path was set early in childhood. Between walks through Mumbai's Sanjay Gandhi National Park and explorations through virtually every biogeographic zone on the Indian subcontinent, this remarkable young man has described a new species of bird to science and personally seen and documented as many as 1,190 avian species in India. A long-time associate of author and birding expert, ***Bikram Grewal,*** *he met him to share both purpose and vision with* Sanctuary *readers.*

SHASHANK, YOU ARE ONLY 34 YEARS OLD, BUT YOUR INTEREST IN WILDLIFE AND BIRDS ALREADY SPANS OVER A DECADE. TELL US ABOUT YOUR JOURNEY.

I remember being gifted a book on the mammals of India by my grandfather when I was just four. And read it again and again until I knew it by rote. When I was seven our teacher asked us to write on the animal we liked the most, and while most of my friends wrote on dogs and cats, I chose the Asian elephant. My love for birds was born when my grandmother brought home a caged bird. Curious about its identity, I looked in the book *Common Birds (India - the Land and People) by Dr. Sálim Ali and Laeeq Futehally* and discovered it was a Red-vented Bulbul. Not happy with seeing the bird in a cage, I began to spend virtually every holiday and any spare time I had exploring the Sanjay Gandhi National Park and other birding spots in Mumbai. On one such field trip, I met Dr. Anish Andheria who promised to take me with him every time he came, provided I stopped walking alone inside the national park. Between him and the inimitable Dr. Parvish Pandya, Vice Principal of Bhavan's College, I was fortunate to be gifted the practical knowledge I needed to launch a life enriched by an understanding of natural history, ecology and conservation. through my high school and college years.

WAS THE WILDLIFE CONSERVATION SOCIETY A KEY STEPPING STONE?

It was indeed an important stepping stone. My association with the Society began in 2010 when I joined the Masters programme jointly offered by WCS India and NCBS. I received intensive scientific training, interacted with and learned from peers, wildlife biologists and conservationists across the world. Dr. Ajith Kumar, the Course Director, guided me through those years. And it was here that I met my wife, Vishnupriya. After my Masters, I joined WCS as a Research Associate and worked with them on a National Science Foundation (NSF)-funded

Low elevation species are adapting to elevated temperatures by expanding their ranges to higher elevations. Similar range shifts are taking place away from the equator towards the poles.

project. This was a collaborative large-scale effort to study patterns of biodiversity across coffee, rubber and arecanut agroforests across 30,000 sq. km. of Karnataka's Western Ghats. During my stint there, I was supported by many individuals, particularly Dr. Krithi Karanth and Dr. Ullas Karanth.

A MUMBAI BOY, WHAT IS IT ABOUT THE NORTHEAST THAT HAS YOU IN ITS GRIP?

Northeast India was my dream destination since childhood. When I was given the opportunity to work on a biodiversity project at the Eaglenest Wildlife Sanctuary, I jumped at the chance. I said yes to Dr. Ramana Athreya without even speaking to family or anyone at my college (I was then an undergrad). That trip was the start of my love affair with the Northeast, one of the world's most incredible biodiversity hotspots. When bird activity was low, all I had to do was turn to amphibians, reptiles, butterflies or mammals. It was an incredible period in my life when I worked with different organisations and scientists in the remotest parts of Arunachal Pradesh, Nagaland, Mizoram, Meghalaya and Assam. The sheer diversity continues to amaze me and keeps me wanting to go back for more.

WHAT TRIGGERED 'THE BIG YEAR' FOR YOU?

In my early birding days, I came across *Kingbird Highway* by Ken Kauffman. It was a story of his big year across the U.S. I knew that I would one day do a 'big year' in India too. What struck me most about the book was the similarities between Kuffman's experiences and my own. I too had spent my teenage years hitch-hiking with Rohit Naniwadekar across India's Protected Areas, with barely any money in my pocket. We would stand at the entrance gate of parks and approach tourists to take us in their cars in return for showing them animals and birds (In the 1990s and early 2000s this was still possible!). By 2015, I felt burned out, thanks to five years of intense research work, and that was when I decided to undertake my 'big year' on the same shoe-string budget as my early days. The experience was invaluable. It gave me a snapshot idea of birding and conservation issues at a national level that no amount of reading could. That year I travelled across 20 Indian states and Union Territories, some 80,000 odd kilometres, reconnected with old friends and made new ones. Complete strangers offered to house me, drive me around and help me get to my target birds. They were an intrinsic part of my big year and many will, I know, remain life-long friends and birding partners.

DOYANG, NAGALAND AND THE AMUR FALCON... HOW DID THIS INITIATIVE PLAY OUT?

We had heard rumors of large-scale bird hunting around the Doyang Reservoir in Nagaland some time ago. In September 2012, Bano Haralu, Ramki Sreenivasan, Rokohebi Kuotsu and I (see *Sanctuary Asia*, Vol. XXXIV No. 1, February 2014) decided to investigate. What we saw shocked us – a massacre of thousands of Amur Falcons. Roko and I spent the next couple of days filming the slaughter and interacting with the hunters to understand the extent and nature of the hunt. It remains the most difficult and emotionally harrowing experience of my career.

The resultant film helped launch an online campaign, which went viral and garnered support from across the globe. More importantly, it helped us to interact and collaborate with the state government and the local communities to come up with solutions. The effort was spear-headed by Bano, without whose understanding of the area and its people we might not have been able to achieve any success. To our delight, from the very next migratory season in 2013, Doyang experienced no Amur Falcon hunting. By any measure this was a dramatic conservation success story!

ABOVE *Shashank captured in his true element while on a biodiversity survey in the Western Ghats in July 2014.*

FACING PAGE *All 'geared' up with the quintessential birders' equipment of binoculars and bird call recording device, Shashank Dalvi roams the forests of the Valley School, Bengaluru..*

I believe the key to conservation is keeping the common species common... while continuing to protect endangered species. India's lesser fauna must have species-specific conservation strategies outside Protected Areas.

RAMKI SREENIVASAN'S PHOTO COLLECTION

VISHNUPRIYA SANKARARAMAN

ABOVE *Shashank studies bird specimens in the Bombay Natural History Society museum.*
TOP *Amur Falcon defenders, from left to right - Ramki Sreenivasan, Rokohebi Kuotsu, Shashank and Bano Haralu in Nagaland.*

WHAT ABOUT THE MORE COMMON SPECIES? WHAT IS THEIR FATE?

I believe the key to conservation is keeping the common species common... while continuing to protect endangered species. India's lesser fauna must have species-specific conservation strategies outside Protected Areas. 'Fortress conservation' has its place but is not by far enough to protect small-ranging, locally common, endemic species. Take for example, many *Micrixalus* aka the dancing frogs that have smaller distributions outside Protected Areas. For them habitat alterations, which might be as seemingly insignificant as a stream diversion or a mini-hydel projects could pose a greater threat than poaching. On the other hand wide-ranging species such as the Indian bull frog *Hoplobatrachus tigerinus* may well face local extinction on account of poaching when they gather in large numbers in the breeding season. So each species requires the implementation of very different and specific conservation strategies, especially outside Protected Areas.

AND THE IMPACT OF CLIMATE CHANGE ON BIRDS' ECOLOGY AND BEHAVIOUR?

In 2014, I did a birding trip to Malaysia and one of our target birds was the Yellow-breasted Warbler at Fraser Hills. Much to my disappointment we failed to find this bird but did find Little Spiderhunters all over at mid-elevations (this is a low elevation species) – a clear case of climate change-triggered altitudinal movement. Low elevation species are adapting to elevated temperatures by expanding their ranges to higher elevations. Similar range shifts are taking place away from the equator towards the poles. But what happens to species that already inhabit the poles, or the highest elevations of their region? Quite simply they have no place to go and could be the first ones to go extinct. The changing climate also has strong physiological effects on animals. If temperatures oscillate over their thermal tolerance limits, their metabolism and behaviour will be impacted and eventually so will their survival.

COULD YOU DISTIL YOUR MASTERS THESIS ON THE 'ROLE OF BRAHMAPUTRA AND HILL RANGES AS A BIOGEOGRAPHIC BARRIER FOR AVIAN FAUNA OF NORTHEAST INDIA' FOR THE BENEFIT OF OUR READERS?

Carried out under the supervision of Dr. Uma Ramakrishnan and Dr. Rajah Jayapal, I concluded that each bird species has its own flying ability, distinct from others. For instance, babblers are weak fliers while warblers, flycatchers and chats are strong fliers. This variation influences how far individuals can disperse and how well populations can mix and breed. To test this, I studied bird populations across the Brahmaputra valley. I explored the genetic differences between birds and compared them to the distances between sites. As expected birds on one bank of the river valley had similar genetic structure even if their sites were very far apart. But the genetic structure changed significantly

This is an exciting time for young girls to enter the field of wildlife, whether as a hobby or a career. Indian parents are gradually understanding the need to allow girls the freedom to get outdoors and choose their own career paths.

if the birds were on the opposite side of the valley, even when the geographic distance was very less. Obviously, populations of weak fliers such as babblers are unable to get across the Brahmaputra to interbreed. The results suggest that such weak fliers require focused conservation attention and habitat protection since each of these populations may well be genetically isolated and unique.

DO ACADEMIC ARTICLES SUCH AS THE ONE YOU PUBLISHED IN *SCIENCE* HELP PROTECT SPECIES AND HABITATS?

News through press, blogs, and social media reach a wide audience in society. But academic journals such as *Science* reach a more niche 'scientific' audience. It allows authors to describe in detail, the scientific questions they are trying to solve, patterns found and the mechanisms that cause such patterns to occur in nature. Since these articles are peer-reviewed, they have higher credibility and are more widely accepted than if you were to publish the work in a newspaper. The *Science* article probably alerted many scientists and academicians to the plight of Amur Falcons; probably more so than the campaign did. The results of ecological studies published in academic journals also help conservationists design management actions. Unfortunately, there is very little cohesion between scientists and managers in India and many vitally important articles lie unread by most, leave a few scientists. This is tragic because they should actually be impacting real conservation on the ground.

YOU CHOSE TO DECLARE THE NEW-TO-SCIENCE HIMALAYAN FOREST THRUSH TO DR. SÁLIM ALI?

Dr. Sálim Ali's contribution to ornithology is immense. Not only did he survey the remotest parts of India for avifauna, he also took active measures for their conservation. It is surprising therefore that no Indian bird species had so far been named after the venerable 'Birdman of India' though a few subspecies do carry his name. When we first discovered the Himalayan Forest Thrush, we had no doubt his legacy should be acknowledged by naming the bird *Zoothera salimalii*.

PARIKSHIT KSHISTY

Shashank with his wife Vishnupriya Sankararaman, who used to be his batchmate during his Masters Programme and a colleague while he was working as a Research Associate with WCS.

AND VANNYA… YOUR NEW BIRD APP?

The world is changing rapidly with technology now a predominant force even outdoors. Nevertheless, birding remains a relatively niche activity in society. Vannya (see page 88) seeks to change that by creating an exciting interface that both novice and advance birders can use to learn more about birds. We also aim to create a common platform for different stakeholders of the birding world to interact and collaborate. I personally believe that birders can act as eyes and ears for threats to wildlife habitats and this application could help knit us together to the advantage of nature conservation.

IS BIRDING MALE-DOMINATED? YOUR ADVICE TO A 12-YEAR-OLD GIRL ON HOW SHE CAN MAKE A LIVING IN THE REALM OF WILDLIFE CONSERVATION.

This is an exciting time for young girls to enter the field of wildlife, whether as a hobby or a career. Indian parents are gradually understanding the need to allow girls the freedom to get outdoors and choose their own career paths. The field is not so male-dominated any longer… my Masters programme actually had more girl students than boys! There are also amazing women conservationists around including Dr. Vidya Athreya, Dr. Krithi Karanth, Dr. Aparajita Dutta, and Dr. Divya Mudappa whose work sets them up as great role models for younger women to follow. My advice to youngsters? Read a lot. Learn as much as you can. And, most importantly, spend time outdoors observing our rich natural heritage.

TAPAN JASANI/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

Tourism's Potential for Conservation

By Joanna Van Gruisen

A few years ago, I attended a book launch in the capital where three of India's best-known tiger experts spoke about the tiger and how tourism could and did benefit its conservation. However, when discussion was opened to the floor for comments and questions, it was as though none of them had spoken. Journalists, tiger lovers and the author's friends, almost all seemed united in their antipathy towards wildlife tourism. It was an echo of the events of 2012 when the Supreme Court closed tiger reserves for tourism for a period and much was written in the press about the negative impacts of tourism.

This has always made me wonder. Elsewhere in the world, tourism is viewed as an important conservation tool, but in India, the prevailing attitude seems to be that it is a disaster for wildlife; that it is an industry that creates damage and is exploitative of the natural resources that attract the visitor. The "costs are heavy and the gains limited" is a predominant view. Resorts are accused of blocking tiger corridors, depleting forests and being a serious "threat" to wildlife. Furthermore, it is often written that the hotels' contribution to local communities is meagre and many call for enforcing a conservation fee, even cess, on the hospitality industry around Protected Areas claiming that they are making their "profit on a resource managed by taxpayers' money" (as though this was unique to wildlife tourism!).

The results of a new study cast a more positive light and show that facts actually paint a rather different picture. The research, led by eminent tiger scientist Dr. Raghu Chundawat, was presented in a preliminary report published by TOFTigers and Baavan, entitled *The Value of Wildlife Tourism for Conservation and Communities.* Four tiger reserves of central India – Bandhavgarh, Kanha, Panna and Pench – were examined and the results not only dispel many of the prevailing wildlife tourism myths, but are encouraging in providing a possible way forward to extend conservation beyond the PAs and to provide sustainable livelihoods for remotely-situated rural communities.

COMMUNITY BENEFITS

The figures are surprising: the park entrance fees alone are higher than the state government's contribution toward the maintenance of the four reserves in the study. And, at least theoretically, this is money paid directly for community development and conservation. Since 1997, all tourism related fees in Madhya Pradesh are deposited in a Development Fund created for each Protected Area. Thus, the fees from tourism provide nearly Rs. 20 crores annually that could and should be spent on development for the local community and/or the PA. Recent figures may indicate a better picture but in 2013 very little of this was in fact fed back into the community. Apparently at best a mere 20 per cent of this went for community development or was provided to the eco-development committees (Kanha); elsewhere it varied from zero (Pench, Panna and Satpura) to 12 per cent (Bandhavgarh), according to 'A Note on Tourism in Tiger Reserves of Madhya Pradesh' in www.academia.edu by Dr. Suhas Kumar (PCCF M.P. retired) in 2013. Dr. Kumar does not record where the rest of the substantial amount goes. In this also lies a strong reason why many resorts are not keen on a conservation fee; they prefer to spend it on private eco-development work rather than pay into a government fund from which so little emerges for the community.

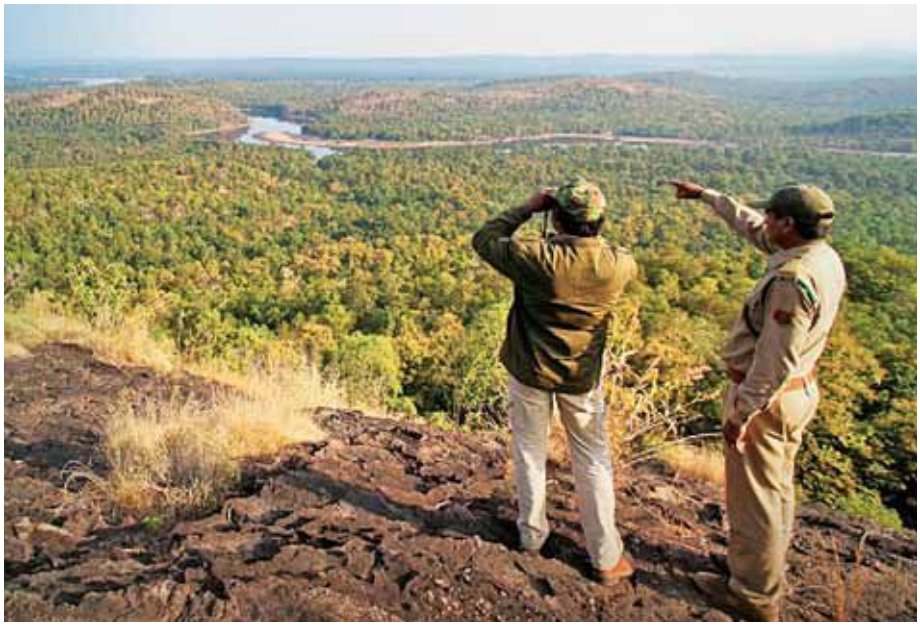
It was heartening to find that most resorts indeed run their own community development programmes and/or contribute to ongoing programmes; these cover "eco-development, environmental education... health, small to medium-sized enterprise development, alternative livelihood options, improvement of basic infrastructure such as electricity supply, drinking water, better road and connectivity and telecommunication and skills development. Most importantly, the sector supports and encourages nature conservation." This latter was most apparent in a comparison of attitudes of people in villages with tourism infrastructure and those without. Some of the non-tourist-affected villages were very hostile to the survey team when they arrived by jeep in their village since they assumed that they must be connected to the Forest Department. A comparison also showed that small business enterprises in villages where tourism was present generated nearly eight times more revenue than in those villages without (Rs. 79 lakh : Rs. 10 lakh).

MORE INDIRECT BENEFITS

What is often overlooked is the indirect financial benefit that the tourism industry generates in these remote areas. They spawn a myriad employment options from handicrafts and artists to plumbers, electricians and accountants. Based on the shared details of a few lodges, it seems that the injection towards this could run to as much as Rs.15 crores around the four parks surveyed.

Tourism is also a labour-intensive industry; it is one of the world's top job creators. This is a crucial aspect as wildlife tourism is usually in fairly remote areas where employment opportunities are sparse. The Madhya Pradesh study found that as much as 80 per cent of the hotel staff are locals and if combined with the fees paid to local vehicle owners, guides and more, as much as Rs.38 crores ($5.8 million) ends up being injected into the local economy. Taking into account the indirect employment generated, plus park fees, possibly 56 per cent of the hotels' turnover actually feeds into the local area (over Rs. 92 crores – around US$ 14 million).

So the numbers indicate that tourism can and does bring substantial benefit to remote rural communities. And this is despite the fact that tourism has grown in such a haphazard unorganised manner, with little or no policy focus or control. In the survey



COURTESY: FORSYTH LODGE

FACING PAGE *Ecotourism could be the means for forests beyond the PA boundaries to be brought into the conservation fold, boosting the viability of small tiger reserves by providing additional protected tiger breeding areas, while also providing stepping stones of safety in corridors from one PA to another.*

ABOVE *Tourism, if well planned to be sustainable, is one of the very few industries that can have an ecologically low footprint, help protect wilderness and offer livelihoods to locals.*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CINTHOL
DEOSTICK
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Aura
CINTHOL
DEOSTICK
3X
Spark
*Based on in-house test results
**Under test conditions

areas, at least, this is happening without too much major long-term damage. Satellite images show negligible change in the forest cover from 2003-04 when the upsurge in hotels around the PAs began. When resort locations are plotted on the satellite images, it can be seen that almost all are clustered around already inhabited spots and hence create minimal extra disturbance to tiger movement.

TOURISM AS A TOOL

Many of the reserves, given their restricted entrance capacity, have reached tourist saturation point. Besides, the reserves that truly attract visitors are few in number. If tourism can be extended, this would spread the benefit – both for conservation and for the remote rural communities. The exciting aspect of this study is that it shows that it can be done and could be self-sustaining through tourism.

Raghu Chundawat's tiger ecology study in Panna identified a scale mis-match for tigers and this is not unique in our PA system. Many tiger reserves are too small to protect a viable population of the big cat over the long term – the extinctions in Sariska and Panna are examples of this. More and larger exclusionary conservation areas are no longer feasible but we can build on what we have, and can extend our areas of conservation, with different paradigms. The success of the PA system can be complemented with parallel models.

Figures from the latest study show that eco-tourism could provide one way to do this. It could be the means for forests beyond the PA boundaries to be brought into the conservation fold, boosting the viability of small tiger reserves by providing additional protected tiger breeding areas, while also providing stepping stones of safety in corridors from one PA to another. By spreading the area of wildlife tourism, not only would more communities benefit, but also the pressure on existing reserves could be reduced. Furthermore, these non-PA areas would offer visitors more diverse wildlife experiences and cater to the different interests and individual preferences of travellers in ways that the present jeep-safari-only model cannot.

When well-managed, tourism, unlike most industries, can create a thriving economy that is not dependent on the one-time consumption of natural resources: one where the local community can become active partners both in tourism and in nature conservation. The next step is to persuade the government of this possibility! For the model to be effective, a sympathetic government policy is required that promotes and encourages sustainable wildlife tourism over a larger landscape.

After three decades of involvement in wildlife conservation, we entered the tourism field as a self-sustaining way to continue such work in the Panna area. This is a rural area where much of the population's livelihood comes from agriculture and/or unskilled labour. In a small way I have seen the changes a few well-managed lodges can bring such areas when run on eco-tourism principles. If this were possible to do in strategic 'stepping stone' locations covering larger, tiger-territory-sized areas, it could also directly contribute to broadening the tiger conservation landscape.

Enhanced sustainable rural livelihoods and wildlife conservation too – what could be better than that?

A sympathetic government policy is required that promotes and encourages sustainable wildlife tourism over a larger landscape. By spreading the area of wildlife tourism, not only would more communities benefit, but also the pressure on existing reserves could be reduced.

BHARGAVA SRIVARI/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

Water Walker

Understanding physics is not the domain of human scientists alone. The ability to live, evolve and thrive in any ecological niche clearly requires the animal to imbibe the laws of physics apart from those of the jungle. Geckos are one group of animals that have got this down pat. On the one hand, Van der Waal's physical forces are at play at the molecular level, allowing them to stick to and move across even the most polished solid surfaces effortlessly using microscopic hair-like projections on their toe-pads. The gecko in the picture of the newly-described species, *Cnemaspis girii,* exhibits quite a different kind of ability – walking on the surface of water by tapping into yet another of the universe's physical properties - surface tension. Simply put, due to the cohesive nature of the water molecules, the molecules at the water's surface bond and form an air-water interface that can, up to a point, resist breaking under weight or force. Animals, such as this tiny day gecko, exploit this property of liquids and are able to navigate across waterbodies without swimming. We understand the theory... the real magic is theirs for they apply it!

Photographer: Sushil Chikane
Location: Satara, Maharashtra
Camera: Canon EOS 5D Mark IV , Tamron 90 mm. f/2.8 Di Macro 1:1 272EE, Shutter speed: 1/200 sec., Aperture: f/9, ISO: 800, Focal length: 90 mm.
Image taken: August 24, 2017, 12:14 p.m.

Help save our tigers, our forests, our water - and ourselves.

Half of the world's wild tigers live in the forests of India. Despite roaming over vast areas of Asia a century ago, today habitat destruction and poaching are pushing our national animal to the brink. Global wildlife poaching represents the largest illegal trade in the world after arms and narcotics.

With climate change threatening human societies across the globe and in India, forests such as Kanha, Corbett, Mudumalai and Pench, the home of the tiger, are invaluable. They sequester carbon and store water, providing invaluable services to human society. In return, we need to protect them.

The Ashok Piramal Group is committed to saving the environment for the benefit of future generations.

Photo: Harsh Piramal.

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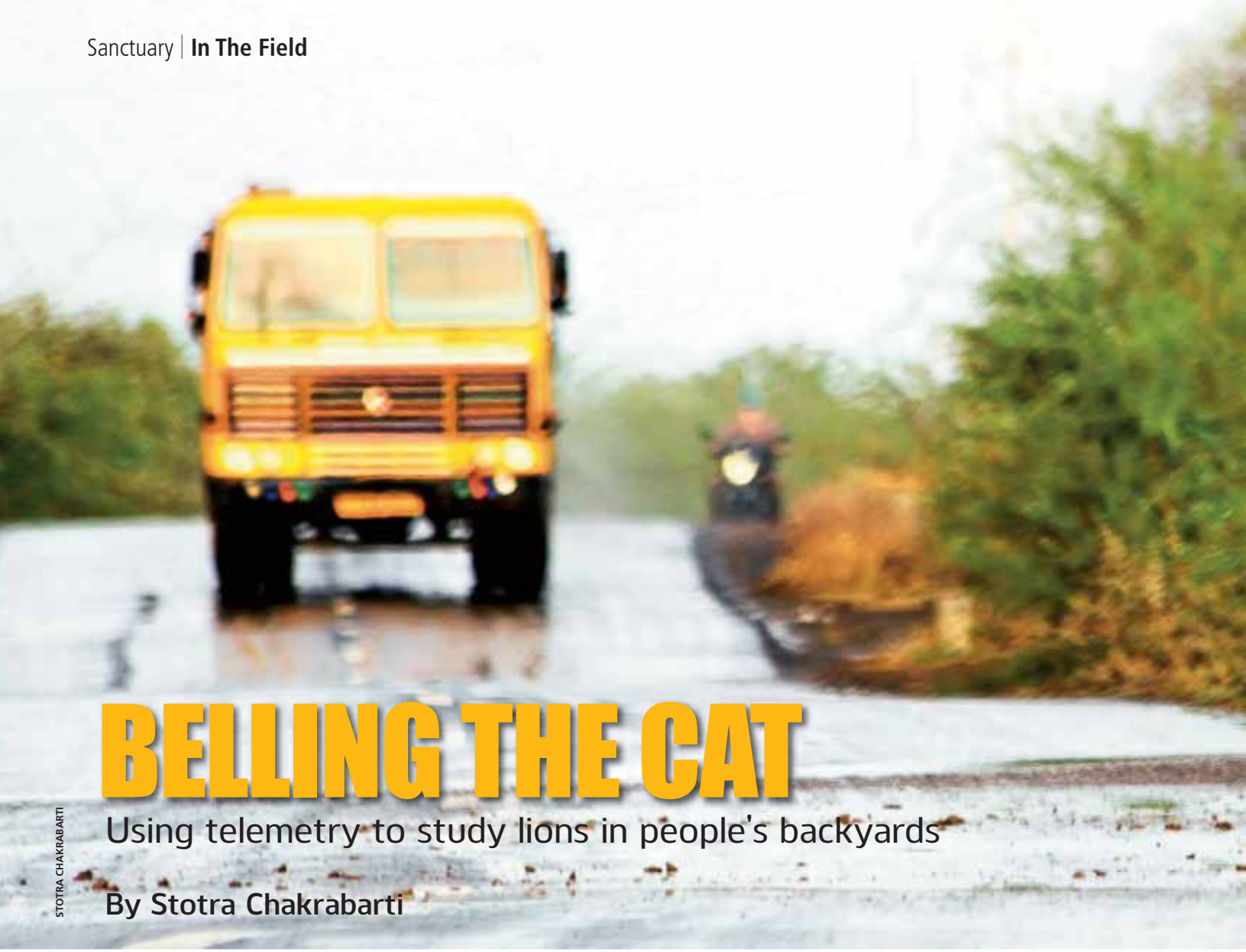


STOTRA CHAKRABARTI

BELLING THE CAT

Using telemetry to study lions in people's backyards

By Stotra Chakrabarti

Krrrrrrr... krrr... krrrrr... krsssshh... About half past 12, the sun merciless upon our backs, temperature just a degree short of a half-century and not a single upright shade of respite, as we stood on a rugged barren hillock in search of a slightly-less noisy but more rhythmic beep from the radio-receiver. However, all we could hear was the lifeless static of the radio! It had been 14 days since we had released this lioness after fitting her with a radio-transmitter, and she had miraculously disappeared from the face of the earth! We had been trying to locate her, day-in and day-out, with an antenna attached to a radio-receiver as our main weapon, but there was not a single blip on the radar. We were tired, confused and at a dead-end. About a fortnight ago, we had captured four adult lionesses living outside the Gir forests in Gujarat, the last-remaining stronghold of the Asiatic lion, and fitted them with GPS radio-collars to study their way of life in a landscape dotted with humans and lion-unfriendly development. The collars provided us with the cats' location through a 'here I am' very high frequency (VHF) beep emitted every second. This signal could be tuned into through a radio-receiver and captured from even two to three kilometres away. The beeps helped us home-in to these regal cats and follow them, as they prolifically (yet perilously) survived in close proximity to humans. With our earlier experience in tracking lions within the Protected Area (PA), we had thought this task would be fairly easy even outside the PA, but, we were mistaken! All the technological nitty-gritties had failed us and exhaustion and fatigue were taking over man and machine.

NOT AN EASY QUEST

I sat down in the shade of our four-wheel drive and looked at my assistants, a team of determined and experienced lion-trackers who have bled-and-sweated alongside my professor (scientist at the Wildlife Institute of India), Dr. Y. V. Jhala (see page 72), in his lion studies that spanned over 20 years. Over the last two weeks we had tried our luck against the June-sun in Gujarat and clambered-up every thorny vantage point on our path to catch the faintest of VHF signals. This was my first stint

with lions outside their normal refuge, the protected forests, and my ideas of their possible hideouts were nothing but inappropriate. I had been taught the ways of searching and observing animals in forests devoid of people, but finding an elusive carnivore among the hustle-and-bustle of people and roads, took a lot more than bush-craft, grit and patience. Presently about one-third of the total lion population live outside the formal boundaries of protected forests. I relied on my assistants who were familiar with the area since the days the first lions moved out of Gir to colonise this densely-human-populated eastern landscape of Saurashtra in southern Gujarat. However, this lioness had them puzzled too. We had planned to start our day-night monitoring sessions, where we literally lived with lions while we followed them 24 hours a day to document behavioural observations round the clock. For that, the lioness needed much prior habituation to our presence and our knowledge of their frequented places. But for this, I first needed to find the lioness.

FACING PAGE *Two lion cubs stare at a truck speeding towards them on a state highway in Amreli district of Gujarat, while their mother disappears into the nearby bushes.*
BELOW *A collared lioness and her male cub offer their morning prayers at a village temple, which would soon be bustling with humans.*

STOTRA CHAKRABARTI

GIR RESEARCH TEAM

ABOVE *The vehicle is used by the author as a vantage point to maximise elevation in an attempt to capture VHF signals.*

BELOW *A collared lioness drags her kill out of the thickets after the team gained her confidence by following and observing her quietly for several weeks.*

Not a single soul was out in the heat while we drove back to our temporary base about 45 km. away. Even the herders were taking a nap lying close to their prized cattle and buffaloes. Back at our camp, perplexed, empty handed and out of options, I dropped the idea of a cooling shower as water from the over-head tank was steaming hot. Instead, I had a brief lunch with my assistants, who tried to lift my spirits with their lion-stories and how they had lost collared individuals for days. The stories had little effect on me; afterall it was my maiden brush with futile attempts of radio-tracking! July would soon be upon us with her fair share of drenching rains, making fieldwork all the more difficult in the slush and profuse vegetation. It was important that we locate the lioness soon, as an individual with a collar in a human-dominated landscape begets more responsibility on the research team. As I sat contemplating on our future course of action, our lead

SIDDHA CHAKRABARTI

A lioness stutters to her feet after radio-collaring, still disoriented under the effect of the dissociative anaesthetic, while other pride members inspect her new necklace.

assistant Bhiku, a man in his mid-40s with enviable composure and skill in the jungle, walked up to me and said, "*Aaj rewa dejo Saheb, kal havar thi naowe-kas thi chalu kariye, mali jahe.*" He wanted me to drop the evening-night search, and start afresh next morning. Given that both muscle and diesel needed a break from the continuous search, I agreed.

TRACKING A LIONESS

Early next morning, at 5:30 a.m., with renewed spirits pumped up by steaming cups of tea, we set out before the last remnants of the pleasant night-breeze were transformed into a blazing wave. We decided to begin our quest again from where we had collared her: Jabal village in Amreli district. We stopped three times on our way, looking for signals. I stood up on our vehicle-roof extending the telemetry antenna, trying to maximise elevational advantage in an otherwise flat agricultural expanse. My assistants kept a wary eye for any pugmarks on the fields before the bullocks began their morning ploughing routine (farmers had begun to sow their crops anticipating early showers). The radio-receiver sprang to life incessantly, only to emit crackling statics, but no beeps! We stopped a few farmers heading back from their night shift, guarding standing crops from nilgai and wild pigs to ask if they had seen a lioness with two cubs. The farmers in the landscape are quite welcoming of lions and keep a regular look out for them as the latters' mere presence helps to keep nilgai and wild pigs at bay. With no affirmative answers, we moved on towards the highway, under which flew the main water-channel of the area. The channel was dry barring a few puddles and my assistants went down to explore for tracks on the sand while I tuned into the radio. Tick, tick and it was gone, back to the gurgling noises again! I turned rapidly towards Ismail, another of my assistants in eagerness that he might have heard it too, and from his expression it was clear that he did. In the ensuing minutes, we tried repeatedly but our attempts were not answered. Could this be it or was it just a figment of our imagination?

Finally, with some tangible hope we climbed an adjacent rocky outcrop and tried once again. Yes! The beeps were faint but very much real. We fathomed that she was over a few kilometres away, towards a series of rugged hillocks infested with scraggly mesquite, locally called as '*bid*'. With an antenna in one hand, a stick in the other and the receiver pendulous on my neck, we briskly followed the signals along a livestock trail. Covering the distance as fast as we could, we suddenly stumbled upon a strong stench of a kill as we neared the hillocks. She had possibly dragged one of the unguarded village livestock into the thickets. As we inched forward, we could hear the beeps even without the antenna being attached to the receiver. Our lady was possibly within 50 m.! Pinpointing in the direction of the signal-emitter, I slowly let-go of the antenna and grabbed the stick tightly in my hands. A lioness out of sight is dangerous but a lioness out of sight with cubs is doubly so! Our next

Long familiarisation with the study-area lions and their groups helped the author and his assistants to observe them up-close and personal.

steps were met with a series of angry growls from just behind the closest bush and we knew she would charge if pressed further. We stood there, adrenaline rushing in our veins, while Bhiku muttered from between his teeth pointing towards a small gap in the otherwise dense thicket. A tuft of black-hair twitched as if pulled by invisible strings and I recognised it to be the tail-tuft of a lioness. The growls stopped and the tuft vanished, followed by the soft crackle of twigs when suddenly a golden head popped out of the bush, ears tensed, lips curled and eyes cutting through us! She was barely 10 m. away and she meant business! With no time to lose we thrashed our sticks and shouted loud, the only tried-and-tested deterrent of a lion charge, and after a few minutes of growls and hisses, which felt like an eternity, she obliged. She stopped, turned and vanished into the thickets as fast as she had appeared. One lesson that I have learnt from my supervisor and assistants was "never show your back to a charging lion, or chances of survival would go down from slim to none!"

Over the next several hours, we slowly gained her confidence as we could see her two cubs peeping behind their mother's body, who lay sprawled on her back just beside a half-eaten cattle carcass. I was happy and satisfied. It was in these moments when one felt dejected and lost, that the true meaning of perseverance and patience could be found. I never had felt more alive than while listening to an angry lioness growling at close quarters. I guess it is for such moments of indescribable exultation that we, all my fellow wildlife researchers and biologists, painstakingly work in harsh conditions

LEARNING FROM LIONS

That was June 2014. For the next three years, we followed her persistently (even changed her collar once in between) and discovered so much about this fierce mother, who defended her cubs from intruding males, walked past villages and people sleeping outside their huts, hunted down nilgai and wild pigs, let go of her independent cubs to solicit a younger male and raise another litter. With a lot of patience, uncountable nervous moments and scares, numerous thorns in our boots and a few in our feet, bruised forearms and tattered caps, we gained the confidence of all our study lions, although sporadic charges and their occasional mood-swings kept us on our toes. Such familiarisation helped us gain acceptance in their families to an extent that we could sip hurriedly made tea while they snored peacefully a few metres away in the day and follow them through the long nights when they roamed the countryside as whitish ghosts in the dimly-lit darkness, in search of prey.

I gathered a lot more than just data from these beautiful cats who taught me the power of patience, compassion and bonding as we witnessed in awe the many secrets of a carnivore sharing space with its biped hetero-specifics. Information from these four lionesses (and their groups) and previously-collared individuals from the landscape helped us slowly join the bits of the puzzle about how a large carnivore co-exists with humans. We could infer that lionesses inhabiting outside the PA used areas of about 110 sq. km., twice as large as their cousins living within PAs. Male lions ranged over areas three times larger than their PA counterparts. This was primarily because of the patchiness of available resources (food and refuge) in the human-dominated landscape, which required them to have large territories to encompass their minimum requirements. Non-cultivated and relatively less disturbed green patches of more than three to four square kilometres were ideal for breeding lionesses to hide and raise their cubs, crucial for sustaining a viable lion population in the landscape. The lions used thorny thickets, as small as one hectare, as day-time refuges to conceal themselves from people and roamed around human-settlements and crop-fields at night in search of nilgai, wild pigs and unguarded livestock. These day-time refuges

After four years of studying lions up-close and personal in people's backyards, I cannot stop but marvel at the adaptability and character of these magnificent predators: tolerant, flexible and so very patient. The story of the Asiatic lions stands as a conservation success because of these traits, and the commendable efforts of the Forest Department and the local people.

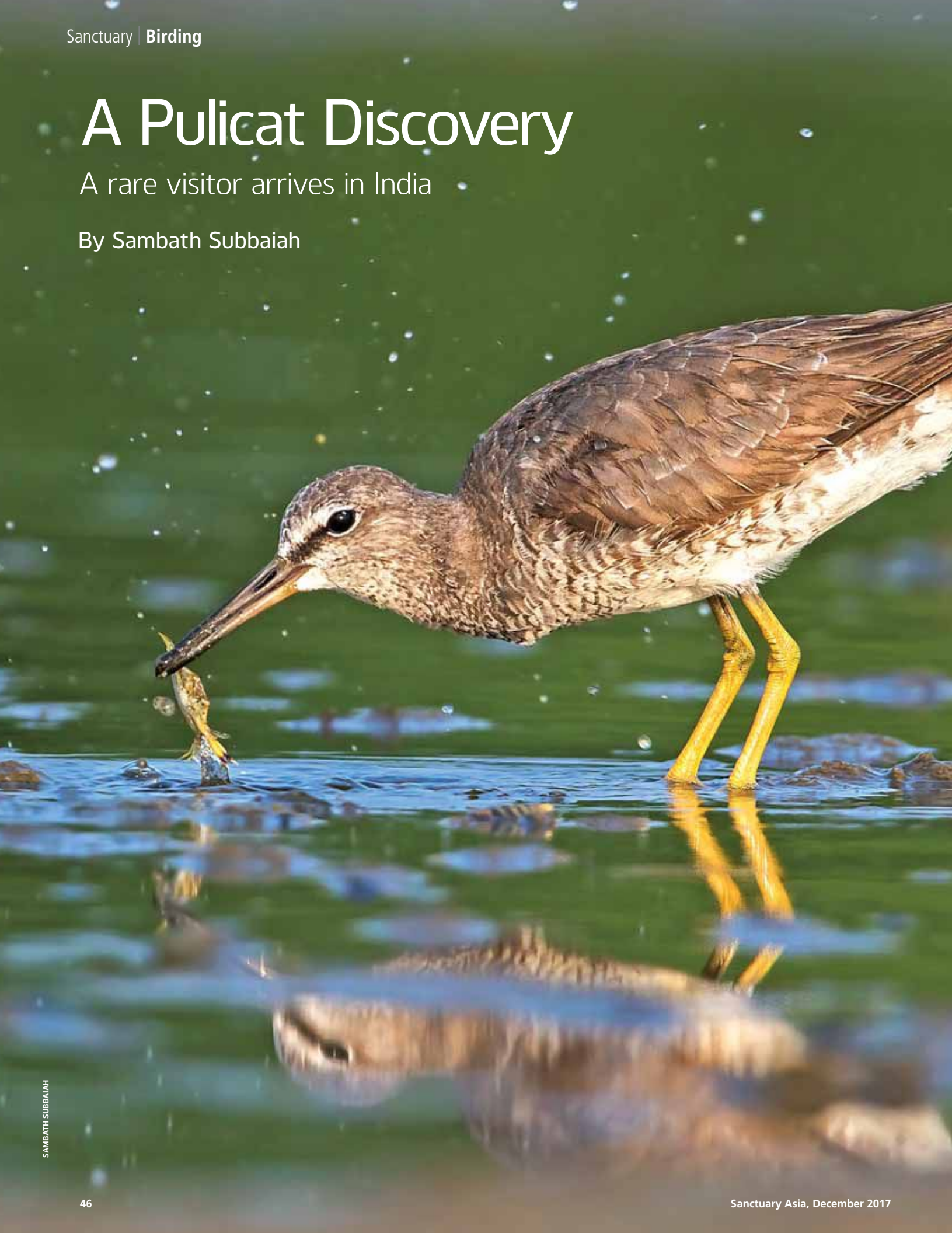
were crucial in maintaining human-lion interface to a bare minimum although both lived in very close quarters of each other, and thus, were powerful ingredients of an exemplary coexistence. Though we frequently found lions close to humans, only infinitesimal of those (<0.05 per cent) resulted in aggressive encounters between the two. The lions sustained themselves mostly by scavenging on dead livestock and actively predating on unproductive un-owned live ones and nilgai. Consequently, depredation on productive livestock was low and very promptly compensated (monetarily) by the Forest Department. The losses thus, have not yet made a dent on the human-coffers, and lions still thrive outside the PA within socially acceptable limits.

After four years of studying lions up-close and personal in people's backyards, I cannot stop but marvel at the adaptability and character of these magnificent predators: tolerant, flexible and so very patient. The story of the Asiatic lions stands as a conservation success because of these traits, and the commendable efforts of the Forest Department and the local people. The people of Gujarat have shown incredible respect and reverence for these tawny cats, unrivalled in any corner of the world for any other carnivore. Owing to this, the lions have bounced back from the abyss to a handsome 500 plus individuals while extending their range from just within Gir to an additional 20,000 sq. km. of the agro-pastoral Saurashtra landscape. Lions presently occupy areas, which were out of bounds for them for the last two centuries! However, every time I see a pride of lions cross a highway or move into human settlements, kill livestock and or get into uncomfortable encounters with humans or a *Prosopis* thicket being mowed down to give way to a high-fenced resort; I feel a shudder in my spine thinking about the daunting task that lies ahead of us to reconcile booming development of a progressive state with conservation of the last lions of Asia.

A Pulicat Discovery

A rare visitor arrives in India

By Sambath Subbaiah



SAMBATH SUBBAIAH

The Grey-tailed Tattler is a medium-sized wader, with long wings and tail. The bill is rather long and straight. In non-breeding plumage it is grey above and almost white below. There is a white eyebrow. The eyes are dark brown, bill black, short legs and feet bright yellow. In breeding plumage, the entire underparts are conspicuously barred dark brown. Immature birds are similar to adults in non-breeding plumage. This species is also known as the Grey or Grey-rumped Sandpiper or the Ashen Tringine Sandpiper.

The Grey-tailed Tattler T*ringa brevipes*, which breeds in Siberia and mostly winters in Australia was recorded for the first time in the backwaters of Pulicat in Tiruvallur district situated on the border between the states Tamil Nadu and Andhra Pradesh, on September 30, 2017 by Sundravel Palanivelu and Sivakumar Shanmugasundaram. The identification was confirmed after consultation with birding experts. Excited by this information, our team of shore bird lovers, Aravind Venkataraman, Ganesh Jayaraman, Sambath Subbaiah and Ramakrishna Rajamani, all regular Pulicat birders, decided to locate the bird.

We visited the shore often on weekdays and weekends to get a glimpse of the rare avian. Given that the bird could be on any of the several small islands spread across 482 sq. km., it was not an easy venture. It hardly helped that the bird was not sighted in the area where it had been recorded. Based on its preferred habitat and feeding preferences, we knew we had to search areas where small crabs, worms, molluscs and snails were plentiful. But accessibility depended on the tidal conditions and that made the search all the more challenging.

Then, one mid-October afternoon, much to our delight, we found our bird feeding on the shore. We remained on the boat and maintained a safe distance from the bird as we photographed it. To cast our gaze on it after so many days of search was indescribable. Frankly we had almost given up, assuming it might be a winter vagrant and would have headed for its wintering grounds in Australia.

HOW TO GET THERE:

By Road: Buses ply between the Chennai Mofussil Bus Terminal to Pazhaverkadu/Pulicat Lake (90 minutes).

By Air: Nearest airport is at Chennai which is 66 km. away from Pulicat. One can hire a private cab to Pulicat or travel by bus from the Chennai Mofussil Bus Terminus.

By Rail: Chennai Central Station is the nearest train station in Tamil Nadu. From here, one can hire a private cab or travel by bus to Pulicat Lake.

Best Season: December to April. This is also the best time to spot the Greater and Lesser Flamingos, which visit in large numbers. September and October are ideal to spot vagrant birds.

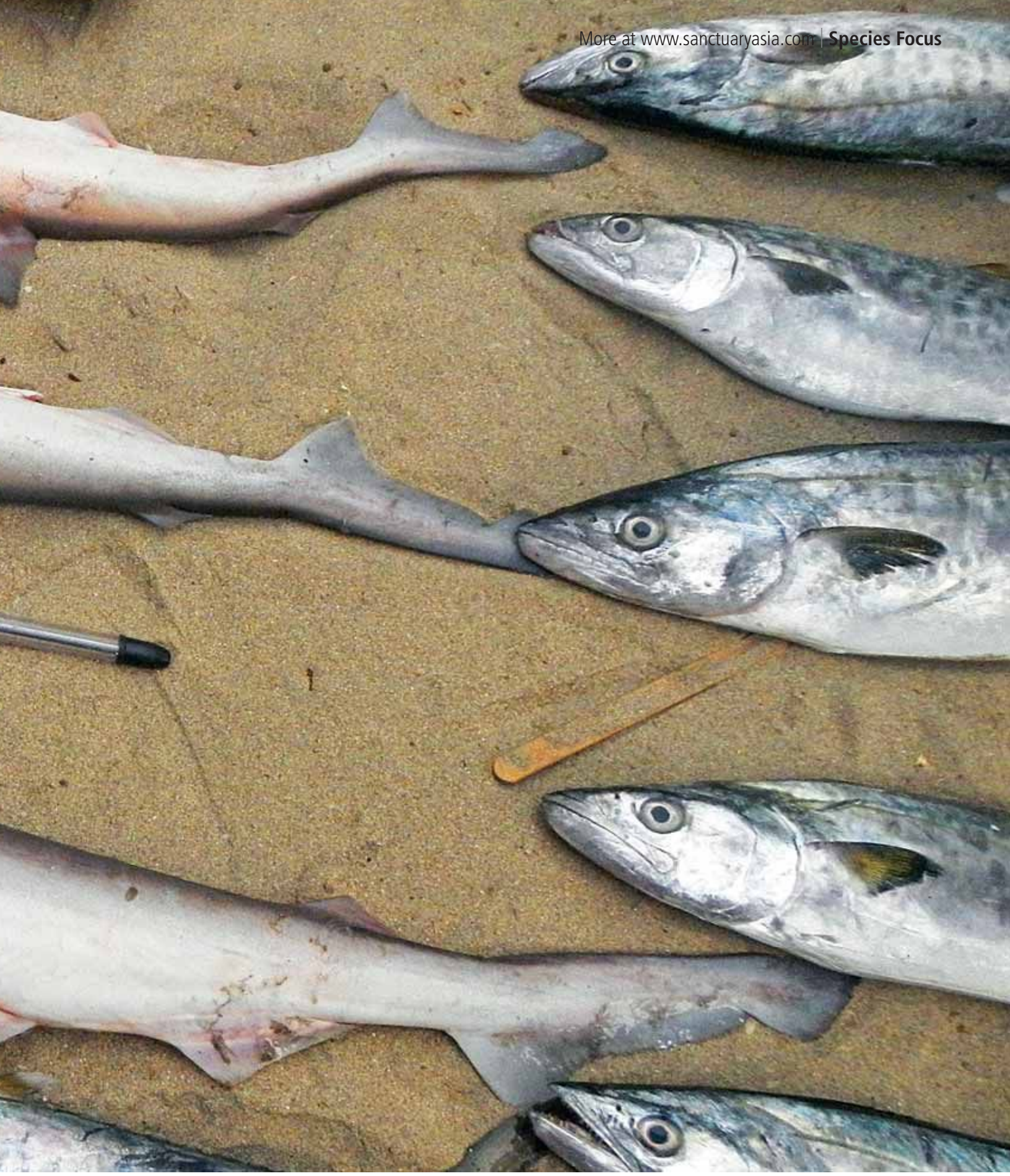
Insider Tips: Please hire a local boat that follows all safety measures to visit small islands in the Pulicat Lake. Don't forget to carry a pair of binoculars and other camera equipment.

Pulicat never fails to amaze birders and photographers and this season has turned out to be even more special. As with several other wetlands and coastal areas in India, the Pulicat backwaters are under threat from industry, overfishing and rampant human encroachments. We hope sightings such as those of the Grey-tailed Tattler will draw the attention of planners to the fragility of our natural heritage and the potential for birds and aquatic lifeforms to become attractants that can actually offer dignified livelihoods to local communities whose help in protecting the avian and aquatic life around them could turn out to be the silver bullet that nature conservation so badly needs.

Sambath Subbaiah, a Product Manager with Ford India, is a passionate nature photographer from Chennai who loves to travel to photograph avian beauties in their natural habitat around the world.

FISHY ENCOUNTERS

Text and photographs by Divya Karnad



This photograph of spadenose sharks that were caught along with small seer fish was taken at a landing site, just before an auction of the catch. While they may not be the biggest money makers, the orderly way that the sharks are laid out indicates that they do fetch a price in the market.

In the shallows of the Arabian Sea, predators lurk. As they walk backwards, slowly pulling on their *rampan* (shore seine), the two-legged predators fishing for their meal pull in a school of small sharks. These are spadenose sharks *Scoliodon laticaudus*, colloquially called dogfish. A wide-ranging species, spadenose sharks are found in the shallow waters and seas of the Indian Ocean and eastern Pacific Ocean. As I watch the fisherwomen loading their baskets with the day's catch, I stop at the heap of little sharks to begin counting, measuring and identifying. Laughing at my daily effort to delay their departure, the fisherwomen remark, "They are all sharks. What more do you need to know?" What more, indeed!

DISSECT NOT

This is not my first encounter with the spadenose shark. A memory from over a decade ago fights its way into my consciousness. I have a vision of the airy dissection laboratory of my undergraduate zoology class. A dead shark was staring up at me from the dissection table as I felt its leathery skin. Several of us wondered whether it was a baby shark. No, we were told, it was an adult spadenose shark, a relative of the milk shark, broadly speaking, and often consumed for its supposed medicinal properties. On that day, we were learning vertebrate anatomy and were each expected to identify and isolate shark organs, making sure not to disrupt the connections of important blood vessels or in any way mess up the presentation of the organs. Every time someone created a mess, they were asked to take a new 'specimen' and repeat the dissection. Two dozen students meant that at least double that number of sharks was brought for dissection. Little did I know that this fish, which we callously cut open and eventually discarded, was a threatened species.

Over the years, the hours I spent hunched over the spadenose shark in the biology laboratory remained with me because I could recognise that fish anywhere. A few years later, as I walked through a fish market in Chennai, and the vendor insisted that I should buy some *"pal sorrah"* (milk shark), I didn't need a second look to know that it was the spadenose shark being passed off as milk shark. My revulsion for the shark being dangled near my nose, stemmed from memories of that difficult dissection, not because IUCN has declared it a Near Threatened species. The dissection had moulded me into an eco-friendly seafood consumer, without passing on any information about the species beyond its anatomy.

It was only in 2014, as I embarked on a study of sharks in Malvan, Maharashtra, that I realised the implications of the demand created by dozens of zoology students across multiple institutions on a species that was already being hit hard by indiscriminate fishing. The spadenose shark is known to be a commercially-valuable species in India, with its flesh being consumed directly or being processed into fishmeal. Additionally, an export market has unfortunately developed for its fins. The demand for dissections could be the straw that breaks this shark's back. Like me, several of these students were put off by the smelly, messy dissections and the species that we had to deal with in those sessions. Unlike me, many of these students continue to lead lives with little to no knowledge about how these species live and what they do. Beyond anatomy, with respect to the dissection, what more do we need to know?

The author's study of sharks in Malvan, Maharashtra, revealed the true, dire status of the spadenose shark species in the seas. The pressure of human demand on this species for use in laboratories and the pot is leading to its decimation.

It was only in 2014, as I embarked on a study of sharks in Malvan, Maharashtra, that I realised the implications of the demand created by dozens of zoology students across multiple institutions on a species that was already being hit hard by indiscriminate fishing. The spadenose shark is known to be a commercially-valuable species in India, with its flesh being consumed directly or being processed into fishmeal.

PARADIGM SHIFT

What is it that creates and changes our relationships with species? Personal connections are when we vivisect and discard the bodies, others when we clean and eat them. Then there is the knowledge that goes beyond the physical limits of a body, knowledge of a life and a history. How do we reconcile these different aspects of knowledge and life?

During the marine conservation and education programmes that I conduct in schools and colleges, I make a point of mentioning the amazing evolutionary history of the spadenose shark, which has developed a placenta and is the closest fish to mammals in the way its foetuses develop. These sharks are known to live for at least five years, with females larger than males. Some students soak in this information, others respond saying, "Don't tell me all that, I won't be able to eat that shark again!" It appears that some people need to compartmentalise knowledge, with no overlaps. Some things constitute food, and people know only certain aspects of the lives of those things. Other things constitute what is wildlife, or what is sacred and these people know different aspects about the lives of those things. Gaining a little knowledge about the life of a species might mean shifting that species from one mental compartment to another, redefining the relationship forged with the species. It is difficult for such people to conceive of a species that is both food and threatened wildlife. Any attempt at blurring these socially-constructed boundaries strikes at the very core of a person's belief system.

How then can we encounter threatened species, like the spadenose shark, which force us to rethink our conceptions of wildlife and food? Perhaps, like the fisherfolk, we can begin to retrain ourselves to accept knowledge about different aspects of a species' life, and see the spadenose shark, simultaneously as a food item, commodity, participant in the marine food web and threatened species. This might alter our attitudes somewhat, causing us to not buy the shark by prioritising its threatened nature even as we understand its existence in the market as a commodity. It is this perspective that enables me to study the threatened spadenose shark, without condemning fishermen for making their livelihood by catching the species.

Optionally, we might choose to retain our compartmentalised knowledge, shifting the spadenose shark from the food compartment to the wildlife compartment. As we wrestle with thoughts about species that do not neatly fit the categories we create, we open ourselves to new ways of thinking about species survival. In my view, these subtle shifts in the way we perceive wild species will define the direction in which wildlife conservation moves in the years ahead.

LEFT AND RIGHT *A fisherwoman displays a spadenose shark. Seer fish occupy pride of place in the hierarchy of this fishmarket, having been cleaned and laid on top of the bucket away from the dirt, while spadenose sharks are caked with mud and scattered loosely on the gunny sack in the sand.*

ABHISHEK SATAM/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

FIFTY-FIFTY

A biologist's manifesto for preserving life on Earth

By E. O. Wilson

1

We are playing a global endgame. Humanity's grasp on the planet is not strong; it is growing weaker. Freshwater is growing short; the atmosphere and the seas are increasingly polluted as a result of what has transpired on the land. The climate is changing in ways unfavourable to life, except for microbes, jellyfish, and fungi. For many species, these changes are already fatal.

Because the problems created by humanity are global and progressive, because the prospect of a point of no return is fast approaching, the problems can't be solved piecemeal. There is just so much water left for fracking, so much rainforest cover available for soybeans and oil palms, so much room left in the atmosphere to store excess carbon. The impact on the rest of the biosphere is everywhere negative, the environment becoming unstable and less pleasant, our long-term future less certain.

Only by committing half of the planet's surface to nature can we hope to save the immensity of life-forms that compose it. Unless humanity learns a great deal more about global biodiversity and moves quickly to protect it, we will soon lose most of the species composing life on Earth. The Half-Earth proposal offers a first, emergency solution commensurate with the magnitude of the problem: By setting aside half the planet in reserve, we can save the living part of the environment and achieve the quarter or one-third? Because large plots, whether they already stand or can be created from corridors connecting smaller plots, harbour many more ecosystems and the species composing them at a sustainable level. As reserves grow in size, the diversity of life surviving within them also grows. As reserves are reduced in area, the diversity within them declines to a mathematically predictable degree swiftly — often immediately and, for a large fraction, forever.

half-earth project

half the earth for the rest of life

A biogeographic scan of Earth's principal habitats shows that a full representation of its ecosystems and the vast majority of its species can be saved within half the planet's surface. At one-half and above, life on Earth enters the safe zone. Within that half, more than 80 per cent of the species would be stabilised.

Biodiversity as a whole forms a shield protecting each of the species that together compose it, ourselves included. What will happen if, in addition to the species already extinguished by human activity, say, 10 per cent of those remaining are taken away? Or 50 per cent? Or 90 per cent? As more species vanish or drop to near extinction, the rate of extinction of the survivors accelerates.

There is a second, psychological argument for protecting half of Earth. Half-Earth is a goal – and people understand and appreciate goals. They need a victory, not just news that progress is being made. It is human nature to yearn for finality, something achieved by which their anxieties and fears are put to rest. We stay afraid if the enemy is still at the gate, if bankruptcy is still possible, if more cancer tests may yet prove positive. It is our nature to choose large goals that, while difficult, are potentially game changing and universal in benefit. To strive against odds on behalf of all of life would be humanity at its most noble.

2

Extinction events are not especially rare in geological time. They have occurred in randomly varying magnitude throughout the history of life. Those that are truly apocalyptic, however, have occurred at only about 100-million-year intervals. There have been five such peaks of destruction of which we have record, the latest being Chicxulub, the mega-asteroid that wiped out the dinosaurs. Earth required roughly 10 million years to recover from each mass extinction. The peak of destruction that humanity has initiated is often called the Sixth Extinction.

Many authors have suggested that Earth is already different enough to recognise the end of the Holocene and the beginning of a new geological epoch. The favoured name, coined by the biologist Eugene F. Stoermer in the early 1980s and popularised by the atmospheric chemist Paul Crutzen in 2000, is the Anthropocene, the Epoch of Man.

The logic for distinguishing the Anthropocene is sound. It can be clarified by the following thought experiment. Suppose that in the far-distant future geologists were to dig through Earth's crusted deposits to the strata spanning the past thousand years of our time. They would encounter sharply defined layers of chemically altered soil. They would recognise signatures of rapid climate changes. They would uncover abundant fossil remains of domesticated plants and animals that had replaced most of Earth's prehuman fauna and flora. They would excavate fragments of machines, and a veritable museum of deadly weapons.

3

Biodiversity as a whole forms a shield protecting each of the species that together compose it, ourselves included. What will happen if, in addition to the species already extinguished by human activity, say, 10 per cent of those remaining are taken away? Or 50 per cent? Or 90 per cent? As more species vanish or drop to near extinction, the rate of extinction of the survivors accelerates. In some cases the effect is felt almost immediately. When a century ago the American chestnut, once a dominant tree over much of eastern North America, was reduced to near extinction by an Asian fungal blight, seven moth species whose caterpillars depended on its vegetation vanished. As extinction mounts, biodiversity reaches a tipping point at which the ecosystem collapses. Scientists have only begun to study under what conditions this catastrophe is most likely to occur.

Human beings are not exempt from the iron law of species interdependency. We were not inserted as ready-made invasives into an Edenic world. Nor were we intended by providence to rule that world. The biosphere does not belong to us; we belong to it. The organisms that surround us in such beautiful profusion are the product of 3.8 billion years of evolution by natural selection. We are one of its present-day products, having arrived as a fortunate species of old-world primate. And it happened only a geological eye-blink ago. Our physiology and our minds are adapted for life in the biosphere, which we have only begun to understand. We are now able to protect the rest of life, but instead we remain recklessly prone to destroy and replace a large part of it.

4

Earth remains a little-known planet. Scientists and the public are reasonably familiar with the vertebrates (fishes, amphibians, reptiles, birds, mammals), mostly because of their large size and immediate visible impact on human life. The best known of the vertebrates are the mammals, with about 5,500 species known and, according to experts, a few dozen remaining to be discovered. Birds have 10,000 recognised species, with an average of two or three new species turning up each year. Reptiles are reasonably well known, with slightly more than 9,000 species recognised and 1,000 estimated to await discovery. Fishes have 34,000 known species and as many as 10,000 awaiting discovery. Amphibians (frogs, salamanders, wormlike caecilians), among the most vulnerable to destruction, are less well known than the other land vertebrates: a bit over 6,600 species discovered out of a surprising 16,000 believed to exist. Flowering plants come in with about 270,000 species known and as many as 94,000 awaiting discovery.

For most of the rest of the living world, the picture is radically different. When expert estimates for invertebrates (such as the insects, crustaceans, and earthworms) are

Nature Needs Half

FACING PAGE *An outcrop of sponges holding on to survival in the sea at Haji Ali, presents a contrast against Mumbai's towering skyscrapers. "Due to habitat loss, the rate of extinction is rising world over. The preeminent sites of biodiversity loss are the tropical forests and coral reefs. The most vulnerable habitats of all, with the highest extinction rate per unit*

There is a deeper meaning and long-term importance of extinction. When these and other species disappear at our hands, we throw away part of Earth's history. We erase twigs and eventually whole branches of life's family tree. Because each species is unique, we close the book on scientific knowledge that is important to an unknown degree but is now forever lost.

added to estimates for algae, fungi, mosses, and gymnosperms as well as for bacteria and other microorganisms, the total added up and then projected has varied wildly, from 5 million to more than 100 million species.

If the current rate of basic descriptions and analyses continues, we will not complete the global census of biodiversity — what is left of it — until well into the 23rd century. Further, if Earth's fauna and flora is not more expertly mapped and protected, and soon, the amount of biodiversity will be vastly diminished by the end of the present century. Humanity is losing the race between the scientific study of global biodiversity and the obliteration of countless still-unknown species.

5

From 1898 to 2006, 57 kinds of freshwater fish declined to extinction in North America. The causes included the damming of rivers and streams, the draining of ponds and lakes, the filling in of springheads, and pollution, all due to human activity. Here, to bring them at least a whisper closer to their former existence, is a partial list of their common names: Maravillas red shiner, plateau chub, thicktail chub, phantom shiner, Clear Lake splittail, deepwater cisco, Snake River sucker, least silverside, Ash Meadows poolfish, whiteline topminnow, Potosi pupfish, La Palma pupfish, graceful priapelta, Utah Lake sculpin, Maryland darter.

There is a deeper meaning and long-term importance of extinction. When these and other species disappear at our hands, we throw away part of Earth's history. We erase twigs and eventually whole branches of life's family tree. Because each species is unique, we close the book on scientific knowledge that is important to an unknown degree but is now forever lost.

The biology of extinction is not a pleasant subject. The vanishing remnants of Earth's biodiversity test the reach and quality of human morality. Species brought low by our hand now deserve our constant attention and care.

6

How fast are we driving species to extinction? For years paleontologists and biodiversity experts have believed that, before the coming of humanity about 200,000 years ago, the rate of origin of new species per extinction of existing species was roughly one species per million species per year. As a consequence of human activity, it is believed that the current rate of extinction overall is between 100 and 1,000 times higher than it was originally.

This grim assessment leads to a very important question: How well is conservation working? How much have the efforts of global conservation movements achieved in slowing and halting the devastation of Earth's biodiversity?

Despite heroic efforts, the fact is that due to habitat loss, the rate of extinction is rising in most parts of the world. The preeminent sites of biodiversity loss are the tropical forests and coral reefs. The most vulnerable habitats of all, with the highest extinction rate per unit area, are rivers, streams, and lakes in both tropical and temperate regions.

Biologists recognise that across the 3.8-billion-year history of life, over 99 per cent of all species that lived are extinct. This being the case, what, we are often asked, is so bad about extinction?

The answer, of course, is that many of the species over the eons didn't die at all — they turned into two or more daughter species. Species are like amoebas; they multiply by splitting, not by making embryos. The most successful are the progenitors of the most species through time, just as the most successful humans are those whose lineages expand the most and persist the longest. We, like all other species, are the product of a highly successful and potentially important line that goes back all the way to the birth of humanity and beyond that for billions of years, to the time when life began. The same is true of the creatures still around us. They are champions, each and all. Thus far.

BABU THOMAS/ENTRY-SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

Seasonal blooms at Munnar, Kerala. "Earth remains a little-known planet. Flowering plants come in with about 2,70,000 species known and as many as 94,000 awaiting discovery."

7

The surviving wildlands of the world are not art museums. They are not gardens to be arranged and tended for our delectation. They are not recreation centers or reservoirs of natural resources or sanatoriums or undeveloped sites of business opportunities – of any kind. The

Each ecosystem — be it a pond, meadow, coral reef, or something else out of thousands that can be found around the world — is a web of specialised organisms braided and woven together. The species, each a freely interbreeding population of individuals, interact with a set of the other species in the ecosystem either strongly or weakly or not at all.

wildlands and the bulk of Earth's biodiversity protected within them are another world from the one humanity is throwing together pell-mell. What do we receive from them? The stabilisation of the global environment they provide and their very existence are gifts to us. We are their stewards, not their owners.

Each ecosystem — be it a pond, meadow, coral reef, or something else out of thousands that can be found around the world — is a web of specialised organisms braided and woven together. The species, each a freely interbreeding population of individuals, interact with a set of the other species in the ecosystem either strongly or weakly or not at all. Given that in most ecosystems even the identities of most of the species are unknown, how are biologists to define the many processes of their interactions? How can we predict changes in the ecosystem if some resident species vanish while other, previously absent species invade? At best we have partial data, working off hints, tweaking everything with guesses.

What does knowledge of how nature works tell us about conservation and the Anthropocene? This much is clear: to save biodiversity, it is necessary to obey the precautionary principle in the treatment of Earth's natural ecosystems, and to do so strictly. Hold fast until we, scientists and the public alike, know much more about them. Proceed carefully – study, discuss, plan. Give the rest of Earth's life a chance. Avoid nostrums and careless talk about quick fixes, especially those that threaten to harm the natural world beyond return.

8

Today every nation-state in the world has a Protected-Area system of some kind. All together the reserves number about 161,000 on land and 6,500 over marine waters. According to the World Database on Protected Areas — a joint project of the United Nations Environment Programme and the International Union for Conservation of Nature – they occupied by 2015 a little less than 15 per cent of Earth's land area and 2.8 per cent of Earth's ocean area. The coverage is increasing gradually. This trend is encouraging. To have reached the existing level is a tribute to those who have participated in the global conservation effort. But is the level enough to halt the acceleration of species extinction? It is in fact nowhere close to enough.

The declining world of biodiversity cannot be saved by the piecemeal operations in current use. It will certainly be mostly lost if conservation continues to be treated as a luxury item in national budgets. The extinction rate our behaviour is imposing, and seems destined to continue imposing, on the rest of life is more correctly viewed as the equivalent of a Chicxulub-size asteroid strike played out over several human generations.

The only hope for the species still living is a human effort commensurate with the magnitude of the problem. The ongoing mass extinction of species, and with it the extinction of genes and ecosystems, ranks with pandemics, world war, and climate change as among the deadliest threats that humanity has imposed on itself. To those who feel content to let the Anthropocene evolve toward whatever destiny it mindlessly drifts to, I say, please take time to reconsider. To those who are steering the growth of nature reserves worldwide, let me make an earnest request: Don't stop. Just aim a lot higher.

Populations of species that were dangerously small will have space to grow. Rare and local species previously doomed by development will escape their fate. The unknown species will no longer remain silent and thereby be put at highest risk. People will have closer access to a world that is complex and beautiful beyond our present imagining. We will have more time to put our own house in order for future generations. Living Earth, all of it, can continue to breathe.

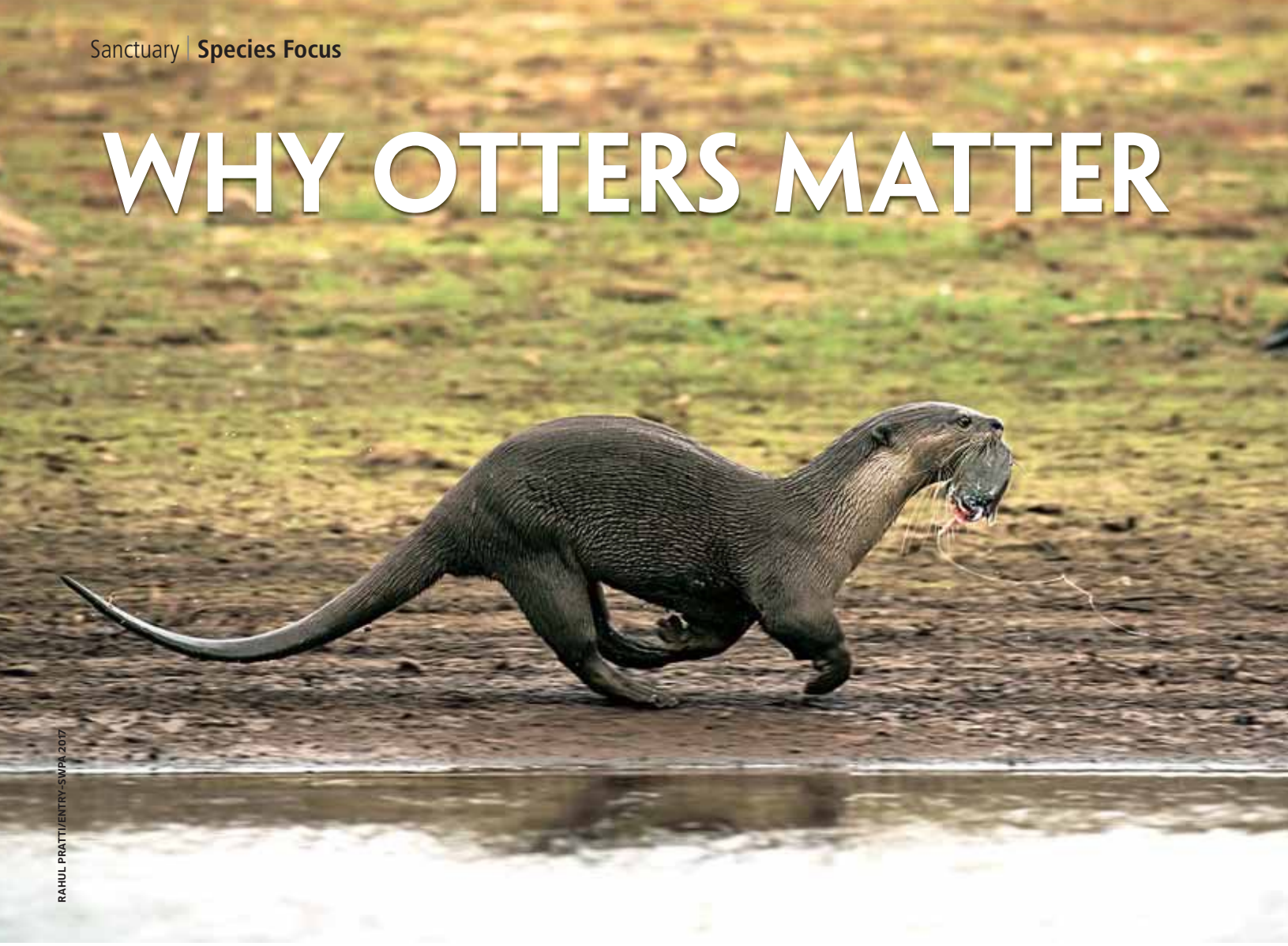
Sanctuary *welcomes this science-based world view from E. O. Wilson that supports the Nature Needs Half vision that we endorsed immediately when it was launched in 2009 at WILD9 (9th World Wilderness Congress). We need a new relationship with nature, using the best science and the best traditional knowledge, and* Sanctuary *is committed to embed this reality into India in the years to come.*

This article was originally published in the January/February 2017 edition of Sierra Club Magazine.

VIPUL RAMANUJ

"The vanishing remnants of Earth's biodiversity test the reach and quality of human morality. Species brought low by our hand, such as pangolins, now deserve our constant attention and care."

WHY OTTERS MATTER



RAHUL PRATTI/ENTRY-SWPA 2017

TEXT BY GOPAKUMAR M.

We sat on a stone wall by the river, Sivu, the fisherman, and I, in silence, waiting for the arrival of what Steven Moss, a British naturalist, once called "the elusive movie-star". It was dusk and the cows had just crossed the placid waters of the Cauvery, after spending much of the day grazing on the island about 300 m. from the banks. Their crossing had taken up much of my attention: everything about the body structure of a bovine is un-aerodynamic, yet the cows had swum across with little apparent effort, their heads just above water and noses up in the air, a langourous watery stroll, before reaching the banks and clambering up dry land.

And, after their crossing, I was now listening to the cacophony of birdcalls, when Sivu touched my arm. "I hear them," he said simply, pointing ahead.

There was little to be seen in the water and the pair of binoculars in this light was of little help, but I did hear the calls, a mix between a whistle and a chirp produced in continuous sequence. A minute later, a couple of little heads came into dim view, swimming downstream towards us and moving with elegance across the surface of the water, producing, behind them a 'wake' pattern of ripples, in the shape of a V, as produced by waterfowl or boats (interestingly, this was first explained mathematically by Lord Kelvin and known today as the Kelvin wake pattern).

The smooth-coated otters were returning after a day's work.

BUNDLES OF JOY

Sivu has been tracking these otters for Nityata River Otter Conservancy for the last three years. His primary role is to monitor their population and alert us to threats to them, along a river stretch that we term the 'H Otter Corridor' ('H' represents the name of the village by the river where Sivu lives. To safeguard the bevy of otters, the name has been kept out of this article). In the breeding season and after, beginning in October and until January, the otters inhabit a

In the public health world, animals such as the otter are considered to be sentinels. This term refers to any animal whose biological, geographical and even psychological change in response to an environmental change can be used as a model to better understand how humans may be affected in the future.

natal den site and nursery that is by his fishing stretch. Through this period, for much of the last three seasons, he has noted down the numbers he has seen every single day along with the time of observation, the number of pups and the location. In the process, he has learnt much more about them than he had known earlier (which itself was a fair bit) and is now a sort of expert-cum-coach to us, providing us much more than just data. We share notes on just how playful they are, sliding down sand chutes into the river and rolling on the sand, while chatting animatedly with each other and we marvel at the ease with which pups – those little bundles of infectious joy – learn to swim.

Sivu has, equally, learnt to let them live alongside him in the river, which is saying a great deal, for fishermen dislike otters because they pick fish up from the nets that are cast into the water and, even worse, tear these nets with their sharp teeth in the process. It is an uneasy co-existence, and can be compared to the one you read about on land, where tigers and leopards prey on domestic cattle, resulting in calls for retaliation from aggrieved farmers. Yet, this analogy has a deeper meaning and couldn't be more apt, for the otter is to the river what the tiger is to the forest: an apex predator, whose health and survival determines the health of its ecosystem, and by indirect inference, our well-being.

Jason Tetro, a microbiologist who is better known as 'The Germ Guy', and is the author of two books – *The Germ Code*, and *The Germ Files* wrote this about otters (he was referring to the sea otter, but the principle can be perfectly applied to the smooth-coated otter as well): *Otters also have another incredible link to humans albeit the association is far more impactful. They can help us identify public health problems related to pollution and infections. Though they live a different lifestyle than us, their mammalian nature allows the opportunity to study what could happen to us as our world changes.*

SENTINELS OF THE AQUATIC WORLD

In the public health world, animals such as the otter are considered to be sentinels. This term refers to any animal whose biological, geographical and even psychological change in response to an environmental change can be used as a model to better understand how humans may be affected in the future. These factors can include a number of possibilities, from the impact of pollution to the spread of infectious disease.

In the period from the 1970s to around 2005, smooth-coated otters across India were poached by professional gangs of poachers, who used information provided by local fishermen on otter presence, laid traps for the animals and then clubbed them to death to meet the insatiable needs of the wildlife trade: otter skin was used in the production of bags for the international market and was transported along with tiger and leopard skins. The Cauvery was no exception; during our travels along the river, we have heard a number of anecdotes of these poaching gangs – whole families of 'Hindi speaking' nomads (either the *Pardhis, Bawarias* or *Bahelias*). About a decade ago, organised poaching seems to have come to a halt for reasons that we do not yet know, yet the future of otters in the Cauvery and in other parts where they have survived, is far from secure.

Nityata's work in, at first, understanding otter occurrence and then threats along the non-protected stretches of the Cauvery river in Karnataka began in 2012 and the agenda was, and remains, to plan and execute a long-term conservation programme with the involvement of local stakeholders. When we first spotted the otters here – that was in the early summer of 2013 – the alarm bells rang in frenzy in our heads. For the river stretch here – the corridor used by otters as they moved about – was in deep trouble. The mining of sand, under

ABOVE & FACING PAGE *Otters in general, and smooth-coated otters of the Cauvery river in particular, are indicators of the health of the waterbodies. These apex predators have a role to play in their watery ecosystems, akin to that of predators such as tigers on land.*

LEFT & RIGHT *Dead fish float in the river after a bout of dynamite fishing. The use of dynamite by some in the Cauvery river has impacted not just the riverine ecosystem, which is vital to otters, but also the traditional fishermen (right) who have been battling the problem of decreasing fish stock.*

a specious licence, was extensive and much in excess of the quota, churning the waters of the Cauvery under the daytime sun, a plethora of boats, each outdoing the other in rapacity. At dawn and after dusk, even as the sand mining continued in stretches, dynamite fishermen visited the river and threw the sticks in with impunity, while the more traditional fishermen, who use gill nets, endured this in fear, their livelihoods slipping away as dynamite blasted out all the fish in the vicinity, destroying native species and fingerlings in the process. As the water levels dropped in summer, all such activity would increase in tempo. The fisheries department, living in pretence that there was no dynamiting, took no action. Instead, they focused on their financial-year 'targets' – the release of commercial species of fish – rohu, katla and tilapia, called 'jilebi' locally. This they did with much ado, patting their own backs for sustaining livelihoods, little realising that such releases were actively damaging endemic fish diversity (the practice, sadly, continues).

Amidst this mayhem, a romp of otters lived precariously. The traditional fishermen, seeing their catch drop, took much of their ire out on otters on the occasions when the animal, adult or pup, was caught in a net, clubbing it to death.

In the last four years, much has changed for the better. Due to better enforcement and the expiration of licenses, sand mining is now history (and will, hopefully, remain that way). Sivu and other traditional fishermen summoned up the courage to chase the dynamite fishermen away, once confiscating over a quintal of fish and reporting the incident to the police. Over the last four years, these net fishermen have also developed some level of tolerance for the otters in their midst, largely due to a sustained campaign of engagement, a tolerance based on an understanding of the importance of this apex predator, combined with some fear for the consequences of any deleterious action on their part.

At the H Otter Corridor, smaller packs of otters seem to aggregate just before the breeding season, around early October, stay together, go through the process of reproduction and weaning, and then disaggregate around February or early March. This aggregation and its reversal may not be

Sivu, a fisherman, helps track this particular population of otters, the author describes for the Nityata River Otter Conservancy.

The relationship between otters and fishermen has always been rather strained as the mammalians tend to go after the fishermen's catch and damage the nets resulting in a backlash against the species.

the behaviour of smooth-coated otters elsewhere though, as there seems to be little literature on the matter.

This aggregated population of otters has, over the last three years, marginally increased and, when last counted in early 2017, stood at 17 (that's just a coincidence!). Our experience in this river stretch is that otters are best counted around November, a little while after the pups are born and first emerge excitedly from their holts. They are cajoled into the water and are taught by their determined mothers to swim.

THE HIDDEN THREATS

The increase in the otter population cannot be termed a dramatic comeback as one would hope for, yet there are dollops of hope. Every year, the number of pups born has been heart-warming, even though their mortality is disturbing – possibly, over half of the pups that are born die before adulthood. The reasons for this mortality could be many and can only be speculated on, for the threats even today are numerous: predators of the pups such as snakes or raptors, drowning, entanglement in net fragments that are in the river and littered all over the islands in the river and along the banks, which result in suffocation or drowning.

If these threats weren't daunting enough, beneath the water lies a nasty, systemic hidden predator against which the otter is defenceless: pollution, that is both the result of untreated sewage flowing into the river, as well as the pesticides used in the rice plantations alongside the river here. There is history – albiet dismal history – to support this view: during the 1970s, England's otter population plummeted, the decline attributed to high levels of Persistent Organic Pollutants (POPs) in rivers. After contaminants such as organochlorine pesticides were banned, otter populations steadily increased and today the recovery of the population appears to be complete. We, along the Cauvery, are way behind: the reports of the Karnataka State Pollution Control Board have noted traces of toxic pesticides, including dieldrin in some river stretches, while levels of *E. coli* bacteria at most measuring points is many times over the safe limit – otters are as susceptible to illnesses from these bacteria as humans are, for they are mammals.

These smooth-coated otter individuals were caught emerging from their post-natal den along the banks of the Cauvery on camera-trap.

Indeed, this is why otters matter. The otters here at the H Otter Corridor matter hugely as indeed do all populations of otters in India and elsewhere. They are mammals and apex predators. Both of these mean that they are subject to the stresses caused by the ill health of the river and their well-being in the river can be seen as a sure indication of the river's health itself.

Nicole Duplaix, the Chair at the Otter Specialist Group of the International Union for Conservation of Nature (IUCN), puts it very succinctly indeed: "One of the surest ways to know if an ecosystem is healthy is to see if there are apex predators. It takes a robust food web to be able to support carnivores at the top. So when you see a coral reef packed with sharks, you know it's doing well. When you see a forest complete with wolves and grizzlies, you know it's a healthy forest. And when you see a river system that is home to river otters, you know it is a healthy waterway. That's why we call otters 'indicator species' – they have a story to tell us.

While we greatly appreciate river otters for their playfulness and for making our day a little brighter with their antics, we need to also appreciate them for the story they tell us just by their presence. If they are around and healthy, then it means good things for the entire habitat. And if they disappear, then they just gave us a big clue to start looking into what's going on in a river or lake system. We need to value river otters for simply being there, and letting us know when all is well."

So, despite the threats to the otters in the Cauvery, we have to fight for their survival, for the issue is not just them, it includes us as well. In this fight, there is reason to hope, for the otters have made it past a rough stretch of time. "Treat them like *bangaru* (gold)," I have told Sivu repeatedly, but I know that he too has his limitations and will balance his concern for them with the demands of a fishing livelihood.

There we sit on that wall, Sivu and I, and watch the otters make their way to a dense clump of reeds. There are more calls emanating beyond and it seems like other otters are on their way, yet, as dusk gives way to darkness, we stand up, dust our trousers and walk slowly away.

We, like our sentinels in the river, need to go home too.

Founder of Nityata River Otter Conservancy, which works on otter conservation along the Cauvery and Tillari rivers, his particular interest is in using the principles of stakeholder pride to protect otter populations.

Birds & Beasts Part -2

The human-inflicted extinction story of India

Text and illustrations by Sumit Sen

In the second part of the series, birdman, author and naturalist extraordinaire, **Sumit Sen**, *writes about species that have not been recorded for several decades, but cannot be categorised as 'extinct' given the difficulty in spotting them.*

While the list of extinct animals is accepted without much debate, there are other animals that we have probably lost, whose extinction cannot be positively proven. It is far easier to determine the status of large animals that leave a discernible sign of their presence than of smaller birds and mammals, particularly if they are difficult to spot or notice. Declaring such species extinct requires hard work and commitment. In the absence of both, what you have is optimistic conjecture. For instance, it is enough to surmise that a bird that was always rare, has not been seen yet since 1876, may still be surviving somewhere in the country!

Welcome to the world of hope, the Himalayan Quail and the Pink-headed Duck! Apart from these two birds, other species featured on these pages are Indian endemics not yet considered extinct by any reliable expert or authority, but whose numbers are so low that their existence is almost certainly in peril. Most have not been conclusively documented in the wild for over 35 years. They are significant, because, being endemics, we are solely responsible for their fate. This list of imperiled birds and beasts concludes with a set of three large endangered animals that are symbolic in different ways. The first two are endemic deer species, from two extreme strife-torn corners of India, confined to small Protected Areas. Both will struggle for survival in the wild and both are unique in our country's wildlife inventory. We conclude with the last threatened Indian animal on our list – an iconic bird whose future is so tenuous that all the lessons of conservation success and failure may not be enough to save it. We are, of course, talking about the very grand Great Indian Bustard, which could well have been India's National Bird, but for its unfortunate name!

Himalayan Quail

An enigmatic species. It is only known from a few winter records prior to 1877 from the Mussoorie and Nainital area in present-day Uttarakhand. And the bird was only seen at dawn and dusk! Conventional logic suggests that the quail was seen in its wintering grounds, and was an altitudinal migrant. However, there is absolutely no information on the location of its breeding grounds making it an Indian endemic by default based on available information. It is possible that the species summered in parts that were inaccessible before falling victim to the combined pressures of climate change, habitat loss and hunting. There has been some effort in the last decade to rediscover the bird, spurred by reported opportunistic sightings. It would be nothing short of a miracle if this small monotypic pheasant is found again in India.

Scientific name: *Ophrysia superciliosa*
Range: Winters in the western Himalaya and known from Mussoorie and Nainital areas of Uttarakhand
Conservation status: Critically Endangered, presumed extinct if not rediscovered by 2023
Last confirmed sighting: 1876
Cause of decline: Habitat loss, hunting and presumed climate-related negative impact

Pink-headed Duck

This bird makes it to the list of animals, which have not yet officially been declared extinct. However, it is more than likely that it is so as years have rolled by without any positive news of its presence. This species is a rather unique waterfowl with vivid plumage adorning a long and graceful neck, making it the only game bird to display a large area of pink feathers. Never reported as abundant since being described by science, it went into a declining spiral from the 19th century onwards. The main reason for the rapid reduction of its numbers seems to be over-hunting as it was prized as a trophy bird. A massive increase in human population in the lowland wetland areas that it inhabited leading to significant habitat loss also added to its decline.

This species has not conclusively been recorded anywhere in the wild since 1949. The only reason why it remains assessed as Critically Endangered and not extinct is the fact that it is a very shy species preferring well-hidden lowland forest pools and tall grasslands. Conjecture that the species may be crepuscular or even nocturnal makes any small remnant populations even harder to locate in remote forests.

Scientific name: *Rhodonessa caryophyllacea*
Range: Mainly found in eastern India, Nepal and Bangladesh with some records from Myanmar
Conservation status: Critically Endangered
Last confirmed sighting: 1949
Cause of decline: Habitat loss, hunting and other anthropogenic factors

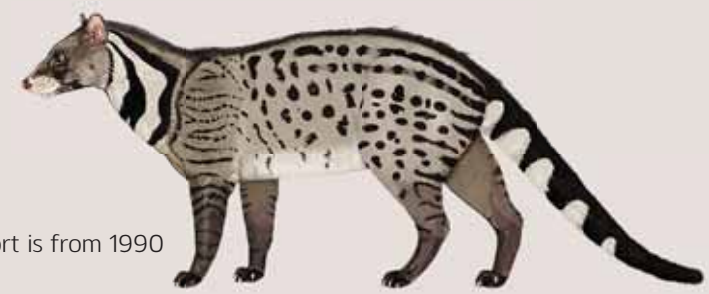
Namdapha Flying Squirrel

Only known from one specimen collected from Namdapha National Park in 1981, this unique and gorgeous flying squirrel has never ever been recorded since, aside from some casual reports in 2002. Assessed by IUCN as Critically Endangered based on extremely restricted range and lack of any recent information, it is not unlikely that this very special squirrel may have fallen victim to local hunters. Hope remains mainly because the species is nocturnal and arboreal making it hard to locate in its dense dry deciduous, montane forest habitat.

Scientific name: *Biswamoyopterus biswasi*
Range: Restricted to a single valley in Namdapha National Park, Arunachal Pradesh
Conservation status: Critically Endangered
Last confirmed sighting: 1981
Cause of decline: Hunting for the pot and habitat degradation

Malabar Large-spotted Civet

This animal's very identity seems to be in doubt and, understandably so, as it has no documented 'last seen' date. Also known as the Malabar civet, it was described by Edward Blyth in 1862. Some suggest that this is not a valid species at all and represents a feral population of escaped large-spotted civets *Viverra megaspila* introduced from Southeast Asia. Why anyone would release these civets in the Malabar region in the 1800s is a healthy topic for discussion, but for now this species is considered a valid taxon, and one that is Critically Endangered. Very little is known about this animal as it was never abundant and was in terminal decline since the 1960s. There are some recent unconfirmed reports of sightings, which offer hope that the species still survives in the wild. That is, if it is a unique species at all, and not an introduced exotic!



Scientific name: *Viverra civettina*
Range: Endemic to the Western Ghats of southern India
Conservation status: Critically Endangered
Last confirmed sighting: No certain date is available. Last credible report is from 1990
Cause of decline: Habitat loss and hunting for civet-musk

Manipur Bush Quail

Like the Malabar civet, there are more unconfirmed reports of sightings of this species than hard core evidence. And like the Himalayan Quail, it may share the same behaviour of being essentially crepuscular and shy. The fact is that this small and rather flashy species was last conclusively recorded in 1932. Reports since then (one in 2006 and another in 2014) suggest that the species survives, but the lack of verifiable recent records and reporting despite the many fold increase in birdwatchers does not paint a rosy picture about its future. Birdlife International classifies this quail as Endangered without any quality scientific evidence in support. It is, perhaps, more likely Critically Endangered already, and deserves more attention than the effort wasted on the more charismatic Himalayan Quail.

Scientific name: *Perdicula manipurensis*
Range: North Bengal to Northeast India
Conservation status: Endangered
Last confirmed sighting: 1932. Stray individual reports since 2005
Cause of decline: Loss of tall grassland habitat through drainage and destruction

Jerdon's Courser

This bird is highly endangered and its current status is hard to establish. Last reported from the Sri Lankamalleswara Wildlife Sanctuary in Andhra Pradesh, which was created for its protection, this nocturnal bird is slipping fast and recent records are few and far between. It would seem that this is the second time the species' future has turned doubtful. Thought to be extinct until 1986, it was rediscovered in the Kadapa district of Andhra Pradesh. Since then it has been sporadically recorded, but was last reported in 2011. It may well have been seen after that date but prudence may have prompted scientists from withholding sensitive information that could be a death blow to a very fragile species.

Scientific name: *Rhinoptilus bitorquatus*
Range: Southern Andhra Pradesh
Conservation status: Critically Endangered
Last confirmed sighting: 2011
Cause of decline: Small fragmented population, habitat degradation and other anthropogenic factors

Sangai

Also known as the brow-antlered deer or the Manipuri brow-antlered deer and sometimes even the dancing deer because of its stepping gait, this species is confined to nine square kilometres of floating '*phumdi*' islands in Loktak lake, Manipur in the far east of India. At last count there were only 204 (in 2013) of these deer left in the wild though the population of other subspecies of Eld's deer is considered viable, even if endangered. Conservation of this 'state animal' is entirely in the hands of the local population as it fights man-made hydrological changes that are destroying its specialised habitat. If care is not taken, it will go extinct once again as it did in 1951 and no E. P. Gee will rediscover it today.

Scientific name: *Rucervus eldii eldii*
Range: Loktak Lake, Manipur
Conservation status: Endangered at species level
Last count: 203 (2013)
Cause of decline: Hunting, habitat loss and hydrology changes in Loktak lake

Hangul

The Kashmir stag or hangul is found in the Dachigam National Park, Kashmir. Despite DNA studies, the jury is still out as to whether this animal is a subspecies of the elk (wapiti) or red deer. Since elk are abundant, as are red deer, no one really knows

how precious the hangul is in the context of global species level conservation. However, for our country, this stag is precious, as just over 100 or so animals remain and it would take very little to tip the balance against them. So while the IUCN and other authorities try and decide whether the hangul is after all a subspecies of the Tarim red deer or just a Kashmiri wapiti, we cannot hang our clothes to dry and hope that the world decides that it is worthy of concerted conservation effort. It is our animal, and we know the facts. We need to act because time is running out for this grand animal. Fortunately in recent days, effective steps, including the removal of a huge sheep farm from within Dachigam, gives us reason to hope. Conservationists in Kashmir are now working to secure the pastures in Upper Dachigam so vital to the survival of the hangul, which also happens to be J&K's state animal.

JOSEPH SMIT (1871)/PUBLIC DOMAIN

Scientific name: *Cervus canadensis hanglu / Cervus elaphus hanglu*
Range: In and around Dachigam National Park, Kashmir
Conservation status: Critically Endangered at species level
Last count: 186? (2015)
Cause of decline: Hunting and habitat loss

Great Indian Bustard

The Great Indian Bustard is a monotypic species endemic to the Indian subcontinent. Amongst the heaviest of all flying birds, this species was once widespread across the subcontinent's arid plains. Today, they may number less than 100 birds and the count is dropping every year. It would seem that the population may have gone below the tipping point and extinction is a matter of time unless there is a miracle. And a miracle is much required because this bird is far more important than the Asian cheetah that we lost. This is no subspecies of a well-established animal. If this unique bird goes, with it will go a great gift of evolution. And we, in India and Pakistan, would be solely responsible for that colossal loss.

Scientific name: *Ardeotis nigriceps*
Range: Previously widespread across most of the dry western plains of the Indian subcontinent but now restricted to small breeding patches in Gujarat, Rajasthan, Maharashtra, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh and Karnataka in India and Sind in Pakistan
Conservation status: Critically Endangered. Extinction predicted by 2030
Last count: 125 (2015). Most likely below 100 currently
Cause of decline: Hunting, habitat loss and degradation and other anthropogenic factors

These are by no means all the 'at risk' birds and mammals in the country. There are some others that are teetering on the brink of extinction such as the White-rumped Vulture, the Bengal Florican, the pygmy hog and some shrews and rats. In some cases, we already have a viable conservation programme for these animals, and in others, the species is more widespread in other countries and conservation efforts should bring greater and quicker results there. Their survival in India, however, is no less critical and India's other endangered life forms can be the subject of a follow-up paper.

In summary, we seem to be moving towards a time when our footprint will inevitably push more and more animals to the brink. It all seems to be building up, and the next couple of decades could see some of the animals on this list moving up the extinction ladder and new ones will most likely be added to the list. It will only mirror a global trend of human overconsumption and greed, which is already inexorably pushing a fragile world around us to the brink. It is just that we have more to lose than many others, and what is sad is that we are pushing our luck without any apparent care in the world.

Crown jewels are a quick and easy source of wealth, there is no getting them back once they are sold to meet today's greed!

1. Some images are artists impressions and the sole responsibility of the author. Accuracy is not guaranteed.

2. The © International Union for Conservation of Nature and Natural Resources (IUCN) is the source of risk information and they are acknowledged.

3. Some images are based on drawings/photographs available in the Public Domain, via Internet Archive.

The Turf War

Text and photographs by Arpit Parekh

In the productive Pandharpauni meadows of Maharashtra's Tadoba-Andhari Tiger Reserve earlier this year, we came upon T-54, a massive, dominant male tiger nicknamed 'New Matkasur'. Half-hidden in the bushes was another tiger, towards which the huge male began to move.

The young male tiger nicknamed 'Legend', one of Maya's cubs from her last litter, scampered towards us. Clearly the young one, still under two-years-old, had found himself in the wrong place at the wrong time.

A territorial battle ensued. By the end of it, though the younger tiger submitted, lowering its head, we saw T-54 bleeding. Despite the clash lasting just a (breathtaking) five minutes, the sub-adult's humiliation was total.

For a full 15 minutes, shoulder muscles rippling, 'New Matkasur' circled 'Legend' in a show of pure dominance. I was awestruck. I was also treated to a lesson in how nature enables powerful predators to work social relationships without resorting to the death of one or the other tiger.

Location: Tadoba-Andhari Tiger Reserve
Camera: Canon EOS 750D **Lens:** Canon EF-S 55-250 f/4-5.6 IS II
Image taken: February 7, 2017

MITHUN KUNDU/PUBLIC DOMAIN

EXPLORING WILD YERCAUD

The Shevroy Hills in the Eastern Ghats

Text and illustrations by M. Eric Ramanujam

Gaur calves gamboling at a distance of hardly five metres from us with the rest of the herd looking on unconcernedly. Believable? If somebody had told me this I would have called him a charlatan, but seeing is believing and my team will attest to the fact that this happened not once but twice at Kiliyur Valley in Yercaud.

This and many interesting experiences occurred between 2011 and 2012 as we undertook a vertebrate survey in Yercaud, the first to target all classes of vertebrates. In the 1920s and '30s, the Vernay Scientific Expedition by the Zoological Survey of India concentrated only on avifauna. We were told two earlier studies had been conducted on the gaur and the short-nosed fruit bat by university students, but we could not get details though we did sight a short-nosed fruit bat with a metal ring around its foot.

Yercaud in the Shevroy or Servarayan Hills of the Eastern Ghats is a popular tourist destination in Tamil Nadu and post-monsoon visitors flock to the Kiliyur Falls that present a breathtaking sight with a plunge of over 90 m. Off the beaten track (not a joy ride!) the valley abounds in wildlife. The climb down the irregular steps can take an hour and the ascent twice as long, but in our book the rewards more than made up for the discomfort, especially from a scientific perspective.

FISH FAUNA OF THE SHEVROY

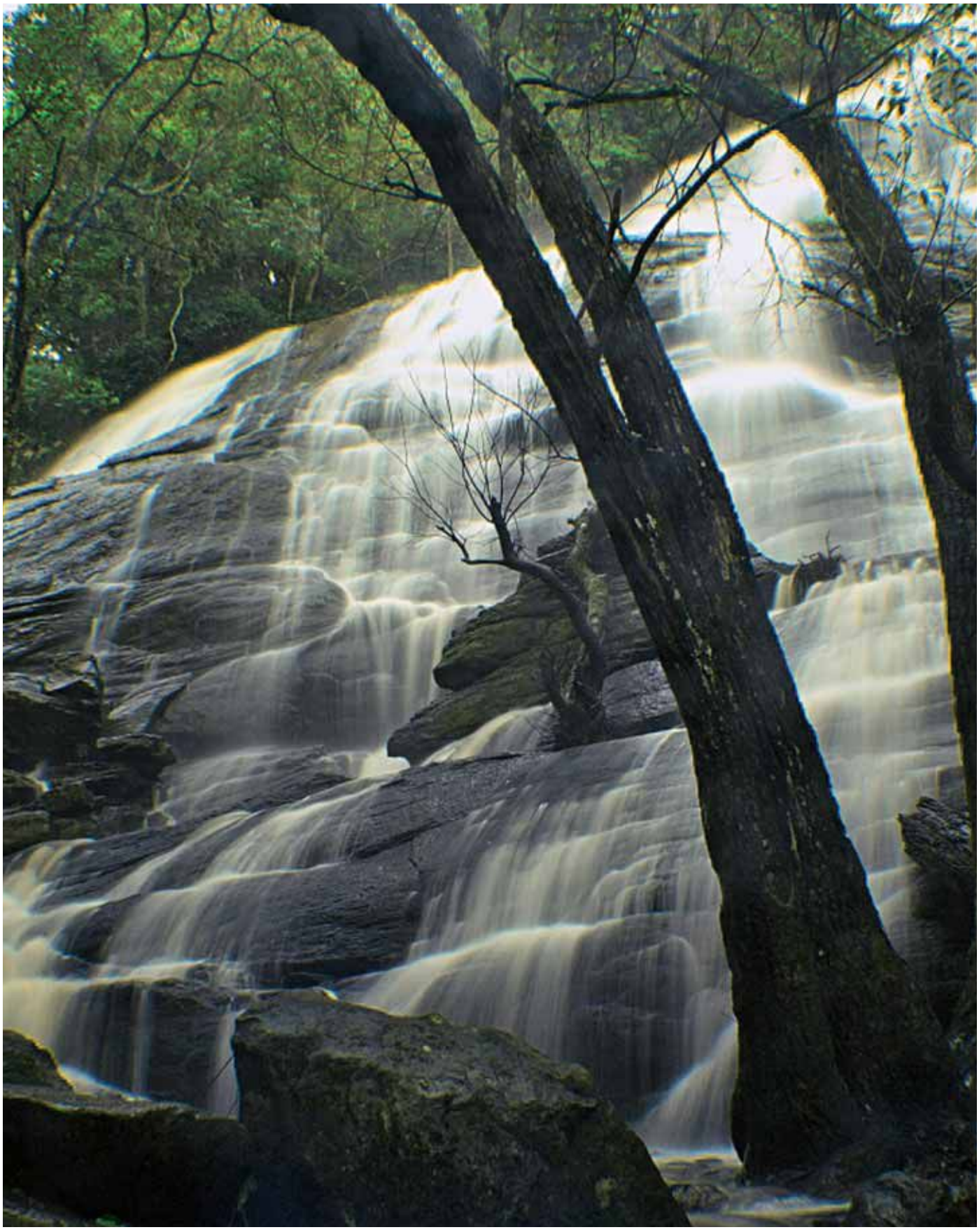
We were a team of three with both specific and multidisciplinary skills and backed by field assistants, local guides and a staff photographer. Preston

Ahimaz, long-time employee of WWF-India, was the generalist and ended up drawing up lists of birds, mammals, reptiles, butterflies, dragonflies and spiders – though only he can describe his unique identification methods. S. R. Ganesh, from the Madras Snake Park was, and continues to be, a zealous gatherer and interpreter of field data concerning herpetofauna. As for me, I concentrated simply on fish. Whilst Preston and Ganesh focused on the Kiliyur Valley and its environs, I went further afield, sampling sites as far away as Manjakuttai and Puthur, which though not very far as the crow flies necessitated scores of kilometres along winding ghat roads. This gave us a fair idea of the ichthyofauna of streams draining into the Vappady and Vaniyar tributaries of the Kaveri river (http://dx.doi.org/10.11609/JoTT.o3247.7595-601). A unique feature of the hill streams of the Eastern Ghats, unlike the Western Ghats, is that the fish diversity is rather low – we encountered only 18 native species compared to an earlier survey in the nearby Javadi Hills that revealed just 14. Of the 18, only two occurred in the Javadis, which shows how diverse ichthyofaunal communities are, even between hill streams that flow in close proximity to each other. This may be because the hill ranges of the Eastern Ghats are disjunctive and display a total absence of Malayan elements and lack endemicity, unlike the near continuous Western Ghats, with distinct similarities to southeast Asian elements with a large number of endemics – so integral to the 'Hora Hypothesis' of the 1940s.

Notable fish findings were the Kaveri carp *Cirrhinus cirrhosus* and the Indian butter catfish *Ompok bimaculatus*. According to the IUCN Red List of Threatened Species, the former is listed as Vulnerable and the latter as Near Threatened. Another interesting finding was a Danio, tentatively named *Devario cf. aequipinnatus*, which showed overlapping characters (scalation) with both *Devario*

A Mottled Wood Owl based on a photograph by Dr. Nishith Kumar.

ANTKRIZ/PUBLIC DOMAIN



ABOVE *Waters overflowing from the Yercaud Lake drop from a height of around 90 m. into the Kiliyur Valley.*
PREVIOUS PAGE *Located in the Shevroy Ranges of the Eastern Ghats, Yercaud is a hill station named after the thick forests (*caud *or* kad *means forest in Tamil) around the lake.*

An Orange Minivet at Kiliyur Falls.

aequipinnatus and *Devario malabaricus*. In addition to native species, we also came upon the translocated species (North Indian carp, which have been introduced for fishery purposes) Catla *Gibelion catla*, which formed an integral part of our diet in Yercaud. Though it could be considered an alien species in the strict interpretation of the term, it must be mentioned that it does not breed under natural conditions and fingerlings are introduced from time to time by the Department of Fisheries. But the most alarming finding was the presence of two alien invasive species: the guppy *Poecilia reticulata* and Egyptian mouth breeder or tilapia *Oreochromis mossambicus*. Though the tilapia was found in low numbers in Yercaud lake and a stream draining away from it, the guppy outnumbered native species in catches almost 10:1. The threat of alien invasives taking over freshwater habitats is a reality and the ornamental fish trade is emerging as the most critical threat to fragile aquatic habitats in peninsular India (http://dx.doi.org/10.11609/JoTT.o2179.700-4).

BIRDING IN THE GHATS

Preston was aided in birding by Sugavanam Balasubramanian, Bala for short, an ex software engineer who has a villa in Yercaud and is an ardent nature photographer. Between the two of them they drew up a list of 52 species and procured reasonably good photographs of 29 of them (awaiting publication in the *Journal of Threatened Taxa*). Preston and Bala have done a great job and may find my treatment of them superficial in this article, but what is of particular interest to me are raptors and owls, and Yercaud has a fair share, only be rivaled in the Eastern Ghats by the Kolli Hills. On any given day and at virtually any time I have come across the Crested Serpent Eagles, a pair of which breeds in Kiliyur Valley. Both parents and their single young could be traced just by listening for the begging calls of the youngster. We did not see them actually hunt, but on a couple of occasions the parents were seen to feed their young on agamas, which were plentiful at the site and very conspicuous, especially the males displaying on open rocks. Crested Hawk Eagles could occasionally be seen on the wing but we found no evidence of the Black Eagle, Bonelli's Eagle, Booted Eagle and Short-toed Eagle (reported from Yercaud avibase - bsc-eoc.org/checklist.jsp?region-INsetn03&list-howardmoore), which was a bit disappointing. Nevertheless, Bala did track down and photograph a Steppe Buzzard *Buteo buteo vulpinus*, a new record for the region – in South India it is known only from the west coast and even in North India only a handful of scattered records exist. Three species of owls were recorded during the survey – the Jungle Owlet, Indian Scops Owl and Mottled Wood Owl – all confirmed by acoustic surveys. The only visual confirmation (we were not around, having returned to our bases in Chennai and Auroville), was when Bala was handed a nestling Mottled Wood Owl, which had fallen out of its nesting cavity. To put it mildly, this left Bala in a quandary and the first inkling of it was when I received a frantic phone call around midnight stating that he did not know what to do as the owlet steadfastly refused to eat the Pedigree Puppy dog food he offered. My reaction was not exactly kind. In the event, a strict vegetarian, he handed the bird over to the Forest Department the next day and did not speak to me for months.

OF VIPERS AND SHIELDTAILS

Though we had interesting moments with the fish and birds, the highlight of the entire survey were the reptiles and here Ganesh was in his element – he even managed to pick an argument with a local while searching for geckos and could see no rationale as to why the guy was objecting to him climbing walls at night. If I am to be a believer in omens, I would have said our jaunt to Yercaud was rather auspicious – even before we reached Yercaud my personal field assistant spotted a green vine snake on the road leading uphill and this gave him brownie points and an unholy advantage over the rest of his ilk. As soon as we got into Kiliyur Valley, another guide gave a squawk of delight and grabbed at what he assumed to be another vine snake (a typical herpetologist's field assistant's behaviour – it seems that the instinct is to grab first and think about consequences later), but this turned out to be a bamboo pit viper, which struck viciously, but fortunately missed. Though there are no recorded fatalities concerning the bamboo pit viper, the bite can be extremely painful and debilitating – as Ganesh can attest to since he has had the unfortunate experience of being bitten by one.

One of our specific goals for undertaking this survey was to find out more about sheildtail snakes, a group of enigmatic reptiles confined to the forested hill ranges of central and southern India, and Sri Lanka. Little is known of their ecology and even the taxonomical status of some species remains unresolved. The study on shieldtails instituted by Richard Henry Beddome in 1886 was taken up by M.V. Rajendran in 1985, but Linnaean and Wallacean shortfalls dogged the group and continues to do so, though there is hope that over the last 31 years some taxonomical exactitude could have come to light. Road kills got us going and two species of shieldtails were collected and examined. The more common Elliot's shieldtail *Uropeltis ellioti* has a wide range both in the Western and Eastern Ghats in both central and southern India; the other is restricted to the Shevroy Hills. Until our survey, and the

Crested Serpent Eagle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ASIA

Gaur

taxonomical reassessment that followed, the latter was accommodated as the Kerala shieldtail *Uropeltis ceylanica*, but when Gower, Captain & Thakur revived *Uropeltis bicatenata* from the synonmy of *Uropeltis ceylanica* in 2008, they demonstrated the potential existence of several other valid species hidden as synonyms within the *U. ceylanicus* group. Today this species has been re-examined and renamed *Uropeltis shorttii* or Short's shieldtail – the nomenclature resurrected from a synonym last used by Theobald in 1876 (http://dx.doi.org/10.11609/JoTT.o3636.5305-14).

The other interesting species collected as a road kill was a Beddome's coral snake *Calliophis beddomei*. A venomous Elapid readily distinguished by its black upperparts and bright red underparts, it grows to a length of approximately half a metre. The species was originally described from two specimens from the Natural History Museum in London collected by Beddome himself in the Shevroys, and the other from Koppa and in the collection of the Zoological Survey of India, Calcutta. Beddome collected three more specimens from the Shevroys and Mudumalai, which are now housed at the California Academy of Sciences Herpetology Museum. Hence, the specimen collected and housed in Chennai Snake Park is only the sixth specimen known to science (http://dx.doi.org/10.11609/JoTT.o3639.5580-2).

Bamboo pit viper

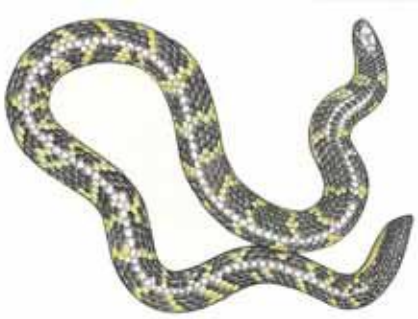
It would be an anticlimax to describe other findings concerning reptiles, but suffice it to say both species of rock agamas *Psammophilus dorsalis* and *P. blandfordanus* existed sympatrically, as did three species of Calotes (*C. rouxii*, *C. versicolor* and *C. calotes*). Some gekkonid lizards such as the Indian slender gecko *Hemiphyllodactylus aurantiacus* that we meticulously searched for, were not sighted in forests, but was seen on a lamp post opposite the hotel where we dined one night. It was a unique find, as this species was first discovered and described from Shevroys itself, back in 1870! Other snakes we encountered were the montane trinket snake, checkered keelback and Indian rat snake. We also encountered a small specimen of the hill form of the Indian terrapin or Indian black turtle. We did not have much luck with amphibians since we were not around when they bred en masse in the post-monsoon seasonal waterbodies, but we did see some hill-forms such as the direct-developing bush frog *Raorchestes sp.* and golden-backed frog *Indosylvirana sreeni*.

The large mammals, as mentioned earlier seemed to be habituated to human presence – the gaur were not at all shy, quite unlike their brethren in the Western Ghats. According to a tourist guide book by the Rotary Club of Yercaud, the gaur population has grown to such an extent that there are frequent problems of people being attacked. There are also instances when lone bulls refuse to move from plantation areas and become a big hindrance to cultivation. At the place in which we sometimes went for night walks we saw gaur elegantly leaping 1.8 m.-high barriers as if in slow motion. Wild pigs too are common in the valley and plantations surrounding it. We did sight the Indian giant squirrel several times, but in spite of all of Preston's endeavours we could not catch a glimpse of the Madras tree shrew, though the locals were quite conversant with it and called it '*moong anil*'. We were often asked if we wanted dead specimens, but we had to decline.

One of the conditions for undertaking the survey was that we were not to trap and handle live animals and this effectively put an end to mist netting and live trapping for small mammals (especially rodents). It was dicey using camera traps since the areas in which they were to be used were not secure and human presence was a recurring factor, which made security of our equipment a major issue. It was interesting to note that tribals comprised over 60 per cent of the local population. These tribals, called *Malayalis* (hill men) or *Vellalas*, are not of aboriginal stock but migrated from Kancheepuram 500 years ago.

Common vine snake

The ban on trapping did hit us below the belt, especially me, who is dependent on small mammal (especially rodent) taxonomy, but there was no way out of it. Suffice it to say that, as far as mammals go we have barely scratched the surface. For most mammals such as rodents and bats, their identification can only be confirmed by handling them and collecting morphometrical data. Nevertheless, there was some interesting indirect evidence pointing to the fact that there is more wildlife than meets the eye: while walking through tribal homesteads we frequently came upon dogs with porcupine quills adhering to them and were told that the porcupine is a delicacy in these regions (I am apt to believe anywhere where the species occurs, even in the plains). The dogs were a unique mix with never the lack of 'hound' in their makeup. Some of them were really nasty creatures and strove their best to shoo us away, but did not actually attack – this leads us to surmise that Ogden Nash was absolutely spot on when he quipped "*Any hound a porcupine nudges, can't be blamed for harboring grudges*".



Shortt's shieldtail based on a photograph by Dr. S. R. Ganesh.

STOTRA CHAKRABARTI

BEING MY FATHER'S DAUGHTER

By Harshini Jhala

It was 4:00 a.m. or earlier perhaps. Waking to a cup of hot milk, I found myself wrapped in a cozy bundle in my mother's lap in the front seat of an open four-wheel drive Gypsy. My dad was in the driver's seat and the cold desert wind slapped us in our faces, causing our eyes to water. I have vivid memories of a childhood spent in Kutchh – a dome-shaped piece of land in northwest India cut off from the rest of the mainland by the Little and the Great Rann of Kutchh. My father and his research team at the Wildlife Institute of India were studying the ecology of the endangered Indian wolf. First the car wound around what looked like a ghost village cloaked under the spell of timelessness. Even the feral dogs busy howling last night were nowhere around.

As we left the village behind I found myself wondering: "Was something caught! Or were last evening's efforts futile?" We parked the vehicle a distance away from where a rubber-padded jaw trap, designed not to hurt an animal, had been laid from where my father surveyed the scene through his field glasses. There was something in that trap. We moved to the trap site quickly, but quietly, with my father insistent that no sudden movement be made that might cause any distress to the trapped animal.

"Anything but a village dog," I said to myself, though we hoped it was a wolf hyaena, or jackal.

It was a wolf!

THE INDIAN WOLF

An animal with a sleek and slender body; perfect for surviving in this harsh arid environment, the wolf is known to prey upon smaller animals such as rodents, gazelle, and hare, but is quite capable of hunting down larger prey including nilgai, wild pig and blackbuck. But in Kutchh, the wolf's main prey were sheep and goats, which brings the handsome carnivores into conflict with people. Given the lack of prey, wolf pack-sizes in Kutchh are particularly small, usually between two to eight. There is a seasonal variation in their coats... thin in summer, thick in winter.

Wolves have always fascinated me. They carry an aura of mystery hidden in their amber eyes. The one we saw in that trap, however, looked kind of sad and I longed to see him quickly set free.

The dart gun was loaded, a concoction of drugs prepared and the shot fired by my father found the shoulder muscle. I began to count backwards. It usually took five to eight minutes for the anaesthesia to work. I had been part of this routine often. Once the animal was down, the real work began; a radio transmitter had to be fitted, blood, hair and parasite samples taken, the trapped foot massaged with an antiseptic cream. This accomplished, the animal was aged from its dentition. The shape and length of canines revealed the age with younger animals sporting

FACING PAGE *Seen here is Harshini assisting her father Dr. Yadvendradev V. Jhala and his team to document data during a lion-collaring exercise at the Gir National Park in 2014.*

KARTIKEYASINGH CHAUHAN

The author, from a very young age, took advantage of every opportunity to go on field with her father. She checks the body temperature of a tranquilised hyaena at Kutchh as her father and his team put a radio collar on it.

sharper, cleaner and longer canines. This particular wolf was around two years old.

While the team went about their business, I wondered what the anaesthetised wolf might have been dreaming about (anaesthesia does trigger vivid dreams in humans!). His wolf family, perhaps or hunting down prey?

If that happened to be a goat or sheep, the migrating *Rabari* who had travelled from Gujarat with camels would be anything but happy.

Though the wolves prefer to keep to themselves they are destined for conflict with humans when they turn to livestock. Legal or not, *Rabri* often pride themselves on being wolf-slayers. The war waged against the wolves is generally restricted to denning areas, but once in a while a sheep carcass will be poisoned and wolves, hyaenas, jackals and vultures all die.

I always feel alive being out there in the wilds with my father. The part of such exercises I most looked forward to was post the frenzy when the animal was administered the antidote to revive it, soon after we had taken a closer look to check for the state of health of the creatures we wanted so much to protect. By now the operation was generally over, and the sun had driven away the cold wind that made teeth chatter... only to be replaced by hot, dry air or 'loo' that stole the moisture from our skin and breath.

Come evening, we would track our subject on horseback. I loved everything about it, the wilderness life, the dust in my hair, the smell of horses, the soft clatter of hooves, the howls of wolves in the distance, the cold morning wind and the hot 'loo' that cracked the skin on my face.

Everything about being out there in the wilds of Kutchh was like being in paradise.

My father has the best job in the world and all I wanted someday was to be like him.

DIFFERENT PLACE, DIFFERENT TIME

Memories.

When it rains, a dry deciduous teak forest can give the untrained eye the impression of being in a tropical rainforest, replete with lush vegetation... I was in one such and in my book it was the most beautiful the forest had ever looked.

As I sat in the vehicle, waiting, it seemed like the rain would never stop. The team had been waiting on that lioness all day and despite being six I was extraordinarily quiet... doing nothing but waiting. But the anticipation and hours of training by the side of my father on innumerable trips made it really easy for me. Hours passed. This was to be my first lion-radio-collaring experience.

Gir's lions are a different lot than the ones in Africa. A relic population has survived here and now is on its way to recovery, their numbers estimated to be around 500. Like wolves, India's lions too have learned to live close to humans, but unlike their African cousins, our lions have evolved a strange harmony with *Maldharis* (cattle herders). The lions do prey on domestic livestock, yet tolerance levels are high, though once in a while a conflict arises.

Today a good chunk of Gir's lion population lives *outside* the Protected Area in human-dominated areas. Radio telemetry therefore becomes the default strategy of choice to understand their ecology.

Finally, just before sundown (near-impossible to tell when that happened because of the pouring rain) the lioness appeared from behind a thicket, presenting my father with a clear shot! The procedure was more or less the same as that with wolves. Dart, wait for her to go under, move her into

I cannot imagine a tomorrow without all those experiences I had. I want other children to feel the awe of wildernesses 20 years from now. But I cannot do this alone.

an open, well-ventilated area where it was easier to work, record vital signs, draw blood, collect hair samples and parasites, check canines to age her, and record body measurements.

The real task was, of course, weighing the animal! I watched as a teak branch was brought down, a huge sack spread with the majestic beast placed on it (not an easy task). With the sack secured to the teak log, a spring balance was attached. Watching from a distance I wondered how they would lift the heavy cat. The lioness now looked like it was in a huge hammock. Between 10 and 12 people united to lift that beautiful creature off the ground and the scale then revealed its weight.

Little did I imagine that then some years later, I would turn from tiny spectator to a part of the entire operation. Many years later I found myself in Gir again, in a different season. The lush green Gir forests I remembered as a child had metamorphosed into a leafless, dun-coloured landscape. The scorching Saurashtra heat, 46°C was daunting but adrenalin had kicked in and nothing mattered, not the blinding sun nor the searing wind. I was finally part of something I was born to do... be a part of a team working to protect endangered wild creatures.

MORE THAN A COOL JOB

The responsibility allocated to me was to note measurements for morphometric data and to check on the anaesthetised lion's vital signs. There was no room for laxity or error. Focused totally on the task at hand, I found myself smiling inwardly at the amazing feeling that I was finally becoming "my father's daughter".

Somewhere between being a spectator, watching my dad collar mysterious desert creatures, lions and tigers, I was now assisting him in the field. My life had come full circle.

When I was little, it was just the excitement of being part of the coolest job in the world. Now, years later I have come to understand the critical importance of research for conservation and to understand ethology or the study of animal behaviour.

Over decades the work of scientists such as my father's has helped provide management advice for Protected Area conservation, securing forested corridors to ensure gene flow and to avoid bottlenecking wild populations. Had the bottleneck that confronted the lions of Gir in the 1900s not been dealt with when their population was down to less than 50, they would have been lost forever. Times change. Technologies change, but the fact is that 50 has turned to 500 and we are now worried about a totally different problem. Will this population be inbred? How will genetic variation be introduced into the population of Gir lions?Unlike tigers where we can work toward mixing and matching isolated populations through corridors, what is to be the fate of the lions of Gir?

With the passage of each year, the need to conserve wild species has become self-evident. I still accompany my father on his never-ending field trips, but I can now notice the small but disturbing changes. The desert paradise together with its fascinating creatures is fast disappearing. The chinkaras we took for granted have begun to make fewer appearances as we ride across the salt desert. Many grasslands are now ploughed for cultivation. Kutchh and Saurashtra seem to have lost some of their 'vastness', for lack of a better word.

Each time I see a spiny-tailed lizard's burrow dug up, my heart sinks. So many animals I used to see and was in awe of, are now rare or invisible. Even the ubiquitous wolf has become a rare sight to celebrate. The same goes for the hyaena that patrolled the wolf's turf at night. Yes, one does hear the occasional howl of a lone jackal in the distance, and that sense that the desert is alive is still there, but not quite the way it used to be. Gone too are the grazing herds of sheep that the migrating *Rabari* would bring in from central Gujarat during the short monsoon. What one sees now is a landscape marred by wind mills, denuded and dug out for limestone, and glittering solar fields of green energy. But has this change ushered in happiness for the local community? Not for the *Rabaris* I presume. I see the bounty of the arid landscape that sustained traditional livelihoods and local wildlife with which they had coexisted for millennia being displaced by unplanned, modern development.

Does this leave me without hope? No.

Despite the dismal prognosis and the laments of conservationists who suggest that we are only delaying the inevitable, I am still hopeful. There are success stories and they paint a different picture. I have witnessed a few myself including the magical recovery of the Asiatic lion and the promise that the tiger will outlive the dire predictions of yesteryears. Across the planet, wolves are recolonising parts of their prior ranges in the U.S. and Europe. Bears too are returning to a Europe populated by younger, more visionary people. In Chad the scimitar horned oryx has been reintroduced and is being protected.

The impossible is doable.

Since I was a child I have admired my father's work, and now I am determined to use that experience and knowledge to take the battle forward. I cannot think of a better way to spend my life than to work to restore nature, repair past damage done, and protect, savour and understand better the delicate balance on which the life-support systems of our planet function. It's a dream that can and must come true and for this to happen more people must somehow work together in joint purpose.

I have a sentimental reason that draws me to conservation as well. I have gained so much from the wilderness and it is time for me to give back. I cannot imagine a tomorrow without all those experiences I had. I want other children to feel the awe of wildernesses 20 years from now. But I cannot do this alone.

An aspiring wildlife conservationist, Harshini Jhala is currently pursuing her Masters in Conservation Biology from the University of Kent.

The March of the Elephants

By Vivek Menon

SABEER MAMPAD/ENTRY–SANCTUARY WILDLIFE PHOTOGRAPHY AWARDS 2017

Elephants have a way of walking that displays their incipient mood. They tramp through bamboo culms seeking tender relishes hidden amidst tangled clumps. They amble through lush grasslands, kicking a tuft every now and then, after the first monsoon rains have ensured a new carpet for them to feed on. A family group seems to saunter when at peace. A lone bull in musth, testosterone staining his face, strides up to his choice female with a rather more determined gait. Once his courtship is accepted, the two promenade languorously in between bouts of mating.

The family's gait changes when they are about to start a long journey from one habitat to another. The stroll now picks up pace as they troop in single file. The ramble turns to a heavy definitive trudge as they shift home and hearth for the season. As the journey enters human habitation, they tiptoe, swallowing air and sniffing at unknown menacing scents. They feel their way around obstacles, like a toddler moving around the fear of new and unknown playthings.

As the family crosses a road or a rail track there is a tentative air to the walk. The matriarch stops, then treads in slow, measured steps, watching and sensing movements and threats before venturing onto tar. The herd follows her instinctively and when the coast is clear and the matriarch has crossed, the family stumbles across in a sudden rush of frenzy. The rush lasts only till the cool earth on the other side is felt under their spongy pads. Almost instantly they slow, and if there is no threat, a little bit of comfort-feeding replaces the panic of a moment ago.

But all this changes during conflict. As mobs chase the elephants, they break into a trot, a heavy lumbering run, heads bowed and bodies pressing against each other for comfort and to present a unified whole to the threat. If the threat persists and when projectiles or burning tyres touch their bodies, the air is rent by anguished trumpets and screams. The pace quickens and every now and then an anointed member of the herd turns back in a mock charge to move the threat away. As time passes the elephants start moving in an agitated, kinetic fashion. During full-blown riots they lose even the cohesion of kith and kin as they stumble in a mad dash towards what little safety a neighbouring patch of scrub may have to offer.

Increasing water scarcity in the region leaves elephants with little choice other than entering villages such as Hediyala near the Bandipur Tiger Reserve in Karnataka.

A PROCESSION OF RIGHTS

In the nation of our dreams, elephants must move as they did roughly three million years ago, when they entered the borders of a land that many millennia later would be known as India. Unfortunately, in the India of today, elephants move in a pantomime of dance and death. *Sanctuary Asia's* award this year to a photographer who has captured the wretched retreat of a mother and calf set aflame by an angry mob (see page 96), is an acclaim for rendering onto film the poignancy of an everyday tragedy. Something has to be done, now, for this senseless conflict to stop.

If I were an elephant, I would start to march. A steady, regular-footed, determined onwards march as of soldiers in battle. I would march to bring order to the chaos of conflict. I would march to bring a sense of normalcy to the unit that has eaten, slept and walked together till the mobs came in. I would march to bring to the attention of the other (so-called) intelligent species sharing my space, the plight of my kith and kin. I would march in protest. Inherit the language of protest from humanity and start a *dharna*, a *hartal* or a procession of rights. March to meet policy makers and the public, showcasing the utter banality of their actions towards my species. March through the very corridors that elephants have used for three millennia and that have been choked by incursive human activities. March in silent defiance, or perhaps set to a cacophony of anguished trumpets.

But, I am not an elephant. I am a fellow denizen of this country and of this Earth that I and the elephants that I love call home. I must act. For this, through the Wildlife Trust of India I am organising a Gaj Yatra. As I cannot appropriate the outrage of a species, this is not a march of defiance. It is not a march of elephants to reclaim their home, but a march to reclaim the national consciousness.

The National Heritage Animal of India, the creature that has inspired the worship of Lord Ganesha of the Hindus and which appeared to Maya of the Shakyas predicting the greatness of the Buddha, sadly needs an image makeover. And the Gaj Yatra, run in collaboration with Project Elephant, Ministry of Environment, Forests and Climate Change, and the International Fund for Animal Welfare, is a national celebration of this magnificent and ancient Indian being. It brings art, literature, science and innovation together to highlight the plight of elephants and point to solutions that would afford them their Right of Passage. It brings Bollywood stars, children, corporate India, musicians, media magnates, sports stars, artists, conservationists and politicians together to try and celebrate the National Heritage Animal of India. And while doing this it focuses the attention of policy makers and those that can make a difference to the future of elephants. The Gaj Yatra is backed by the technical depth of the *Right of Passage* publication that has detailed all the 101 corridors that elephants need to move between their habitats in India.

I am unsure how long this journey will take. It has started on World Elephant Day on August 12 this year from Teen Murti Bhawan in New Delhi. It has received the blessings of Lord Ganesha the next day at the Siddhi Vinayaka Temple in Prabhadevi in a Mumbai launch. It has already called in to Bengaluru at a concert at the Vidhana Soudha, at the 100 Drums Wangala festival of the *Garos*, at the 20th International Children's Film Festival at Hyderabad, and at the Ziro Festival of Music in Arunachal Pradesh. While this is happening, however, the elephant still suffers across its range.

There is no simple answer to a complex problem. I can only quote Lawrence Anthony in *The Elephant Whisperer*. "*Perhaps the most important lesson I learned is that there are no walls between humans and the elephants except those that we put up ourselves, and that until we allow not only elephants, but all living creatures their place in the sun, we can never be whole ourselves.*" 🐘

B. C. CHOUDHURY

The author is Executive Director, Wildlife Trust of India and Senior Advisor to the President, IFAW.

AUGUSTINE PRINCE

BEASTS OF A DIFFERENT STRIPE

Media sensationalism, public panic, political pressure, muddled thinking – at a time of increased conflict between humans and large carnivores, these interconnected strands have woven a narrative that depicts virtually every tiger that kills a human as a bloodthirsty man-eater. While underscoring how such attitudes are harming the larger cause of tiger conservation in India, **Dr. Mayukh Chatterjee** explores the complexities of man-eating and man-killing behaviour.

"Tigers, except when wounded or when man-eaters, are on the whole very good-tempered."

~ Jim Corbett

Over the past few years, India has witnessed a surge in the frequency of human-wildlife conflict in its varied dimensions. Attacks on humans by large carnivores inevitably garner the most attention and Forest Department officials are often pressurised into a frenzy of reaction by the public and local politicians. When attempts to address a conflict situation are unsuccessful, they can culminate in acts of violence and outrage by the public – almost always directed at the Forest Department. Many a time the conflict animal is also cornered, killed and mutilated.

An increase in cases that 'go awry' has a detrimental impact on a species' survival prospects in the long run. When the species involved is a national icon like the tiger, things get even more complex.

Old tigers are sometimes pushed out of their territories by younger, stronger adversaries and find themselves hunting in human-use areas.

COURTESY: WTI

A camera trap photo of a tigress that travelled over 200 km. southwards from Pilibhit Tiger Reserve to the swampy banks of the Ganga, just 30 km away from Kanpur, in February 2015.

AS CONFLICT BURNS BRIGHT

Since the 1970s, India has made relentless efforts to protect the tiger – not just as an icon but as an umbrella species, an apex predator that ensures the well-being of entire ecosystems that it resides in. A party to the Global Tiger Recovery Programme endorsed in 2010, which aims at doubling the world tiger population by 2022, India surpassed its set goal of 2100 tigers in 2014 itself. Tiger numbers have continued to rise, but with less than five per cent of the country's landmass remaining as the tiger's last refuge, an increase in breeding populations can only translate into escalated human-tiger conflict.

Tigers involved in conflict with humans are invariably portrayed by the mass media as vicious, bloodthirsty beasts that pose a serious threat to human survival. Such slanted, sensationalised narratives that tarnish the creature's public image have foreseeable long-term negative impacts on tiger conservation and thus on the species' very survival in India. News of human-tiger conflict is widely appealing not just due to the tiger's brilliant and formidable appearance, but also because somewhere deep down it reminds us of our 1.8 million year old wild ancestral relationship: of man as prey!

Tigers have preyed upon humans opportunistically as long as we have shared space. A few of them down the millennia have become – almost obligate – human predators, or man-eaters as we call them. But what is a man-eater? And how can one distinguish between intentional man-killing or man-eating incidents and mere accidental encounters? To understand this we must first explore tiger behaviour and some of the drivers of human-tiger conflict.

Tigers naturally disperse from their natal territories to establish their own home ranges as they come of age. They may also move in search of more prey-rich areas, or in the quest for a mate. Old individuals may also gradually be pushed out of their territories by younger and stronger adversaries. Left to itself, a healthy breeding tiger population will inevitably spill out of a Protected Area into adjoining patchy and unprotected forests, which sometimes provide prey-rich habitats with species like chital, sambar, nilgai, wild pig, blackbuck and hog deer. Within the rest of the tiger distribution range outside protected forests, domestic and feral livestock are also consumed. Artificial habitats like sugarcane belts, which also provide good cover and prey, act as extended forests for large carnivores.

Many of these areas are today classified as territorial forests and are also units of functional tiger corridors. With a lot of unprotected habitat being destroyed, fragmented and converted to human-use in the recent past, this is largely where tigers and humans face-off, sometimes with fatal results.

CHANCE ENCOUNTERS AND SERIAL KILLERS

Consider the Dudhwa-Pilibhit landscape in Uttar Pradesh, where Wildlife Trust of India (WTI) runs its Terai Tiger Project in association with the U. P. Forest Department and with support from the U.S. Fish and Wildlife Service. With a little over 110 tigers and over a thousand villages huddled along its jagged periphery of disconnected forest patches, the landscape has witnessed 114 attacks by tigers on humans since 2002. Of these 83 have resulted in human deaths – but in very few of these cases have the tigers even consumed human flesh, let alone been true man-eaters.

AUGUSTINE PRINCE

Tigers commonly prey on livestock outside Protected Area boundaries. As they disperse and go on to establish their own home ranges or are ousted by younger, stronger tigers, they may enter unprotected areas that could also include artificial habitats such as sugarcane belts and fields.

Man-eaters or man-killers are much like the spine-chilling human serial killers we hear about: the stuff of good stories, frightening, and extremely rare. In reality, few tigers that for a variety of reasons find themselves hunting in human-use areas actually kill humans – and even if they should in the course of chance encounters happen to do so, few stick to the chronic killing of humans. Most return to the forest to hunt their natural prey, sometimes even after extended forays into human territories.

Take, for example, a recent case from the Pilibhit Tiger Reserve. In early August this year, about 30 km. from the Mala Forest Range, a young male tiger encountered and killed three men amidst vast sugarcane fields. These fields had ample waterbodies and at least four documented species of wild ungulates. From the first two human victims the tiger consumed sizeable portions. It also killed a nilgai and a buffalo calf, though the Forest Department disposed of both carcasses to prevent the tiger from being poisoned by locals. Tranquilising and trapping attempts were made, but failed as the tiger shied away from the faintest human presence during the month-and-a-half-long operation. Subsequently, people were kept out of the area as a precautionary measure, allowing the tiger to gradually move back into the forests of Pilibhit.

In another instance in October 2014, an adult tigress travelled over 200 km. southwards from Pilibhit to the swampy banks of the Ganga, opposite Kanpur city. She thrived on feral cattle, nilgai and hog deer, evading all capture attempts for nearly six months, after which she began moving northwards to Sitapur and disappeared. Monitored through her pugmarks and infrared camera traps, she appeared to be a healthy tigress, completely active at the dead of night and utterly shy of human presence. In an earlier case in 2012, a sub-adult male had been caught on the outskirts of Lucknow city and released back into Dudhwa National Park. He had grown into a full-sized male by 2015, not coming into conflict with humans again after his release.

THE INFIRM AND THE INEXPERIENCED

It is believed that physically impaired or infirm tigers that fail to hunt fleet-footed wild prey are most likely to be inclined towards easier prey like livestock, and sometimes humans. In his observations on man-eaters, Jim Corbett wrote of a number of tigers and leopards that bore grievous injuries from porcupine quills, with humans becoming the prey of choice out of compulsion.

On August 31, 2016, a tiger was captured by our Rapid Response Team (RRT) and the U.P. Forest Department at the southern tip of the Mailani Range of the South Kheri Forest Division. It had killed eight people, including two minor girls, between January and August 2016. Only the seventh victim was consumed. As in the previous three kills, villagers gathered swiftly and scared the tiger away to recover the victim's corpse. In each of the last four kills, many of them spoke about how the tiger stubbornly stood its ground beside its kill, in one instance even following them for sometime as they carried the victim's body away.

After the tiger was successfully tranquilised by our RRT in the forest patch around which it was hunting, a quick physical examination revealed key missing pieces to the story. This

three-to five-year-old male had a broken canine and severe cataract in his right eye. He had probably been pushed out by resident tigers from the richer forest patches, after which he survived by eating cattle and other livestock and feral animals. By this time his cataract had perhaps begun obstructing his sharp binocular vision and he began mistaking crouching humans as prey and attacking them. With extended bouts of hunger, he would have soon realised that these creatures could also be hunted and eaten.

This 'theory of infirmity' can also be extended to individuals with poor experience in hunting, like cubs that have been separated from their mother too early. The case of the man-eater 'Mallu' from the Deoria region of Pilibhit exemplifies this. When Mallu was captured he had no deformity of any sort that could have impaired his skills at hunting fleet-footed prey. He seemed more like a young, inexperienced tiger who had discovered and decided to stick to fast food!

Mallu had killed seven people by the time he was captured on February 11, 2017. He had begun attacking and killing humans back in November 2016, but the nature of his attacks at the time showed no clear intent and little finesse. Towards the end of his free-ranging tenure, however, he made four attempts on human lives within a month, all when victims were sleeping on cots inside mosquito nets, and despite livestock being present on the scene as an alternative. He had grown audacious by then, and adept at lifting people from their homesteads; 45-year-old Manjeet Kaur, the only survivor of his attacks, recalled how he had refused to back away even as her family members screamed, beat at him with sticks and pelted him with stones. He even made a bold second lunge at her, injuring her grievously before disappearing into the night.

Several such meticulously documented cases in the Dudhwa-Pilibhit landscape strengthen the understanding that man-eaters are a rarity, and that many tigers that are not man-eaters can and do occasionally consume human flesh. Thus, every instance of human flesh consumption does not give birth to a recalcitrant man-eater; only detailed information

MAYUKH CHATTERJEE/WTI

MAYUKH CHATTERJEE/WTI

ABOVE *Tigers are naturally equipped to hunt fleet-footed prey like chital deer.*
TOP *An aerial photo of a nilgai killed by a tiger in a sugarcane field near the Pilibhit Tiger Reserve in August 2017.*

gleaned from pugmark dimensions, camera trap and other photographs, situational details of attacks, nature of wounds inflicted on the victims, and regular movement patterns during conflict situations can help piece together case studies, and possibly through them the motive of the animal.

Such insights can greatly inform conflict management strategies and decisions. To ensure detailed documentation and aid in conflict management on the ground, communities can be integrated into the process in the form of well-trained and equipped Primary Response Teams (PRTs), such as those formed by WTI in Uttar Pradesh. These PRTs and the specialised RRTs, working in unison, can constitute a major conflict mitigation support to state Forest Departments across tiger landscapes in India.

Finally, positive media engagement at multiple levels is crucial to ensure that factually correct, less sensationalised media reports are published, and that the tiger's long-term image is not caricatured into that of a white-fanged creature with bloodshot eyes, out to get you and me.

The author is Head, Human-Wildlife Conflict Mitigation, Wildlife Trust of India.

THE CIVET IN YOUR CUPBOARD

ABHISHEK NARAYANAN

The civet family which the author helped 'rescue' in Jawaharlal Nehru University, New Delhi.

By Abhishek Narayanan

"*Kitna bada bichhoo hai...* How large is the scorpion and where was it last seen?" I asked the groggy hostel guard at Delhi's Jawaharlal Nehru University. *"Woh doh foot ka bijju hai sir, aur uske teen bacche bhi hain,"* he responded.

A half-a-metre scorpion with three young ones? Having lifted enough rocks to find scorpions beneath them, I was nonplussed. I looked helplessly down at the long forceps and small bag that I had brought with me, and at my colleague, a fellow rescuer with Wildlife SOS. "Did you hear '*bijju*' or '*bichhoo*'?" he asked. Blaming a bad mobile connection, I said I had heard *bichhoo* (scorpion). I didn't know at the time that *bijju* was the colloquial name of an animal that would continue to amaze me through the course of my wildlife career.

WHERE THE WILD THINGS ARE

The creature locally known as *bijju* or *kabar bijju* (grave digger) has many names, but one etymology is particularly interesting: 'civet', derived from the French '*civette*', which goes back to the Arabic '*zabād*, denoting the musky perfume that is derived from the scent glands of some civet species. The musk resembles an ingredient in the fragrance 'Obsession for Men' by Calvin Klein, civetone. The common palm civet, *Paradoxurus hermaphroditus*, in fact derives its scientific name from the fact that both sexes have perineal scent glands that resemble testicles (hence 'hermaphroditus'), though the sexes are in fact distinct.

But returning to our protagonist, *Bijju*. We entered one of the hostel rooms to find a common palm civet and her three kittens, the happy occupants of an empty shelf in a cupboard. The human occupants of the room were less happy though and didn't want a "wild animal" with them, so as responsible rescuers (if slightly ignorant back in 2009) we 'rescued' the civets and took them to our shelter with the intention of releasing them into a forest – where, as we then believed, all wild things belonged.

Over the next few days, the mother happily raised her young ones in a small enclosure in the shelter, being fed bananas and occasionally some meat (since civets are omnivorous). Eventually, once the kittens were weaned, they were ready to be released – or as I thought then, 'rehabilitated'. We released them into a suitable forest

habitat in the middle of Delhi, though not before the mother had bitten me as I tried to 'recapture her for release'.

A few years down the line I found myself still 'rescuing' civets in places I least expected to find them: bustling human habitations. On each occasion I felt that the civets themselves were very comfortable in human-modified landscapes, but people were not willing to coexist with a wild animal. While working towards my Master's degree studying urban snakes, I came across the concept of synanthropisation/ synurbisation: the adaptation of wildlife to urban development. Foxes in London, Peregrine Falcons in North America and Germany, and stone martens in North America suddenly seemed relevant: all species that have successfully established thriving populations in completely urban habitats. Were civets adapting similarly, since one was more likely to find a common palm civet in urban human-use areas than pristine forests? Were they exhibiting synurbisation as well?

DANCING ON THE CEILING

Cut to June 2017. I was in Baripada, Odisha, at the Similipal Tiger Reserve headquarters, for meetings related to the Mobile Veterinary Service (MVS) unit established by Wildlife Trust of India (WTI) in 2014. During my visit we were called in to assist a government official who claimed he was having problems with animals creating a racket on his ceiling.

His house was huge; an old construction nestled in a mango orchard. Looking at the house's false ceiling and the human-created forest I had an intuition that it was the ideal habitat for palm civets. My suspicions were confirmed when we were shown a video of a civet mother and five pups climbing out of the skylight. What piqued our interest though was that they looked quite unusual: white with faint dark markings.

We know about body colour aberrations in wildlife. From Odisha itself there have been recent records of melanistic tigers (with more distinct dark stripes than usual) and albino snakes (completely pale with discoloured eyes). These civets looked leucistic: partially white and partially black, mini versions of the giant panda! Dipping into historical records, I later found that there was a description of a separate race of civets in Odisha, *Paradoxurus hermaphroditus nictitans* (Taylor, 1891), which resembled a leucistic variety.

ABHISHEK NARAYANAN/WTI

The three leucistic civets hand-raised by the Wildlife Trust of India's MVS unit in the Similipal Tiger Reserve earlier this year.

Whatever their race, our training dictated that they be left alone; there was no need to capture and move them. But while I had acquired that knowledge over my eight years of work in wildlife conservation, the reluctance of people to coexist with wild creatures persisted. We were unable to find anybody to break through the false ceiling at the time, but that night we received a call that the animals had been seen emerging from their hideout and we needed to remove them.

During the capture attempt the mother and two kittens escaped, leaving behind three young ones. Three civet kittens rescued in similar circumstances were already being hand-raised at the MVS field station since April, and we took the call to rehabilitate (in the correct sense this time) all six kittens together. We chose a wooded patch with plenty of fruiting trees near the field station, which itself lies at the edge of the Similipal Tiger Reserve. The MVS veterinarian and I (being careful not to get bitten this time) examined the six kittens, sexed them (four females and two males) and weighed them. We also noted identifying marks to assist in post-release monitoring.

The 'soft release' protocol that we follow for small carnivores requires us to help animals develop a fidelity to their release site by holding them in a suitable enclosure for an extended period of time. Accordingly, the six civets were placed in two cages of around 1.2x0.9x0.9 m. on a platform 1.5 m. above the ground. We fed them in the evenings and early mornings – they loved mangoes, which perhaps reminded them of the food their mother used to bring them in their orchard home. Four weeks later, the gates were opened and they were allowed to explore their surroundings: soft release. The team monitored them through camera traps and noticed that at least three were returning to the cage even two months later, indicating that the method for developing site fidelity had worked and they had in fact been rehabilitated.

Civets are probably exemplars of the Darwinian 'survival of the fittest', given their adaptability to disturbed environs. I continue to be impressed and enthralled by their ability to thrive in a world that is becoming increasingly difficult to live in, even for us humans!

The author is Divisional Head – Wild Rescue and Rehabilitation, Wildlife Trust of India.

Nature's imagination can run wild! A no-holds-barred evolution approach has gifted this peacock mite its glamourous look. This ornate and aptly-named mite belongs to the genus *Tuckerella* and is generally considered a 'herbivorous pest' in the tropics where it is found. But beauty lies in the eyes of the beholder and we cannot get over the beauty of this specimen, magnified over 200 times, under an SEM or Scanning Electron Microscope.

Note: This is a falsely coloured photomicrograph.

Christopher Pooley/Public Domain

The Sanctuary Papers

Text By Purva Variyar

Little Understood Grasslands

Wastelands. That is the name grasslands often go by in several countries including India. They are subject to destruction, degradation and, or conversion, usually without much resistance from policy makers and locals. That is because these rich ecosystems are little understood and are thought to be less important and sometimes worthless tracts of land. So much so that at the launch of the Transformation of the African Savannah Initiative, the president of the African Development Bank (AfDB) put forth a proposal for converting nearly two million hectares of savannah in several African countries into farmlands to feed the rocketing human population. Crops such as maize and soybeans will be cultivated here and livestock will graze here. But, at a severe cost. These grasslands hold under their soil tons of carbon. Cultivation here would result in release of all this into the atmosphere. Apart from curbing climate change, Africa's grasslands are home to the Big Five (elephants, lions, rhinos, leopards and buffaloes) and various other creatures great and small. These animals not only are a crucial part of the ecosystem, but bring in tourism worth billions to the African countries. For these reasons and more, please let grasslands be grasslands.

Seventh Great Ape

Our close, endangered cousins, the orangutans, found on the Sumatran and Bornean islands of Indonesia have been keeping a big secret. A whole new species of the great ape has been roaming amongst them.

As recently as November 2017, a third, new species of orangutan *Pongo tapanuliensis* was identified on the Sumatran island, with a small population living in the Batang Toru forest. Their specialised habitat lies to the south of the orangutans' Sumataran range. They showed stark genetic differences as well as skeletal ones including different tooth size. *P. tapanuliensis* is now seventh in the list of the world's great apes and the third species of orangutans to have been discovered so far!

But this new species is in as much trouble as the other two orangutan species – Sumatran and Bornean. Their already fragmented habitats are being further destroyed and degraded for small scale agriculture, mining and monoculture plantations. Hunting too is a huge threat. With only a small population of 800 individuals, if urgent conservation measures are not initiated, this rare species of ape will be gone as suddenly as it 'appeared'.

Cloaks of Invisibility

In nature, colour has purpose – and it's not just the presence of colour, even the absence of it. Deep in the dark abysses of the oceans live some spectacular species of animals, who have developed ingenious ways of becoming 'invisible' to give their predators the slip.

Now, being transparent is about letting light pass right through the body. Or even the ability to bend light in such a way that none of it reflects back to the observer's eyes rendering oneself invisible. The glass octopus *Vitreledonella richardi,* for example, makes up for its partly-transparent body with certain opaque organs by minimising the shadows it casts, which could otherwise betray its position. About 200 to 1,000 m. deep in the sea, the glass squid (Cranchiidae family) can pull off the vanishing act by using photophores found near its eyes. It produces light that almost perfectly matches the amount of light falling on it from all sides, thus blending its almost entirely transparent body with the surrounding light.

Hyperiid amphipods apply 'nanotechnology' that allow them to bend and interfere with light thereby not allowing it to be reflected. Close observation of the Hyperiid species has revealed several microscopic protuberances in the form of bumps and spheres, of about 100 to 300 nanometres in size. Interestingly, scientists now think that these microscopic structures could really be bacteria attached to the body, which cloak the host animal with 'invisibility'!

VINAY A. SALVI

A glass squid makes up for its non-transparent optical organs by using its photophores, which help make it entirely 'invisible'.

VINAY A. SALVI

Transparency works as a near-perfect defensive feature for the glass octopus.

Meadows of the Sub-Antarctic

How does any organism manage to survive in the harsh, unforgiving climes of the Antarctic and the sub-Antarctic islands? The truth is, there are some tough and resilient beings that not just survive, but thrive there. We are talking about 'megaherbs' of the perpetually-freezing islands of the sub-Antarctic. While our imagination paints a picture of a barren land, devoid of colourful flowering plants, the reality can take one's breath away. You will be surprised at the complete contrast in the form of bright and colourful plant species that can be found growing, adapting and evolving here.

Well-known British botanist, Sir Joseph Dalton Hooker, once related the floral scenario of the Antarctic on an expedition as "producing a floral display second to none outside the tropics". The coping mechanism in some of the herb species such as *Pleurophyllum speciosum* exhibited surface temperature to be around 4^0 C to 10^0 C higher than the surrounding air temperature. Hairs on the leaf ridges trapped heat, darker colours absorbed more solar radiation and large leaf sizes helped in taking in more heat. These adaptations are definitely not exclusive to the plants in the sub-Antarctic islands and are seen even in 'giant herbs' of the tropical alpines such as Hawaii and Andes among others. Though not closely related, plants of the sub-Antarctic and the alpines resorted to similar adaptations and both have survived to tell their tales, still largely unheard and little understood.

Did You Know?

The breeding grounds of Adelie Penguins are located southernmost than any other species of penguin. They are known to walk almost 96 km. on certain occasions to reach their traditional breeding grounds.

The Whalebone Devourer

What image forms in your head on reading the line above? That of a carnivorous, teeth-baring, intimidating mega creature, right? Well, you are in for a quite a surprise.

The protagonist of this whalebone-consuming tale is a tiny marine worm of the genus *Osedax* whose literal Latin translation decodes to 'bone devouring'. When a mighty whale dies, its decomposing flesh and bones make their way to the ocean floor, sinking to a depth of 2,000 – 4,000 m. This phenomenon is known as a whale-fall. While the whale's softer tissues are ingested by organisms big and small, the lesser-known, specialised deep-sea worms – *Osedax rubiplumus* and *Osedax frankpressi* – emerge with their delicate, feathery and reddish tentacles called 'palps', swaying in the waters. It is the roots of these worms, which penetrate through the tough bone minerals to reach the delicious, nourishing bone marrow. Assisted by a species of bacteria that they host, *Oceanospirillales,* the worms break the marrow fats and other bone material into smaller, simpler compounds. These worms have evolved to seek nourishment in a niche so specific and unlikely, and exemplify the diversity and connectivity observed within an ecosystem.

VINAY A. SALVI

The bone devouring Osedax worms live in the bones of the dead whale carcasses.

Saviour Worm?

Tonnes of plastic waste across the globe is one of the most potent environmental problems facing humankind today. Laced with chemicals that can be dangerous if ingested or absorbed through the skin, plastic has a huge detrimental impact on the health of humans and animals too.

What makes plastic even more dangerous is that compounds such as polyethylene are so tough that they remain non-degraded for hundreds and even thousands of years. Plastic has managed to invade the most inaccessible and unexplored corners of the planet, making its way into food webs and disrupting ecosystems. However, what the 'most intelligent' species in the land is unable to crack, the caterpillars of the wax moth can. The wax moth larvae, it has been found, can eat and digest plastic! Researchers have claimed that these tiny feeders can gorge on polyethylene and even generate compounds that can prove industrially useful. Essentially, these caterpillars can break down 'indestructible' polyethylene chemical structures. This ability is attributed to its natural diet of bee's wax, whose structure is largely similar to polyethylene. Though certain fungi and bacteria are also known to break down polyethylene, it takes them much longer. The aim now is to somehow isolate the essential molecules and microbes, which aid the caterpillars to break down polyethylene and possibly produce it on a larger scale to rid ourselves of the accumulated plastic. Our saviour is here?

VINAY A. SALVI

The wax moth caterpillars, can gorge on plastic due their unique ability to break down tough molecules such as polyethylene.

Did You Know?

The calls and barks of the Gunnison's prairie dogs are specific to the type of predator. Different populations are also known to sport different dialects.

Birding and ornithology in India has come a long way since its inception during the British era. During that period of enormous discoveries, there were new bird species to describe, and information to collect. This resulted in the first-recorded baseline data for species distributions. Until date, it is this information that is still being used in our field guides. In fact, the early ornithologists did such a thorough job in those 150 or so years, that just four new species have been described since India's independence in 1947. The bulk of the credit goes to naturalists such as A. O. Hume, T. C. Jerdon, Edward Blyth, Brian Hodgson, Samuel Tickell, John Gould and some others who were active between the mid-1800s and early 1900s.

Post-Independence, there continued to be interest in birds but it was lacklustre with nothing very exciting to report. However, in the last 15 years, birding has undergone a transformation and is evolving at a breathtaking pace. Before 1999, the most reliable source of information was in Dr. Sálim Ali's and Sir Dillon Ripley's 10 volumes of *Handbook of the Birds of India and Pakistan*. One couldn't carry these tomes to the field, and identification was an exhausting process. In my early days of birding, I remember heading out to the Bombay Natural History Society (BNHS) library after spending a day in the field. I would take extensive field notes on all the characteristics I could observe and then pore through these volumes to try and identify my sightings. If that wasn't conclusive, I would explore the BNHS' skin collections to confirm the identification. I must say, while it was time consuming, it was also a great learning process.

Then came modern day field-guides by Grimmett, Kazmierczak and Rasmussen, which made bird identification easier. All three were easy to use and included updated information. In addition to these, the creation of e-groups such as *bngbirds* and *birdsofbombay* allowed much exchange of information over the Internet. Webpages such as www.kolkatabirds.com, www.orientalbirdimages.org served as extremely useful databases. Simultaneously two developments in India in the early 2000s – the IT boom and the arrival of digital cameras – triggered a massive surge of interest for birding and bird photography. This has led to a bias favouring photography over birding in India and other Southeast Asian countries.

Over the past decade, birding has become even more digital in India with the appearance of recording equipment, although these were an integral part of birding in Western countries. Websites such as www.xenocanto.org are extremely popular among birders for both locating birds in the wild and for identifying them. Then came *Facebook* that led to the formation of many birding and wildlife groups; for example, *Indian Birds* with nearly 1,12,000 members and *Sanctuary Asia* with nearly 1,48,000 members. One also has recourse to powerful platforms such as *ebird* with much global scope and reach.

However, there are still a few challenges. Reliable field guides are expensive and still too bulky to carry around in the field. There are not more than three to four illustrations of each species in these field-guides. They also lack bird vocalisations. Some field guides (in PDF format) do contain bird vocalisations, but file sizes are heavy and take up a lot of space in the phone memory. We still do not have enough information handy, when it comes to elevations of bird species. Along with bird vocalisations, distinct identification features and behaviour, elevation also plays a very important role. For example, if one notices a Leaf Warbler in the mid-elevations of the eastern Himalaya with identification features such as distinct crown stripe, two wing-bars, fleshy bill, and alternate flicking of wings, then it is most likely to be a Blyth's Leaf Warbler.

As I write this, a quarter of the world's population – around 1.8 billion – are aged between 15 and 30. This young demographic is driving the rapid adoption of digital technologies with much more information available at one's fingertips. Now is the time for birding to become ubiquitous and not remain limited to a small elite group. This became even more clearer to me when I successfully completed my Big Year in 2015, observing a record 1,128 species on a shoe-string budget. To implement this vision, I came up with the idea of a mobile application called *Vannya*, designed to bring the entire birding community – both novice and experienced birders – on a single platform.

Vannya is free to download and has been carefully designed to ensure ease of use by even novice birders. Unique features of the app include The Bird of the Day, Top Trending Bird and the coverage of all popular taxonomies of the Bird List. It also features bird size references for every species along with basic ecological and taxonomic information. Further, we are expecting to release two enhancements in the near future. These future versions of *Vannya* create an exciting roadmap for seasoned birders with features such as bird vocalisations that can also be used offline, bird distributions, habitats, elevations, identification features to help identify particular bird species, and more.

A team of biologists and engineers have been working really hard over the past one year to create this application. All the concepts that we visualised on the white board, were realised as software codes in the application. We have a long-term vision for *Vannya* and are working towards a platform that educates more people about India's rich natural heritage besides helping birders, scientists, and the conservationists network. In the long run, we also hope that *Vannya* will enable the birding community to act as eyes and ears for conservation.

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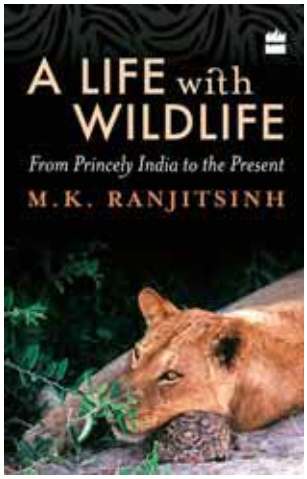
BOOK REVIEW



A LIFE WITH WILDLIFE: FROM PRINCELY INDIA TO THE PRESENT

By M. K. Ranjitsinh
Published by HarperCollins
Hardcover, Rs. 799/-

Which is the animal that has faced the maximum decline after Independence? Most would say it's the tiger (some estimates say there were 35,000 tigers in India in the twentieth century), some would say it is elephants or the teetering Great Indian Bustard.

M. K. Ranjitsinh though, says it is the blackbuck. In his memoirs, *A Life with Wildlife: From Princely India to the Present*, Ranjitsinh tells the story of many species – and his observations may come as news to us. The blackbuck was the "showpiece of the plains", and has suffered a dramatic decline, he writes. In Saurashtra, the author estimates blackbucks declined from 80,000 to 3,000 between the 1940s and 1960s. This is a pertinent way to understand this book.

Ranjitsinh writes of all the wildlife he has experienced, not just charismatic species. From elusive takins to tigers, blackbuck to wild pigs and the critically endangered Great Indian Bustards. His life provides a meaningful and continued link between pre-Independence and present-day India, through his personal observation as well as participation in the drafting of law and policy.

That Ranjitsinh helped in drafting the *Wild Life (Protection) Act* of 1972, and in carving out several sanctuaries, is well known. What is lesser known are the stories behind these actions. For instance, his memoirs say state governments frittered away conservation ethics after Independence – Odisha called for hunting of tigers even in the 1950s, and other states deforested heavily. While many may not agree with his pro-royalist views, the book is a valuable account of how conservation was brought on national and state agendas. There have been many 'Ranjitsinh committees' in the National Board for Wildlife, several letters to heads of government, and rewilding or reintroduction proposals (such as bringing Asiatic cheetahs to India). Some of the author's interventions worked, and some didn't. The memoirs seem to suggest what counts in conservation is the effort, rather than guarantees of success.

On the other hand, this is also a personalised natural history account. There are vivid accounts of treks, jungle walks, encounters with wildlife like bears and leopards – and scars – gathered over the years. The author recounts breaking into tears when he spotted a leopard in Rampara, a cherished forest, on December 31, 2015. For the teeming wealth of natural history knowledge and raconteur it offers, the tone of the book meanders and should have had better editing.

For many a modern reader, a pertinent curiosity would be – what does a retired civil servant and additional secretary in the environment ministry, sometime-hunter and an active conservationist have to say about conservation today? One of the burning issues is that of the modern hunt – many states today wish to scour out and cull animals. This is what Ranjitsinh told *Sanctuary Asia*, "Culling should not be started. If an animal has to be destroyed, it must be by the wildlife department itself. The reason is that we are a country in which there are no halfway measures. Either we allow full grazing or we close grazing altogether. Regulated grazing has never worked. We have moved from a hunting ethos to a protection one in the country. If we go back to a so-called controlled hunting phase, not only will it be hugely misused but the conservation ethos itself may change. And it will provide the present government an opportunity to undo whatever has been achieved in the last four decades."

There are, unhappily, some other repeats of history too, chief being massive pollution and an absence of responsibility towards environmental damage. The author was present in Bhopal in 1984 when the gas tragedy happened, though spared from direct exposure. The true lessons of Bhopal were not learnt, and are still not realised, the book avers. By going against Nature in creating pesticides or poisons stronger than the last, we are creating short term but completely unsustainable patterns; a process we see repeated today, he stresses. The air of Delhi and Mumbai, and many other cities, is testament to this lack of sustainability.

This is an important lesson – problems are cyclical; thus finding sustainability and solutions is even more important and shouldn't be brushed off to the next generation. I'd thus recommend this complex but rewarding book not just to the wildlife enthusiast but to anyone interested in environmental decision-making.

By Neha Sinha

COURTESY: BHUTAN GLORY ECO-CLUB

BHUTAN GLORY ECO-CLUB

In the remote villages that fringe the Fakim Wildlife Sanctuary in Nagaland, a dynamic duo is transforming community sentiment towards conservation. Founders of the Bhutan Glory Eco-club, Tsuseki and Limthure belong to the *Yimchunger* tribe and have spent more than half-a-decade involving local youth in conservation, developing cultural taboos around hunting and documenting the region's biodiversity.

Named after the Bhutan glory, a butterfly endemic to the region, the club collaborated with the state Forest Department to convert Fakim (pop. 450), into Nagaland's first complete LED village. The duo's relentless efforts won the support of the community and their village counsel, which, for starters forbade hunting during breeding seasons.

Fellows of Green Hub, a youth and community-based video documentation centre, they are focused on documenting community efforts to protect the environment, wildlife and biodiversity of Northeast India. Tsuseki and Limthure are proficient photographers and videographers. Their biodiversity interests have seen them document 44 species of birds and 101 species of butterflies in Fakim alone. Their photos were published in a book *Wildlife of Fakim*, which has helped to create awareness about the region's biodiversity amongst locals and were also exhibited for local communities, church leaders and village heads.

"Tsuseki and Limthure's work is of real value. Their perseverance has resulted in their remote and hunting-impacted village moving towards forest protection and conservation," says Rita Banerji, wildlife filmmaker and founder of Greenhub.

On the recommendation of Banerji, Tsuseki and Limthure were appointed Project Leaders for *Sanctuary's* 'Mud on Boots' project in January 2017. The grant they received has enabled them to conduct weekly sessions for 18 key members of the Bhutan Glory Eco-club. Since then they have held photography workshops and awareness programmes for students in the nearby government primary school. What was most heartening was the invitation from the Forest Department in Khonoma village to present their findings of the survey conducted to assess the status of the vulnerable Blyth's Tragopan. This was followed by an invitation from the Forest Department of the Tseminyu village, who wanted to know more about their work

LIMTHURE

COURTESY: BHUTAN GLORY ECO-CLUB

The Bhutan Glory Eco-club, named after the rare butterfly (top) found in parts of Northeast India and neighbouring Bhutan, uses photography, art and tree plantation drives to involve local communities in their mission.

in Fakim so that other local communities could be motivated.

Such steps may at first glance seem relatively insignificant to some, but those working in the Northeast understand the vital importance of winning even small battles to involve communities in positive conservation campaigns. This is because communities influence each other and the domino effect of positive steps can rapidly take root across much wider landscapes than planned. Planting native seeds, restoring patches of *jhum*-impacted (swidden agriculture) lands and winning the trust of the wider community are all part of the mission. In Tsuseki's words, "We understand that the fine balance between the imperatives of wildlife and the needs of people must be maintained. We are determined to rewild lost lands and improve our own water regimes."

Interestingly, art, design, photography, and writing are key skills that are helping the local youths to express themselves with friends, family and even distant communities. Soon the club intends to establish homestays and other conservation-based livelihoods in Fakim and its surrounds. It asks that researchers and NGOs pitch in with simple help including capacity-building, training and modest resources.

Tsuseki goes on to say that, "Deforestation and the expansion of agriculture are major reasons for wildlife depletion. The Club now not only works with the Wildlife Department but is also recognised by the influential North East Network, a women's rights organisation."

With determination born of inner conviction, these two remarkable flag bearers, are creating a cadre of environmental activists who work with traditions that help and seek to change those that do not.

Sanctuary Nature Foundation intends to continue to support the work of the Bhutan Glory Eco-club in the years to come and we urge our readers to add their strength to this vital mission.

How You Can Help: Donate money if you can. Your old cameras, laptops or even equipment such as external hard disks would be helpful.

Contact: Tsuseki Yimchunger
Tel.: +91 98624 16529
Email: ytsuseki@gmail.com,
Limthure Yimchunger
Tel.: +91 84160 59466
Email: limthure@gmail.com

Time To Address The Elephant In The Room

On November 6, 2017, the world was graphically reminded of the gauntlet that India's elephants must negotiate on a daily basis just to access food, water and safety for their young ones (see Readers Forum, page 96). A mind-numbing image of an elephant mother and calf traumatised by fire balls thrown at them by a mob of young, jeering men, taken two years ago in Bankura, West Bengal, shook the conscience of the world. The image encapsulated a pan-India Human-Elephant Conflict (HEC) problem and saw Biplab Hazra anointed as the Sanctuary Photographer of the Year 2017 for offering visual proof of the gargantuan Human-Elephant Conflict that continues to be aggravated by thoughtless planners and insensitive ministries at both the Centre and the State level.

Vital elephant habitats and routes continue to be ravaged, pushing HEC to a point where rural communities and long-ranging elephants (both victims) are being forced into lethal conflict.

This struggle is by no means confined to West Bengal. The unrelenting degradation and destruction of wildernesses such as **Dalma in Jharkhand**, from where the Bankura herd was displaced several years ago at the hands of deforestation and mining, has reached boiling-point in different parts of India. Sajal Madhu, *Sanctuary's* Mud On Boots Project Leader, has been working to record and mitigate HEC in Raigarh under his initiative 'Hathi Bachao Sangharsh Samiti'.

Back in May 2015, violation of wildlife laws by the **Numaligarh Refinery Limited (NRL) in Assam** had deadly consequences for the elephants of the Kaziranga landscape. Showing complete disregard for the rules and the orders of the National Green Tribunal, the NRL acquired land very close to **Deopahar Proposed Reserved Forest**, Assam, within the 'No-development Zone'.

Here, without the necessary clearances, NRL built a golf course on the northern side of the old township by destroying forests, hillocks and wetlands, and also constructed a massive boundary wall, running more than two kilometres in length on the newly-acquired land around Deopahar forests. This wall effectively obstructed an important elephant corridor. The wall claimed the life of a seven-year-old male elephant, whose death was caused by a severe haemorrhage as it desperately tried to break through the wall. Today, another proposed joint venture between Numaligarh Refinery Limited (NRL) and Finland's Chempolis Oy, slated to be built just outside the Deopahar forest, is the next ecological disaster waiting to happen.

In central India, Chhattisgarh has seen its own fair share of conflict that has claimed the lives of a number of elephants and people in 2017, including two women who were trampled to death by a herd of elephants in May; and two elephants, one of which was pregnant, that were electrocuted in January. By some estimates a terrifying 150 elephant deaths from electrocution have been recorded between 2000 to 2015.

Sanctuary's on ground sources maintain that the situation in the state is getting bleaker by the day and that official numbers do not accurately reflect ground realities.

In February 2017, *Sanctuary* launched its campaign **'Giant Refugees'**, in support of a herd of wild elephants caught in simmering conflict with humans on the outskirts of **Bhubaneshwar city**, Odisha. In a situation that is strikingly similar to that of West Bengal's Bankura elephants, Odisha's Chandaka-Dampara Wildlife Sanctuary, natal home of the herd, had become too degraded to support the herd, which would therefore gravitate towards fields where HEC became inevitable. Wildlife conservationists have urged that land be acquired and islanded patches of forests in Odisha's Athgarh Forest Division be regenerated and protected and that the Odisha Forest Department be financially and administratively supported so that a dedicated team can monitor the movement of the herd until a permanent solution can be found. As of now, like a scourge, mobs of young men have taken to provoking and chasing the pachyderms, hurling sticks, stones and in some notorious cases even tar-fire-bombs at the terrified animals.

Despite countless appeals made by wildlife activists and even senior forest officials, the Chief Ministers of various states have not found within themselves the necessary motivation to pursue solutions to put an end to the suffering of both man and animal. Such indifference promises to be catastrophic, as a ticking time bomb of HEC promises to spin out of control.

WHAT YOU CAN DO:

Sanctuary readers are among the most pro-active networks in India. As a supporter you can help these #GiantRefugees by writing to the Honorable Prime Minister of India and the Union Environment Minister.

Make the following points:

- In the land of Lord Ganesh, protecting wild elephants and their forested homes must become a major national priority.
- One benefit of such action would be improved water and soil regimes and sequesteration of atmospheric carbon, all collateral benefits of regenerating ecosystems.
- It is vital that corridor connectivity between forests in conflicted state and beyond be restored.
- Until a permanent solution is found, State police forces should be directed to work together with Forest Departments on crowd control so that mobs do not harass elephants and allow them unfettered passage.
- Project Elephant needs to set up a dedicated task force in close coordination with Project Tiger since both animals often share the same habitat. This coordination under the guidance of trusted experts can make a tangible difference to humans and elephants and direct the restoration and revival of corridors in conflict-states.

You can address polite letters to:

Shri. Narendra Modi,
Honorable Prime Minister of India,
South Block, New Delhi.

Dr. Harshvardhan Singh,
Minister, Environment, Forests and Climate Change, Indira Paryavaran Bhavan, Jorbagh Road, New Delhi – 110 003.

You may choose to send a polite email to:
dr.harshvardhan@sansad.nic.in; ps2mefcc@gov.in; connect@mygov.nic.in

With a copy to:
editorial@sanctuaryasia.com

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NETWORKING

On November 6, 2017 the world's slumber was broken by a searing image of a burning elephant calf and its mother, attempting to flee a mob in the Bankura district of West Bengal. The haunting scene captured by Sanctuary's *Wildlife Photographer of the Year 2017 Biplab Hazra drew an avalanche of comments on our social media channels. We share their pain and concern.*

COMMENTS

I am a mother and a teacher. I have talked a lot about animal human interactions. I try to keep it positive as I teach 8-15 year olds. What else can I do? I don't want my daughter to sit with my smart phone and cuss at people for doing this; it is a waste of time to do that.

Barkha Agrawal, New Jersey

Our village is frequently invaded by these wild animals that come all the way from the Dalma Range. The fault of course lies with us. It is because of rampant habitat destruction (in this case the forest) that the elephants come near human settlements. This has been a great problem over the years. And as the picture shows these elephants have been subjected to terrible abuse and torture. When the elephants come near a village, the respective Forest Department hires people to drive them back to the jungle. These people are locally known as Hulia Party. They use fire crackers, big and bright lights, harpoon, tin drums to make noises to scare them off, torches and bow and arrows. There is no denying that these poor creatures suffer greatly at our hands. But it is also true that they have wrecked havoc on poor peasants that are entirely dependent on agriculture. They ransack the paddy, potato, and wheat fields. Many farmers have committed suicide because of the losses. But worse still, they have killed innocent people too. The silver lining amongst this gloom is that now the Forest Department has built deep trenches along the perimeter of the jungle fenced with electrical wire. That electrified fence won't kill them but it's strong enough to repel them. Hopefully, we have left the worse behind us.

Mainak Mazumder, West Bengal

This image completely and utterly breaks my heart. I am overwhelmed by the fear and anxiety, pain and torment, these precious creatures have undergone and are enduring. What can be done?

Michelle Maynard Koenig, Ohio

I can't stand to see this. There are better ways to deal with the problem of elephants coming into the rural areas. The government needs to end this abuse and come up with a better solution.

Deborah L. Hretsina, Ontario

As long as the crisis stays away from the seats of power, the state government can conveniently choose not to acknowledge it while the centre remains obsessed with *gau-mata*.

Rajarshi Bhattacharjee, Durgapur

To all who have viewed this horror and are no doubt horrified and angry... the request is please get involved. Write to the Minister at MOE&F (http://envfor.nic.in/). Please express your concern and outrage at the event but please be civilised in what you write. The biggest threat and the biggest opportunity our wildlife has is the lack of support for conservation.

Ashok Vashisht, Panchkula

This image completely breaks my heart. It's sad to see what these beautiful creatures have to endure.

Jessica Atkins, New York

South Bengal is in a mess with respect to elephant protection. The government does not care. Please let me know if you are aware of any one involved in elephant conservation in south Bengal and I would like to help as well. Please dedicate an entire issue about the problem of elephant mismanagement in South Bengal. Especially, Bankura district.

Partha Sarathy, South Bengal

I saw the photo and my heart broke for their suffering. I understand there is escalating conflict between humans and these magnificent animals, but to inflict such horror is beyond understanding. Going to bed last night I could not stop thinking about their pain and fear, and when I woke up, I decided to start a petition on care2.com.

Ali Murf, Ohio

I am an American living in Liberia and I saw the award-winning photo 'Hell Is Here'. I want to find out ways I can contribute to the protection of these elephants in this specific location in India. Can you please direct me to an organisation working on elephant conservation and protection there? It would be so greatly appreciated.

Whitney Haruf, whitney.haruf@gmail.com

The images are beyond disturbing. What actions are the Indian government taking to punish these despicable cowards and put them behind bars and to protect these innocent elephants? What else can be done?

Brian H., cosmocleo@hotmail.com

For the Editors' take on the issue, please turn to page 96.

Join *Sanctuary's* online network:

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READERS' FORUM

HELL IS HERE

Holding people accountable for elephant welfare and solutions to decrease human and elephant conflict must happen. *Sanctuary* should assist in finding solutions to this extinction event. Tell us what we can do.

Mark Goldsworthy, markallangoldsworthy@gmail.com

It's most unfortunate to see the sad plight of elephants in south Bengal and other parts of the country. I am happy to help. Merely writing petitions to the CM won't help. Approaching the Supreme Court would be a better option. We need more action on the ground.

Partha Sarathy, South Bengal

I saw your horrifying post on people throwing flaming tar balls at elephants in India. From across the world I would like to help. Guide us how we can add our strength to yours so elephants can regain lost forests.

Jen Honickman, jnghonickm@gmail.com

The photo of a baby elephant and its mother being attacked by burning tar balls was very upsetting. My hope is that the people who do this will be punished for the cruelty they inflict on these intelligent animals. Why would you pick a picture of a calf being burned to death? This deserves an award? I don't remember the last time I have been so upset.

Cheryl Leber, cleber_7800@fuse.net

Why would you award someone for taking this picture and not helping the elephants? Why would it win an 'award'? You must put a warning on pictures such as these. I am traumatised by the images. I have been an animal advocate my entire life and have worked to protect elephants. The photographer should have thrown down the camera and addressed the horror of this event.

Sharon Mastrianni, sharonmk3@verizon.net

I recently saw a post titled 'Hell is Here' in reference to the Asian elephant. I am proud to see your publication raise awareness on the issue. However, I am just appalled at what people are doing to these creatures. How can a person cheer while harming any animal? I feel so powerless in this world where we kill one another and now we cheer when tormenting a baby elephant calf with fire balls. I tend to scroll through news, and like many others, I admit I have become somewhat desensitised and mildly jaundiced to the human realities we all see every day. Yet seeing and reading about these poor creatures and seeing their plight I want to work towards solutions. This travesty cannot continue. This barbarism is not human.

Thomas, busht17@hotmail.com

Though the title of the photograph "Hell is Here" is in favour of elephants. I would not have presented the photographer with the award because others may instigate such torture just to win an award at some future date. Also people living in other human-elephant conflict areas may take a cue from such images and resort to throwing fireballs and crackers on elephants.

Nitin Singhvi, Raipur

We share the pain of Sanctuary Asia *readers and Sanctuary Nature Foundation supporters. This trauma has being inflicted in Bankura, West Bengal for two decades or so. Why did the judges choose this image? To shake India and the world from decades of complacency where elephants were suffering in oblivion. More over the loss of elephant habitats to projects such as dams, mines, roads are often*

financed by institutions such as the World Bank and it is time that tax payers in other countries added their voice to ours asking for a stop to such illegitimate loans. Similarly, within India agricultural encroachments are encouraged by politicians in exchange for votes. These elephants were driven away from their natural home thanks to habitat destruction. Both elephants and local farmers are victims of faulty planning and land management. Tragically, mobs have also taken to traumatising elephants. Sanctuary *is working to protect the pachyderms by highlighting their plight and working for the #RightOfPassage of these #GiantRefugees. Such images serve to bring the force of public opinion to bear on both Central and State Governments. The image was taken two years ago and despite super-human efforts no effective action to redress the problem has emerged. We want the elephants saved. We want the trauma to end. We believe revealing reality will have a much greater effect than hiding the truth. -Ed.*

BIRDS AND BEASTS

A multi-specialty naturalist, Sumit you are a great illustrator, photographer and writer, the other qualities I am not mentioning! Wonderful.

Kushal Mookherjee, Kolkata

BANKE RESTORED

Great to hear about the restoration of Banke National Park. Hope it is well protected and managed in the future too.

Ashok Vashisht, vashisht.ashok@ymail.com

SANCTUARY WILDLIFE FESTIVAL

I thank you and the entire team of *Sanctuary Asia* for organising a brilliant wildlife photography workshop and the awards ceremony on November 5, 2017. As part of the advanced wildlife photography workshop I picked up both technical and conservation skills from some of India's most renowned photographers.

Vishal Dave, Ahmedabad

BELOW LEFT TO RIGHT *The date stamp on these images, submitted by Biplab Hazra, Sanctuary's Photographer of the Year 2017, reveal that the elephants were being chased to and fro and not away from crop fields. Also that the calf was not 'on fire' as many mistakenly presumed, though it was singed and scared witless by the mob of young men. It is* Sanctuary's *position that the onus of peace between man and animal lies squarely on humans. Our purpose will be well served if policymakers at the central and state levels are moved to come up with practical solutions to mitigate the problem. Hopefully, from these images where faces are visible, arrests and exemplary punishment will follow.*

Next Issue

Reimagining 'Baloo' of Central India
Working as a Kanha-Pench Landscape Coordinator with The Corbett Foundation's Kanha division enables **Aniruddha Dhamorikar** to experience life in the jungle the way Rudyard Kipling imagined in his classic *The Jungle Book*. Based on the findings of a research project titled 'Dynamics of Human-Sloth Bear Conflict in the Kanha-Pench Corridor', he highlights how competition for shared resources can lead to stress for these normally shy and reserved animals.

Herping in Thar
Even after countless trips to the wonderland that is the Thar, **Catherine Christian** and **Vipul Ramanuj** say that the search for amphibians and reptiles leaves them routinely awe-struck. They showcase species found here through images that draw attention to what we may lose in the race for 'development'.

In Pursuit of Small Cats in Bhitarkanika
As a project biologist with the Wildlife Institute of India, Dehradun, **Vivek Sarkar** was part of a team mandated to nominate Odisha's Bhitarkanika Wildlife Sanctuary and National Park as a UNESCO World Heritage Site. A photography expedition to the park led him to encounters with three small cats on the top of his wish list.

"TIGER DEKHA? TIGER DEKHA?"

DR. ANISH ANDHERIA

Wildlife tourism is a vital conservation tool, but can be a double-edged sword. Unimaginative tourism of the kind we see in this image shot in the Tadoba Tiger Reserve is detrimental to wildlife. This 'circus' plays itself out virtually every day in national parks and sanctuaries across India.

In a mad quest for prized tiger sightings and great images, we tourists seem unwilling to adhere to even the most basics ethical standards. Correcting such anomalies is vital to the future of wildlife tourism (see page 34). As of now, however, the National Tiger Conservation Authority (NTCA) is playing the role of a spoiler. The NTCA doggedly insists on foisting its flawed, one-size-fits-all tourism policy across India. This forces hundreds of vehicles carrying thousands of visitors into handkerchief-sized territories, much to the distress of tiger society. Far from decongesting our parks, a laudable objective, this short-sighted policy often causes dusty traffic jams in forests in the worst possible way. The animals suffer. The forest suffers. The tourism experience suffers. Much to their chagrin, those who travel from afar for peace and solitude are confronted with 'yahoos' yelling and screaming. It's time most wildlife departments were directed to focus their attention to what they are good at – the critical task of habitat and wildlife protection.

It's time wildlife departments were directed to focus their attention on what they have proved they are good at – the critical task of habitat and wildlife protection. This is the primary task that Kailash Sankhala, the first Director of Project Tiger set for them in 1973. They should not try to become either tourism experts or social workers.

There are enough creative, ethical tourism professionals, who know how to manage the buffers of our most biodiverse forests in ways that can prepare such lands to receive spillover populations of herbivores and carnivores from well-protected core zones. Here, location-specific, proven rewilding strategies such as *Community Owned Community Operated Nature Conservancies* can offer self-employed local people dignified livelihoods by making them the primary beneficiaries of wildlife tourism. Working with nature as owners of rewilded lands and homestays might even staunch the tragic farmer suicides that have traumatised those who feed us.

It's a simple idea that links social justice with economics and biodiversity conservation by using nature's complex systems to our advantage. That in my view is probably the best option we have in the coming decades of fixing the conundrum that defines India's wildlife tourism initiatives today as exemplified by ungainly vehicle to vehicle shouts of "*Tiger dekha? Tiger dekha?*"

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K&L Arms/12/17

Registered with Registrar of Newspapers under RNI No. 37628/1981
Postal Registration No. MCS/010/2015-17.
Published on 1st of every month
Posted at Patrika Channel Sorting office, Mumbai - 400001.
Posting date: 3rd & 4th of every month

Image by: DR. ANISH ANDHERIA

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FOREVER STRIPES

The survival of the tiger and all the creatures that share its habitat, including leopards, wild dogs, elephants, rhinos and uncounted plants, insects, birds, reptiles and herbivores, depends on whether humans can set aside vast parcels of land for nature.

The wildlife conservation movement needs the support of us all. For more information on how you can help, or to pledge your support for those who work 24x7 to protect our wildlife, write to Dr. Anish Andheria (Director, Wildlife Conservation Trust) at **anish.andheria@gmail.com** or visit **www.wildlifeconservationtrust.org**

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