HORNBILL

DISCOVER THE LIVING WORLD

JANUARY-MARCH, 2018

BNHS INDIA CONSERVING NATURE SINCE 1883

BOMBAY NATURAL HISTORY SOCIETY

Fantastic views.
Wherever, whenever.

ZEISS Victory SF

// RELIABILITY
MADE BY ZEISS

The new ZEISS Victory SF 42
Small details reveal great differences

With the latest version of the Victory® SF Binoculars from ZEISS you won't miss a thing. Thanks to the incredibly sharp image, a tremendous field of view and an optimised SmartFocus mechanism, they are the ideal companion for all nature enthusiasts travelling to the far corners of the earth in pursuit of their passion.

Carl Zeiss India (Bangalore) Pvt. Ltd.,
Plot No.3, Bommasandra Industrial Area, Bangalore-560 099, India.
Customer Support: consumeroptics.india@zeiss.com • Tel: 011-45156000

www.zeiss.com/sports-optics

CIN: U33125KA2009PTC049465

ZEISS

HORNBILL

January-March, 2018

Cover: Chameleon
Vipul Ramanuj

Published and printed quarterly by Dr. Ashok Kothari for the Bombay Natural History Society, Printed at Akshata Arts Pvt. Ltd., Lower Parel, Mumbai.
Reg. No. RN 35749/79, ISSN 0441-2370.

For more information on the Society and its activities, write to the Honorary Secretary, Bombay Natural History Society, Dr. Sálim Ali Chowk, S.B. Singh Road, Mumbai 400 001, Maharashtra, India.
Tel.: (91-22) 2282 1811
Fax: (91-22) 2283 7615
E-mail: info@bnhs.org
Website: www.bnhs.org

CONTENTS

FEATURES

Reptile Conservation

From time immemorial, reptiles have been looked upon as powerful mythical creatures across various cultures throughout the globe. As aides to various gods, shape-shifting supernatural beings, or mighty dragons, reptiles have been the inspiration behind various folktales. Humankind's curiosity in reptiles is evident right from their mention in the first book of the Bible to the observations of Aristotle, the father of biology. Accounts on reptiles and amphibians can be found in early Egyptian, ancient Greek, Hindu, Shamanist, Chinese, and other South Asian texts, as well as in Pre-Columbian Americas. They were considered to be chthonic creatures inhabiting the underworld and were richly represented in mythology, culture, art, and literature. They have been known to evoke revulsion, fear, admiration, and even hysteria across ages. In Indian culture, we have special regard for reptiles, especially snakes which garner both respect as well as fear.

The fear of reptiles, especially snakes, prevalent in India, is not just due to mythical stories and cultural beliefs. It is estimated that approximately 45,000 human lives are lost annually in India due to snakebite. Yet our understanding of snake ecology, the reasons for such a high number of snakebites, and understanding of venom itself is poor. From around 300 species of snakes recorded in the country, the 'big four': cobras, krait, Russell's viper, and saw-scaled viper are known to cause the maximum number of deaths.

Taxonomic studies on reptiles in the Indian subcontinent began in the 19th century with British explorers. Some in-depth ecological studies on them began in the latter part of the 20th century, but a lot more remains to be done on studying and conserving this secretive faunal group. Romulus Whitaker is one among the early pioneers in reptile studies and conservation. Whitaker has dedicated his life to understanding these animals and helping in their conservation, right from the King Cobra and Gharial to marine sea turtles. Popularly known as the Snake Man of India, Whitaker has won numerous prestigious awards including the Rolex and Whitley Fund for Nature, for his contribution to reptile conservation.

Whitaker's work is a great example of how collating innovative ideas with local communities can aid conservation of this most feared group of animals. He founded the Irula Snakecatchers' Cooperative while working with the Irula tribe in Tamil Nadu for extraction of venom and the production of antivenin. He also set up field stations in the Western Ghats and Andaman Islands, engaging local communities and maintaining symbiosis between locals and researchers. The King Cobra telemetry project in Agumbe, Karnataka, was a unique study on the ecology of snakes and provided valuable insights for understanding this elusive reptile. He has made wildlife films about these fascinating animals, to create awareness and generate public interest. Currently, he is involved in addressing the issue of snakebites in India through the 'Indian Snakebite Initiative' which involves various researchers, volunteers, and nature enthusiasts throughout the country, providing information on factors associated with snakebites. This initiative is trying to map the 'big four' in India and to identify issues at the local level. He also made a film for BBC titled 'One Million Snakebites' to create awareness about snakebites in India, the availability and condition of medical facilities, and also myths

associated with snakes. Such innovative and collaborative ideas are necessary when it comes to addressing conservation issues, especially for a group of animals that is feared and loathed.

Other than the phobia of snakes by humans, another hurdle in the way of reptile conservation is a lack of understanding of the importance of their survival. As most of them are nocturnal, shy, and secretive, very little is known about the role of snakes in the larger scheme of life. Modern reptiles, being the closest relatives of the extinct dinosaurs, are like living fossils and hold many answers to questions about evolution, historic biogeography, changing ecosystems, among others. They have survived on this planet for millions of years and have adapted to various different habitats. This specialization has in turn given rise to species of various shapes and morphological types. So, there are burrowing lizards with reduced or atrophied limbs, and the gliding lizards and parachute geckos which have extended ribs covered with skin between their limbs that help them glide amidst tall trees in rainforests. There are pit vipers and pythons with heat-sensing pits which help them locate and ambush warm blooded animals, and pygmy chameleons of Madagascar that are so small that the adults can perch on top of a matchstick! These unique adaptations of reptiles help them survive in the harshest of conditions and avoid competition, but they come at great cost. As these animals are specialized to prefer niche conditions, they are also amongst the most threatened by rapid changes in the habitat and climate. Sex determination in reptiles like turtles and crocodiles is dependent on temperature, hence climate change is a major threat to them, as it may result in drastically skewed sex ratios.

Even though considerable studies have been done on the taxonomy of reptiles, they are sporadic and unorganized. In the last decade, more than 30 new species of reptiles have been reported from India. There is a high probability that many more are yet to be discovered, but due to the threats facing this group, we might end up losing species that are not discovered yet. Hence, it is important to systematically work towards their conservation before it is too late. This can only be facilitated with innovative ideas involving communities and researchers working together. Knowledge of ecology and behaviour is crucial to species survival, while local communities could provide additional information about species occurrence, habits, and habitats, and aid in conservation work. An example of this can be seen in the sea turtle hatchling centres on both the east and west coasts of India. Involving local communities has not only helped in the survival of the hatchlings but has provided livelihood to the locals, thus changing their attitudes towards wildlife. Reptiles have been a critical part of our landscape and natural history, both culturally and historically, and the conservation of these elusive and fascinating creatures is of prime importance to us.

Deepak Apte
Saunak Pal

In quest of the Green Avadavat

Text: **Rajat Bhargava**

RAJAT BHARGAVA

My tryst with the Green Avadavat

My association, or should I say obsession, with munias is now almost four decades long. I was hooked on to keeping munias as pets when I was a seven year old schoolboy. Three years later, as a Class V student, I held my first live bird exhibition in 1980 in my school biology lab. Call it privilege or fortune, aviculture came naturally to me as a pastime. I lived in an area where the backdoor of my house opened to the homes of a community of *Baheliya* bird trappers and dealers. Born in Meerut – then a major bird export centre of India – 70 km north of Delhi, since childhood I have keenly observed various birds in trade, understood the culture of bird keeping, and even speak the dialect of the trapping and trading communities. As a teenager, I felt good to be one among them. As they say, "Birds of a feather flock together"! Learning about birds from the *Baheliya*s, who had unparalleled field knowledge of munias and other birds, was an unforgettable experience for me.

During the 1980s, a time when there was free trade in birds, I observed more than 150 native bird species being brought to Meerut from most parts of India for export to European countries for the cage-bird business. The bulk of the trade comprised of parakeets and munias. India is home to eight species of munias (family Estrildidae). These include the Red Avadavat *Amandava amandava*, Green Avadavat *A. formosa*, Scaly-breasted Munia *Lonchura punctulata*, Indian Silverbill *L. malabarica*, Tricoloured Munia *L. malacca*, Chestnut Munia *L. atricapilla*, White-rumped Munia *L. striata*, and Black-throated Munia *L. kelaarti*. The names of genus *Amandava* and species *amandava* are both derived from Ahmedabad, which was a major export hub for munias 200 years ago.

As a child, I saw most munia species in my backyard. Munias are popular aviculture subjects worldwide due to a variety of reasons. They are small (about 10 cm) and hardy birds, highly prized for their attractive coloration and easy to care for in captivity. Being primarily seed-eaters, their diet is low cost and easily available. And they have a variety of appealing trill and chirp calls.

In 1989–1990, the Government of India imposed a blanket ban on the native wild bird trade. I often wondered if the ban was a curse or boon for me. I was sad for my backdoor trapping community, but I also realized that my career was transforming from an aviculturist to an ornithologist after I joined the Centre for Wildlife and Ornithology at Aligarh Muslim University in 1991 to pursue a Master's in Wildlife Science. During my postgraduate studies, I was appalled to learn from Dr. Asad R. Rahmani, my ornithology teacher, that the Green Avadavat (formerly called Green Munia) had been listed as a threatened species in 1988, and is distributed and endemic only to central India. It intrigued me that despite the Green Avadavat being traded worldwide since the late 19th century, there was hardly any information on the species in the wild in its native range.

Conservation status and inclusion in CITES

The Green Avadavat is a globally threatened species listed in the Vulnerable (A2cd+3cd+4cd) category, based on the assessment carried out by Birdlife International. It qualifies for this criterion since it has a rapidly declining population owing to widespread trapping for the cage-bird trade, compounded by habitat loss and degradation through agricultural intensification. Since Green Avadavat is known to be a poor breeder in captivity, its continued presence in international markets suggests that many are wild caught birds. It is listed in Schedule IV of the Indian WildLife (Protection) Act, 1972, whereby its hunting and trapping is totally prohibited.

COURTESY: ST. MARY'S ACADEMY, MEERUT CANTT

My first live bird exhibition in school

In early 1997, I was referred by the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) secretariat to review and carry out a "Significant Trade Study" on Green Avadavat, following a proposal from the Government of Netherlands to include Green Avadavat in Appendix II of CITES, based on the extent of trade of this Indian endemic in their country; Netherlands was then one of the biggest importers of birds from India. CITES is an international agreement between governments which aims to ensure

RAJAT BHARGAVA

Caged Green Avadavats


RAJAT BHARGAVA

Red Avadavat (male)


RAJAT BHARGAVA

Red Avadavat (female)


ABRAR AHMED

Female Red Avadavat dyed green


RAJAT BHARGAVA

Black-throated Munia


RAJAT BHARGAVA

Indian Silverbill


RAJAT BHARGAVA

Scaly-breasted Munia


RAJAT BHARGAVA

Tricoloured Munia


RAJAT BHARGAVA

Chestnut Munia


RAJAT BHARGAVA

White-rumped Munia

that international trade in wild animals and plants does not threaten their survival. This landmark suggestion from Netherlands was unanimously accepted at the CITES 10th meeting of the Conference of the Parties (COP) at Harare, Zimbabwe.

More on Green Avadavat

The Green Avadavat is a small (*c.* 10 cm) and colourful munia. It is olive-green above, and has a pale yellow throat and breast. The centre of belly and undertail-coverts are bright yellow; the flanks are barred olive-brown and white. The female is similar to the male, but browner above and duller and paler below; the flanks have fewer and less obvious bars. The bird is known to inhabit grass and low bush habitat, tall grassland, sugarcane fields, and boulder-strewn scrub jungle.

According to Sálim Ali and S. Dillon Ripley's HANDBOOK OF

THE BIRDS OF INDIA AND PAKISTAN, the Green Avadavat is "very locally and unevenly distributed. It is found mainly in central India from Mt Abu, Gwalior, Jhansi, and Surguja south to Mahabaleshwar, Utnur, and the Vishakapatnam Ghats. It is also recorded from Lucknow and Lahore." A small breeding colony, which was formerly present in Lahore, Pakistan, is believed to have originated from escaped cage-birds. According to most bird trappers familiar with the species, its stronghold is still in Odisha.

RAJAT BHARGAVA

In some parts of India, munia is considered an auspicious bird; individuals are trained by pundits to pick an astrology card to predict one's future

My experiences with munias

I started keeping various species of munias from the 1970s. To feed them, I would steal 15 paise every alternate day from my grandma's "puja ka thala" to purchase 50 gm of birdseed (a kilogram sold at Rs 3 in those days)! Through my repeated requests, or rather pestering, of my neigbourhood trappers, I was often permitted to accompany them during their trapping trips to the grasslands, scrublands, and crop fields around Meerut. Initially, I would quietly follow the trappers to nearby sites on foot, but with time and familiarity, I would cycle up to 40 km on weekends, lying to my parents that I was going to attend extra tuition classes. It was only during a curfew during the late 1980s that my parents got to know the subjects I was studying during my 'tuition classes'!

The Indian Silverbill was the commonest munia around Meerut, and undoubtedly the most 'naïve', being easily caught by the double bamboo trap. It could be lured to the net with tame decoy birds. It is partial to uncultivated land and scrub forest, and was sold for less than a rupee till 1990 at the grassroots level. In those days, getting more than 50–60 birds in winter was not uncommon, but there is now hardly any habitat left for these once very common birds due to the so-called "reclamation of wastelands".

The Red Avadavat was caught from seeding *Saccharum* grasslands in winter. In summer, before the breeding season, Red Avadavat along with the Scaly-breasted Munia, was caught in bulk from its roost congregation in sugarcane fields or wet tall grasslands. The funnel net was the most common method for catching munias after sunset. In the peak breeding season, only the Red Avadavat males were caught in Meerut using decoy females tied to the net. There used to be an annual Red Avadavat fight in Meerut around Rakshabandhan festival organized at the Shahpeer-ka-Maqbara, a traditional practice almost extinct now – some of the participants were almost 70 years of age. If only I was able to document this practice with digital equipment then!

The Red Avadavat was the most preferred munia by local bird keepers as well as importing countries, where it was called Strawberry Finch. The Indian Silverbill was the least preferred by locals, and the Scaly-breasted was sold as 'doctor-bird' for keeping with and treating other munia cage inmates, as it is hyped to have miraculous curative powers and if mingled with other birds can prevent their illness. There is a famous saying "Piddī pālē pilpilā, āshiq pālē lāl, kabootar pālē chotṭā, takē ṭhagē kā māl" (which translates to – soft, fat people keep Indian Silverbills (*piddi*) as pets, while young lovers keep Red Avadavats (*lal*). Domesticated flying pigeons are kept by crooks who eye others' birds.

The Black-headed Munia, now split into the Tricoloured and Chestnut Munia, was once supplied by Bangalore and Chennai dealers to Meerut via Delhi with hardly any individuals having a chestnut belly (seen in Chestnut Munia). Chestnut Munia, along with White-rumped Munia, came from eastern India suppliers from west Uttar Pradesh onwards. In the summer of 1987, when I had just passed my Class XII board examination, western Uttar Pradesh witnessed huge summer

RAJAT BHARGAVA

Traditional events such as Red Avadavat fights in north India *terai* are now almost extinct. The last of the munia fights in Meerut was organized in the mid 1980s

migration of the Black-headed Munia for the first time, which continues till date. This species come with the first shower of rains, breeds in Meerut, and vanishes by the end of November with large flocks of juveniles.

Now coming back to my favourite munia – the Green Avadavat, they were largely brought to Meerut around June end by Kolkata dealers even though this species does not occur in West Bengal. That inspired me to find out more about India's most elusive munia species from bird trappers, dealers, and exporters. I even tried to breed it in my collection, but with little or no success. After completing my post-graduation in Wildlife Science in 1993, my aim was to see this species in the wild rather than in cages. My *Baheliya* friends advised me to take the help of their former suppliers in Jhansi, bordering Madhya Pradesh. My memories of the first sightings of Green Avadavat in the wild 24 years ago are still fresh. Lacho bai, a well-known woman bird dealer from Jhansi, used to bring Green Avadavats to Meerut every summer. During a visit in 1994, her clan (the *Aaheri*s) generously offered to show me Green Avadavats around the Madhya Pradesh border with Uttar Pradesh. Moreover, during the trip, I got to see how this species was collected from the wild, followed by insights into the process of their initial acclimatization to captivity.

On a short field trip in June 1994, we located a small Green Avadavat population near Tikamgarh. In an area of about 1 sq. km, we recorded a population of 60–70 birds in a stony, arid wasteland, along with Red Avadavat, Scaly-breasted Munia, Indian Silverbill, and Tricoloured Munia. The Baya Weaver, Black-breasted Weaver, and Streaked Weaver were also sighted along with the munias. The Green Avadavats mostly kept to themselves while resting and foraging for food. Interestingly, the Green Avadavat is not a shy bird and can be approached as close as 8–10 m and was even found near human habitation.

Green Avadavat, from my observations in Madhya Pradesh and Rajasthan, fed mostly on the ground on grass seeds, and when approached, flew to Lantana bushes nearby, where the green on their back camouflaged well with the vegetation. Flock members keep in touch with each other through their *swee swee* calls (and also along with similar Red Avadavat-like feeble cheeps). In summer, they had a bimodal feeding activity pattern, foraging in the morning and evening. When the weather was hot, they would spend long hours resting in the shade; in Tikamgarh they rested in Ipomea shrubs along with other aquatic vegetation. With the onset of the breeding season in June, they mostly kept in pairs, and would sit on a thin branch, and when excited, would flatten the tail, pointing towards each other, synchronously uttering a high pitched note.

Mount Abu – A Green Avadavat Paradise

The best place known for certain sighting of Green Avadavat is Mount Abu Wildlife Sanctuary, where my ex-BNHS colleague, Dr. Satya Prakash Mehra, conducted preliminary studies. Mount Abu attracts foreign and Indian birders for watching and photographing this beautiful munia at close quarters. I feel Mount Abu is the only place in India where this species can survive in extreme cold weather around December and January; otherwise in most of its distribution range in central India the winter temperature is rather high. In a nutshell, it is a real 'sun-worshipper'! Quite recently in August 2017, Mr. Hemant Singh, the present DFO of Mount Abu, observed a colony of 10–15 pairs of Green Avadavats nesting in a Lantana bush about five feet from the ground.

BNHS initiates a country-wide study on Green Avadavat

During one of my visits to BNHS headquarters in 2016, it took me no time to convince the Director, Dr. Deepak Apte, that BNHS should

RAJAT BHARGAVA

Mount Abu Wildlife Sanctuary is an ideal place to see the endemic threatened Green Munia

prioritize ornithological studies to focus on threatened species that are endemic to India. As soon as I sent him a proposal to assess the population status and threats to the Green Avadavat, he immediately commissioned a study under the Sálim Ali Nature Conservation Fund.

The main aim of this ongoing project is to gather information on Green Avadavat populations throughout its range, and to identify key sites of its remaining populations. Secondly, we plan to conduct ecological and behavioural studies on this little known species. An investigation into its tolerance to habitat degradation is another objective of the study. And lastly, we hope to prevent or reduce the capture and trade of Green Avadavat by developing more effective measures at the grassroots level and develop rehabilitation strategies for traditional bird trappers and traders willing to adopt alternative livelihoods and help in its conservation.

Green Avadavat Conservation Breeding Centre in Rajasthan

Most birders in India would be astonished to know that there is a Green Avadavat Breeders Group under the umbrella of Queensland Finch Society in Australia. This group, dedicated to captive breeding of our endemic munia, has a stock of less than 100 birds. Aviculturists in India cannot keep stocks of the Green Avadavat since it is a protected species, and captive breeding is not encouraged as it may lead to hidden trade in the species.

After a decade of consultation to develop a state of the art captive-breeding facility in India, I am thrilled to share the news that Udaipur is coming up with a world class Conservation Breeding Centre for Green Avadavat at Gulab Bagh, Udaipur. This is a Rajasthan State Forest Department initiative coordinated by Shri Rahul Bhatnagar, Chief Conservator of Forests, Udaipur under the leadership of Dr. G.V. Reddy, PCCF and Chief Wildlife Warden, Rajasthan. BNHS is the designated knowledge partner in this first of its kind project in India. The Udaipur Forest Dept has sent the Central Zoo Authority of India a master plan for approval of this project on the lines of the BNHS Vulture Conservation Breeding Programme.

In future, BNHS would like to initiate a similar project at Van Vihar,

MONIRUL ALAM

The wrong diet of paddy given to this small grass seed eating finch resulted in mortality of most Green Avadavat seized at Dhaka airport

Bhopal, with the Madhya Pradesh Forest Department.

Is the cage-bird trade a threat to the Green Avadavat?

The Green Avadavat is a highly sought after cage-bird in both the domestic and international markets, second only to the Red Avadavat. Its rarity is now one of the reasons for its high desirability. The species is often sold by the name of 'Tiger Finch'.

Tim Inskipp, a leading international ornithologist, reported in 1981 that a minimum of 2,435 Green Avadavats were imported by dealers into the USA from India between 1970 and 1972. During this period, the species was ranked ninth among the birds commonly exported from India and contributed 0.4 per cent of the total birds imported by USA. Further, in 1983, he mentions that at least 13,580 Green Avadavats were recorded by RSPB (The Royal Society for the Protection of Birds) at Heathrow Airport, London during 1974–76.

According to an article by Lt Sharad Sane, a former Indian bird exporter, which was published in a 1978 *Hornbill* issue, nearly 20,000 Green Avadavats were traded each year from India during the 1970s. Studies by TRAFFIC India during the mid 1990s revealed that 2,000–3,000 adult individuals were caught each year, with Green Avadavat accounting for less than 2% of the annual munia trade.

My current estimates suggest that 200–300 Green Avadavats may be caught in some years. Despite being listed in CITES, its seizure suggests a continued threat to wild populations. For instance on July 2, 2010, a Pakistani national was detained at the Hazrat Shahjalal International Airport, Dhaka, Bangladesh, when he was trying to smuggle about 200 Green Avadavats (along with other bird species) into Pakistan – possibly for export to the Middle East, and Asian and European countries.

Female Red Avadavats are often dyed green to make them look more colourful and exotic, and retailed in domestic markets as pets, or sold for 'merit-release' (an old practice of buying and releasing captive birds on religious or ethical grounds). Escapees of such birds at sites outside its distribution range are sometimes wrongly reported as Green Avadavat. The key identification tip is the red uppertail coverts in the female Red Avadavat, which are noticeable irrespective of whether it is dyed or not, that distinguishes it from Green Avadavat. The white spot on the shoulder of the Red Avadavat is another identification mark; this is sometimes not visible in juvenile Red Avadavat. The Green Avadavat, by itself, can easily be identified by the presence of zebra-like barring on the flanks.

More awareness, research, and conservation work on this little known species needs to be urgently taken up to protect the species and its habitat. Green Avadavat should be upgraded to Schedule I of the Indian Wildlife (Protection) Act to afford maximum possible punishment to deter any further exploitation. ■

Contribute information to the BNHS
'Save the Green Avadavat' Project

I appeal to all our readers to contribute information on any past or present sighting of the Green Avadavat, to help map the current status of the species. Please send the date, year, numbers seen, place, state of your sightings, and any other relevant information, to r.bhargava@bnhs.org You can also call me: 9837122373/022 22821811.

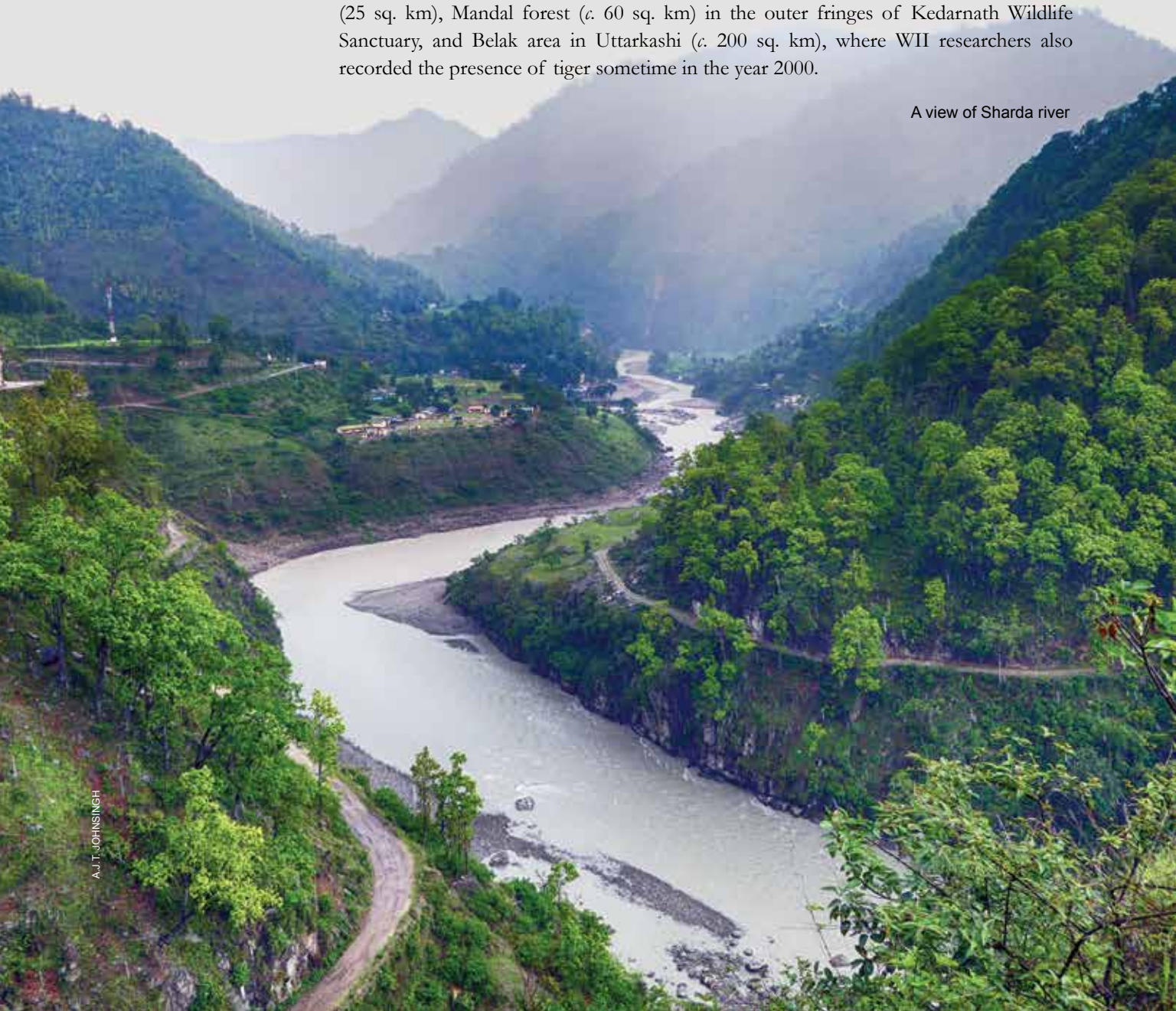
Rajat Bhargava is a Senior Scientist (Ornithology) at BNHS. His main interest is documenting bird and human cultures in India, along with conservation work on Finn's Weaver and Green Avadavat.

Traversing a Sacred Landscape

Text: **A.J.T. Johnsingh** and **G.S. Rawat**

The mountains seemed insurmountable and the climb interminable as we trekked from Baram (788 m) to Bhaiman Udyar (3,152 m) in Askot Wildlife Sanctuary, Uttarakhand. Our mission was to see the habitat where researchers from the Wildlife Institute of India (WII) had camera-trapped a tigress in March 2016, at an altitude of 3,030 m. The 100 sq. km forest around Daphiadhura-Bhaiman Udyar is one of the five places in the Greater Himalaya of Uttarakhand where Sambar has been recorded. The other four sites are Ghandhura (80 sq. km), Thalkedar (25 sq. km), Mandal forest (*c.* 60 sq. km) in the outer fringes of Kedarnath Wildlife Sanctuary, and Belak area in Uttarkashi (*c.* 200 sq. km), where WII researchers also recorded the presence of tiger sometime in the year 2000.

A view of Sharda river



A.J.T. JOHNSINGH

A.J.T. JOHNSINGH

Girl climbing a *Quercus lanuginosa* tree to cut fodder

Recently, WII has become a partner in the Kailash Sacred Landscape (KSL) Project initiated by the Nepal-based International Centre for Integrated Mountain Development (ICIMOD). KSL is a culturally rich, ecologically diverse, and geologically fragile transboundary region spread over 31,000 sq. km in the south-western portion of the Tibetan Autonomous Region of China and adjacent areas in Nepal and India. Marked by the imposing Mount Kailash, KSL is a sacred landscape revered by millions of people of various religions – Buddhist, Hindu, Bon, Jain, and Sikh – and visited by thousands of pilgrims every year. The landscape is also the source of four rivers, the Indus, Brahmaputra, Karnali (or Ghaghra), and Mahakali (or Sharda) which provide water and ecosystem services vital for the lives and livelihoods of millions in the Himalayan region and their downstream areas. The Kailash landscape in India is about 7,120 sq. km, covering the entire district of Pithoragarh (6,826 sq. km) and a smaller part of Bageshwar district (294 sq. km) in Uttarakhand.

Walk to the cattle camp

We were anxious to complete our five-day 50 km trek before the onset of the rains and were pleased to be greeted by a cloudless sky as we began the trek from Baram early in the morning on June 9, 2016. We walked along the right bank of Ghosi nullah, a tributary of the Gori Ganga which joins Sharda river (known as the Mahakali in Nepal) at Jauljibi. The

densely wooded slopes along Ghosi nullah are rich in flora, prominently Sanan or Chariot tree, ficuses, Jamun, Basket Willow, Chebulic and Belliric myrobalans, Kharpaat, and impressive specimens of Indian Mahogany, clothed with an abundance of orchids. The high mountains rising on either side of the valley had dense growth of Himalayan Chir Pine, with an occasional Wild Date palm. These hills are the favoured habitat of Goral. And when the hills were bathed in the golden light of the morning sun, we saw three Goral scrambling up a slope. Melodious calls of Great Barbet, Indian and Common Cuckoo were a delight to the ears. Around 08:45 hrs, we stopped briefly for breakfast near a stream known as Dholigad, which had clean and clear water, but we were distressed to see piles of garbage: plastic sachets left by the villagers.

Our next halt was at an altitude of 1,667 m, at the home of one of the four young hill men who were accompanying us as helpers. At the house, situated at the entrance of Kanar village, he provided us with copious amounts of buttermilk, an elixir on the uphill walk, and briefed us about the crop depredations caused by Barking Deer, Goral, and Wild Pig. Yellow-billed Blue Magpies screeched and flew in the forest of the valley below. Black Partridges called loudly from different corners of the agriculture landscape. Himalayan Griffons, Bearded Vultures, and Crested Serpent-Eagles soared high in the sky.

Lunch was arranged in the home of a villager, situated at an altitude of 1,758 m. Close by was a sacred grove with a red-painted temple of Durga, locally called Kokila Ma. The grove was cool, with trees such as Sweet Olive, Himalayan Chokeberry, and White Oak. When in flower, the fragrance of Sweet Olive permeates the entire valley. Our lunch of *khichdi* (dal and rice cooked together) had a liberal dose of Kanar valley ghee, flavourful and reportedly good for health, obtained by feeding cows on the leaves of Rianj Oak, which is patchily distributed in the valley.

Lunch was followed by a short rest, as our destination for the night was a cattle camp at an altitude of 2,152 m. Getting there necessitated a stiff climb up a slope on steps of slate rock. As we climbed, a pack of mules going to the cattle camp accompanied us, and we saw several girls collecting fodder from various species of oak and fig and *Chrysopogon*

A.J.T. JOHNSINGH

Durga temple in a sacred grove in Kanar village

A.J.T. JOHNSINGH

Mules are indispensable in the mountains to carry loads

G.S. RAWAT

Aerides multiflora, a common orchid growing on the trunk of *Toona ciliata*

G.S. RAWAT

Colourful *Curcuma montana* grows in pine-needle covered soil

AJAZ HUSSAIN

Dendrobium amoenum, another commonly seen orchid

A.J.T. JOHNSINGH

Golden flowers of *Potentilla fulgens* amidst the rocks and grass

G.S. RAWAT

Paris polyphylla is used in traditional medicine

A.J.T. JOHNSINGH

Geranium himalayense in its meadow habitat

gryllus, a perennial bunchgrass, native and reported to be exceedingly palatable and nutritious when young. It was remarkable to see a girl climbing an oak to cut branches for fodder, right at the tip of a 12 m tall branch, overhanging a steep and deep valley. Extraordinary confidence and practice is needed to do this with a sickle in one hand, and hill girls are adept at it.

The walls of the hut in the cattle camp were built with clay, with roofing of *Chrysopogon gryllus*, and bedding with *Danthonia cachemiriana* grass collected from higher altitudes (sub-alpine and alpine slopes). The entrance was small, through which a tall person had to crouch and crawl, but inside the shed was cozy and warm. All oak and other fodder species around the shed had been heavily lopped. The mules grazed on the abundant lush grass, and we could see that this mountain landscape had escaped invasion by exotic weeds.

The onomatopoeic call of the Common Cuckoo and the soft whistling note of the Oriental Cuckoo woke us up early next morning. After a breakfast of wheat flour *roti* liberally laced with ghee, and potato and soya meat curry, we started the final trek to Bhaiman Udyar (locally, *udyar* means cave). There are five caves built by the local people using rocks as walls below overhanging rock shelters. One cave shelters Lord Shiva, and the others are used by the locals and their sheep and goats when they are taken to the tree-line and alpine meadows to graze in summer.

The trek to the cave

The climb from the cattle camp to the cave took us through fine stretches of forest, the home of Sambar and Tiger in Askot Wildlife Sanctuary. High altitude Kharsu Oak was the dominant species. The other species were *Rhododendron arboreum*, the state tree of Uttarakhand, Oval-leaved Staggerbush, *Symplocos chinensis*, Kath Bhoj, and *Symplocos ramosissima* (a food plant for Black Bear). Fortunately, the oaks here were not lopped, as they are far away

A.J.T. JOHNSINGH

Caves built by the locals above a large rock, where we stayed on 10th and 11th June, 2016

from the cattle camp and the village. There were also magnificent trees of Himalayan Holly, which were heavily debarked by Sambar (as the bark grows back, debarking does not kill the tree). On one large Nepali Darchini *Dodecadenia grandiflora* tree along the trail, we saw antler rubbings done by Sambar stags to shed their velvet.

There was an abundance of fallen acorns of Kharsu Oak, a nutritious food for ungulates and Black Bear. The forest floor was littered with lichens, another favoured food of ungulates during winter. The shrub vegetation near the tree-line was dominated by Ringal or Hill Bamboo, and the last stretch to the cave took us across alpine habitat dominated by *Danthonia cachemiriana* grass, which can grow to a height of a metre.

Observations from the cave

We stayed the next two nights in the cave. The first night it became somewhat crowded as some goats and sheep had pushed down the wooden board at the entrance to the cave and trooped inside to avoid the rain. We pushed them back outside with some difficulty. Tibetan mastiffs, the local shepherd dogs, barked non-stop all night. The weather was extremely unpredictable, cloudy and drizzling, and at other times sunny and bright, with snow-white clouds drifting across the blue mountains. Lighting a fire inside the cave was out of the question as firewood was in short supply, and our assistants were felling rhododendron trees for fuel. Rhododendron and oak are the favoured fuelwood here. *Castanopsis tribuloides*, an excellent firewood species of the oak family at low altitudes (<1,800 m), has become rare in the mountains due to over-exploitation. The wildlife around the cave included Monal Pheasant, Barking Deer, Sambar, Goral, and Himalayan Tahr.

With us was Ajaz Hussain, a WII researcher from Kargil, who is working on the Kailash Project, looking at ways to mitigate human-wildlife conflict. One day he went up to the alpine area accompanied by

A.J.T. JOHNSINGH

Goral raiding crops is not uncommon for the Gailgara hamlet, situated at 2,200 m

the forest guard Kailash Singh Jestha and a local assistant, to see how yarsagumba fungus, which is reported to have rejuvenating properties, was collected. In the Indian Himalaya, its collection has increased in the last 10 years, and a kilo of good quality yarsagumba can sell for up to 12 lakh rupees. It can be collected only from April to mid-June after the snow-melt, and the task is tedious as it is the size of a matchstick and grows vertically amidst short alpine grasses and herbs. Ajaz found that collections were very poor this year. The yarsagumba was small in size and most had degenerated early. The locals attributed this to the total lack of snowfall in the preceding winter. One great ecological damage from yarsagumba collection is the destruction of vegetation for firewood and the large amounts of garbage left behind or burnt in the alpine habitat by the collectors.

Descent to Bhat-Bhatta hamlet

On 12th June, after an early breakfast, we left the cave to reach Bhat-Bhatta hamlet (2,150 m) where arrangements for our night stay had been made in a primary school. Initially, we climbed about 120 m along the rough shepherd trail from our cave towards Chiplakedar (the main pilgrim route to Chipla temple), then cut across a meadow where like precious jewels, dark blue flowers of *Anemone obtusiloba*, golden flowers of *Potentilla fulgens*, and deep purple flowers of *Geranium wallichianum* lay hidden among the grass.

Then we descended into a valley densely clothed with rhododendron, oak, Indian Birch, hornbeam, and maples. This patch of excellent forest is known as Daphia Dhura (Monal Ridge) Reserve Forest and is part of Askot WLS. Along the way, we saw that patches of Ringal within the forest had been burnt, and tender grass and Ringal were sprouting here. The protein-rich sprouts attract wild ungulates, but the flipside is that such sites are good hunting grounds for poachers. All through our stay, we heard periodical gunshots in the forest. We also found a wire snare. Yet, Barking Deer alarm calls were the most common sound we heard in the forest, even more frequent than langur calls. It appears that the difficult terrain and the fact that the villagers use only muzzle-loading guns help the wild ungulates survive in the mountain.

We stopped for lunch at Suwarkhal, and as the name implies, the place was full of Wild Pig diggings. A group of White-throated Laughing-thrushes foraged about as we ate. Thereafter, we walked about 2 km along a ridge and to reach the school, descended into a deep valley with rocks strewn on the slope. An elderly goatherd was going down into the valley. It appears that goat raising is profitable in the hills. No doubt, to sustain this lucrative occupation, protection and regeneration of the existing forest cover with more palatable species is a must. In this regard, we were pleased to see a 10 ha patch of forest regenerated by Kailash with the help of the locals. Khim Singh, a cheerful and hardy local assistant accompanying us, said that he had planted more than a thousand oak saplings in the fallows around his village Khetikhan. Khim Singh also has goats and he is doing the right thing to perpetuate this

occupation without causing much damage to the surrounding forests. Another villager in Maitli area, we were told, has taken up successful plantation of Love Apple *Paris polyphylla,* a high value medicinal plant largely collected from the wild in various parts of Uttarakhand. The cultivation of *Paris* and other herbs such as *Swertia chirayita*, *Trillidium govanianum*, *Polygonatum verticillatum*, *Dioscorea deltoidea*, and *Berginia ciliata* could be promoted in the high altitude buffer villages of Askot WLS.

Our stay in the school was memorable, as we had the opportunity to interact with the local people. They were remarkably cheerful, laughing and joking often, but complained bitterly about the lack of snowfall which affects their crops and their income from yarsagumba. One family wanted us to visit their fields where crop raiding by Barking Deer and Goral is reported to be a serious problem in the early winter months of October and November. The crop fields were near a steep mountain slope that descended into the Gori Ganga and had a dense growth of Chir Pine.

We raised our concerns about poaching of Leopard and Black Bear for illegal trade, but they assured us that they do not indulge in such activities, though it was possible that the outsiders who throng the mountains for grazing, medicinal plant collection, and as labourers, hunt animals. Although hunting is illegal in India, hill people should be permitted to hunt Wild Pigs that raid crops, provided that they do not hunt other wildlife such as Barking Deer, Sambar, Goral, Serow, and Himalayan Tahr, species which enable the tiger to survive here. Local assistance is also a must to keep away poachers.

Return journey and thoughts on conservation

On 13th afternoon, we descended to Lumti where our vehicle was waiting to take us to Kathgodam, to board the train to Dehradun. As we drove towards Lumti, the wind howled through the pine forest, sounding like heavy rain at a distance. Colourful Hill Turmeric draped the forest floor below the pines. We returned to Kathgodam via the Panar landscape where Jim Corbett had shot the Panar man-eater (which had reportedly killed 400 people). On the way, we stopped briefly in Panuwanaula where, in September 1910, Corbett had stayed for a night in the dak bungalow on his way to shoot the man-eater. While travelling, our thoughts were with the simple, cheerful, hard-working local people whose future is closely tied to regular and sufficient snowfall and abundant forage for their herds. We are helpless against the lack of snowfall, but what the villagers can and should do is to bring back garbage from the alpine areas to their villages, rather than burn it in the mountains. The garbage eventually should be taken to towns like Pithoragarh for recycling.

Forest Guard Kailash and Khim Singh have shown the way to augment forage availability that is vital for the upkeep of cows and goats. This could be easily implemented all across the Sacred Landscape by motivating and training forest staff and providing financial support and encouragement to locals like Khim Singh. Perpetual funding for this and allied programmes like growing firewood, mushroom cultivation, beekeeping, cultivation of fruits such as Kiwi and Avocado, and keeping Uttarakhand clean and garbage-free can come with the setting up of a Conservation Fund that could be easily raised by collecting a conservation fee from each pilgrim and tourist who enters Uttarakhand. The fee for a person could be at least Rs. 50, and for a four-wheel drive vehicle not less than Rs. 500. Crores of rupees can thus be perpetually raised in Uttarakhand to support the abovementioned programmes. We hope there will be full support to these programmes from the conservation community and the Government. ■

A.J.T. JOHNSINGH

Sunder Singh carrying 30 kg paddy; life in the mountains toughens the people

Acknowledgement

We thank Kashmira Kakati for reading through an earlier version of the article.

A.J.T. Johnsingh is associated with WWF India, Nature Conservation Foundation, and Corbett Foundation. He strives for mahseer, wildlife corridor, and large mammal conservation in the country.

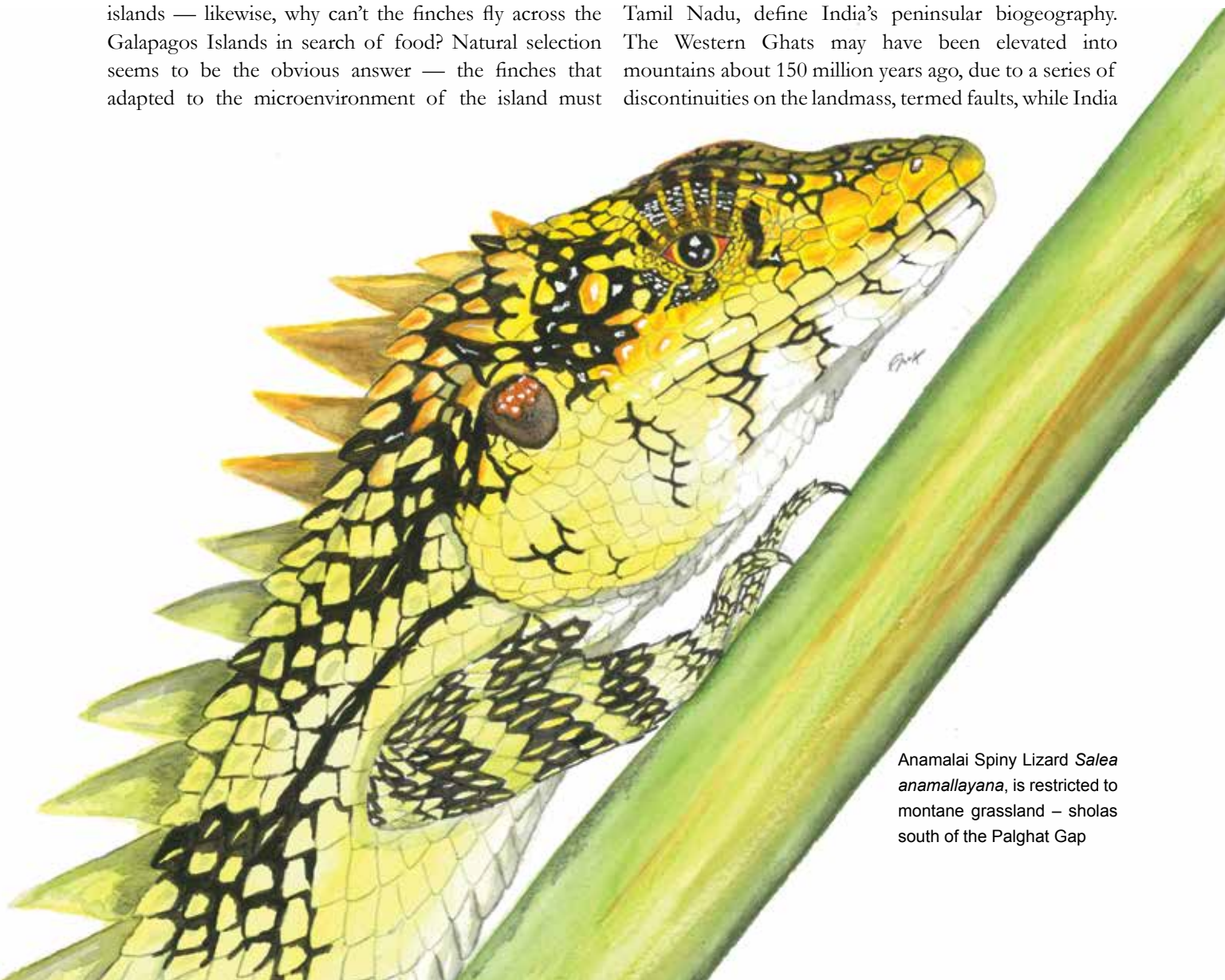
G.S. Rawat, currently Dean at WII Dehradun, is a Field Botanist with specialization in Alpine Flora of the Himalaya.

Reptile Evolution in Sky Islands

Text and Illustrations: **Achyuthan Srikanthan**

Darwin's finches are a case in point demonstrating how land discontinuities in the Galapagos archipelago led to the evolution of multiple species of finches that are closely related to a mainland species. In a process termed as adaptive radiation, the common ancestor occupies new niches triggering competition for diet resources. Over several generations, the ancestor has sufficiently diverged, thereby giving rise to new species with distinct morphological/ physiological features. But why do finches need to evolve? The ancestor flew from mainland South America to the islands — likewise, why can't the finches fly across the Galapagos Islands in search of food? Natural selection seems to be the obvious answer — the finches that adapted to the microenvironment of the island must have been successful enough to sustain their populations, while at the same time evolving into new species. We can observe this same pattern in the evolution of cichlid fish due to the breakup and formation of the lakes in the Rift Valley in Africa, the diversity of an endemic group of plants in Hawaii called the silversword alliance, and many more. In this article, I would like to throw light on the adaptive radiation of reptiles in the tropical rainforests of the Western Ghats.

The Western Ghats, straddling the Deccan region of India from south of Gujarat to the southern tip of Tamil Nadu, define India's peninsular biogeography. The Western Ghats may have been elevated into mountains about 150 million years ago, due to a series of discontinuities on the landmass, termed faults, while India

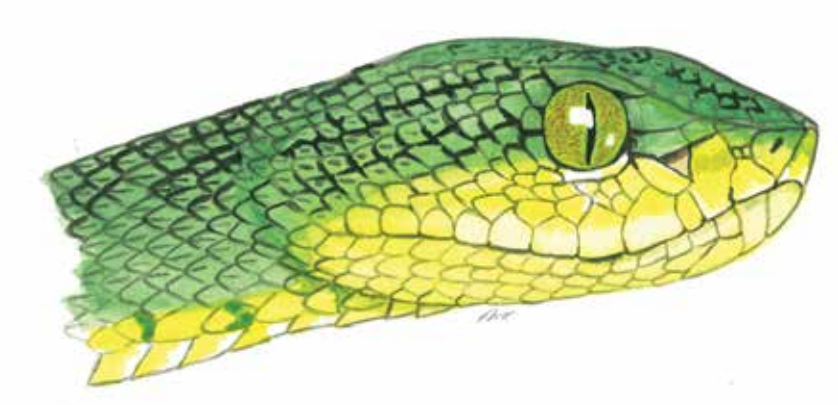


Anamalai Spiny Lizard *Salea anamallayana*, is restricted to montane grassland – sholas south of the Palghat Gap

Star-eyed Frog *Ghatixalus asterops* and Large-scaled Pit Viper *Trimeresurus macrolepis* are typical endemics of sky islands

was separating from Madagascar and moving towards the Eurasian plate. Around 66 million years ago, the Western Ghats were also the epicentre of a series of volcanic eruptions lasting nearly 800,000 years, releasing immense volumes of climate modifying gases, such as sulphur dioxide. It is a less known fact that the volcanic eruptions of the Western Ghats coincide and may even correlate with the timeline of the mass extinction of dinosaurs, known in paleontological terms as Cretaceous-Paleogene (KPB) or the Cretaceous-Tertiary (K-T) boundary. The Deccan Traps in Maharashtra are a testimony to the magnitude of volcanic activity in this region, with lava flow that would have covered almost half of India. Fast forward to the present; the same Western Ghats are a paradise on earth for a dazzling array of life forms in an intricate web of biotic and abiotic dependencies.

It is well-known that the Western Ghats are among the world's most important biodiversity hotspots. The region comprises four types of habitats influenced by latitude and altitude. Up on the highest reaches of the Western Ghats, nestled among the clouds, one can encounter reptiles and many fragile creatures that cannot be seen elsewhere. It is this group of animals that appeal to the evolutionary biologist and the aesthete in me. The montane rainforests of Western Ghats covering higher altitudes stand out due to the highest percentage of species endemism and biodiversity within this geographical region. The uniqueness of this ecosystem has led several species, including birds, to specialize and therefore evolve into new species. Famously dubbed as 'sky islands' by biogeographers, montane forests exhibit sharp variation in climate and species distribution along the elevation gradient. This is termed as stratification and results in species occupying such habitats to become confined to a particular region at a particular elevation. At lower altitudes, it can be observed that certain species of pit vipers are found to be widely distributed throughout



Trimeresurus sp., an arboreal pit viper widespread in the lower elevations of the Western Ghats and some parts of peninsular India

Hypnale hypnale, a hump-nosed pit viper widespread at low elevations in Sri Lanka and peninsular Indian Western Ghats

Trimeresurus strigatus, a ground dwelling, terrestrial pit viper restricted to the high elevation grassland-sholas of the Nilgiri mountains

Ahaetulla perroteti, a ground dwelling vine snake related to arboreal snakes from the lower elevations, endemic to the grassland-sholas of Nilgiri mountains

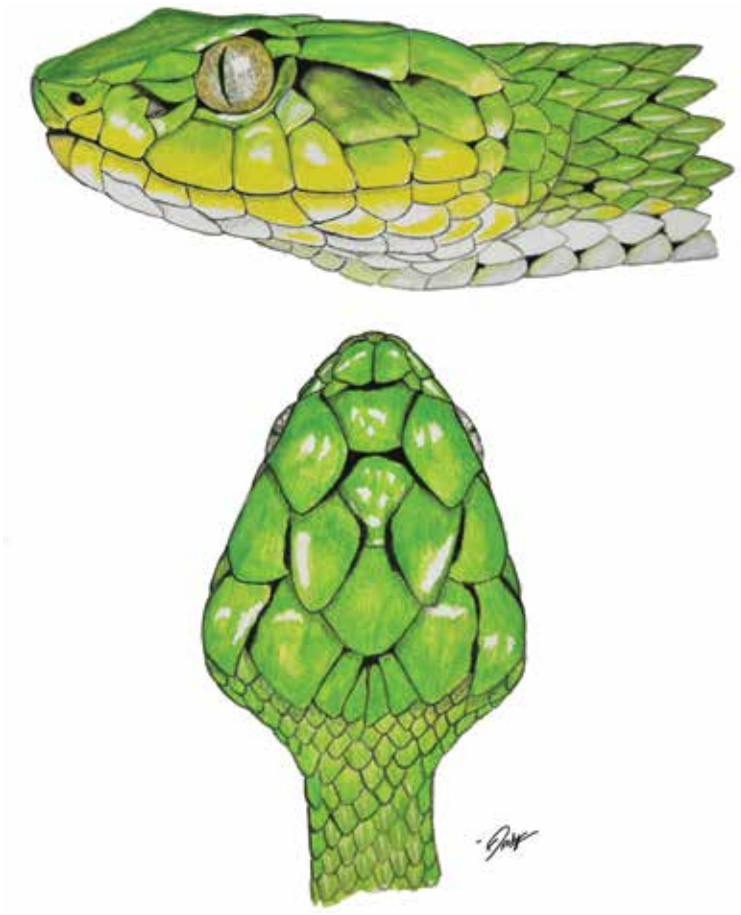
the Ghats, an example being Malabar Pit Viper *Trimeresurus malabaricus*. On the other hand, the distribution of high-elevation pit vipers is affected by physical discontinuities in the mountain system such as the Palghat Gap.

The Palghat Gap in the southern Western Ghats, between Coimbatore in Tamil Nadu and Palghat in Kerala, is a discontinuity spanning about 50 km separating the Anamalais from the Nilgiris. This feature is an element of curiosity among geologists as it appears to be topographically matched to the Ranotsara Gap found along the Angavo mountains in southeast Madagascar, adding further evidence to the breakup of the Indian plate from Madagascar. This discontinuity serves as an important biogeographic barrier between the fauna of the Nilgiris and the Anamalai mountain complex. Due to this discontinuity, high-elevation pit vipers such as the Large-scaled Pit Viper *Trimeresurus macrolepis* and Gunther's Vine Snake *Ahaetulla dispar* are found in the sky islands south of Palghat gap, whereas, the high elevations of Nilgiris are occupied by the Horseshoe Pit Viper *Trimeresurus strigatus* and Bronze-headed Vine Snake *Ahaetulla perroteti*. Likewise, the high-elevation spiny lizards of the enigmatic genus *Salea* is represented by a species on either side of the Palghat Gap, namely the Anamalai Spiny Lizard *Salea anamallayana* and the Nilgiri Spiny Lizard *Salea horsfieldii*.

In the Precambrian era, it is speculated that Sri Lanka was positioned between Madagascar in the west and the Antarctic landmass along the east, after which it broke off from Gondwana, similar to the Indian plate. It is postulated that the rift between India and Sri Lanka occurred by means of a boundary

fault during the Jurassic period. Owing to this intimate geological and thereby biogeographic history, Sri Lanka is considered to be contiguous with south India, especially the Western Ghats. The Central Highlands of Sri Lanka, similar to the Western Ghats, also exhibit such isolated sky islands with their own endemic fauna. The Dumbara Valley, analogous to the Palghat Gap, serves as a broad divide between the Knuckles massif (home to a high density of Sri Lankan endemic species) and the rest of the central mountains of Sri Lanka. Remarkably similar to the spiny lizards of the southern Western Ghats of India are the pygmy lizards of genus *Cophotis* found in the Central Highlands of Sri Lanka. The Dumbara Pygmy Lizards *Cophotis dumbara* are separated from the Ceylon Deaf Pygmy Lizard *Cophotis ceylanica* by this valley.

Although having evolved from different lineages that are not genetically related, both the spiny lizards of the Ghats and the pygmy lizards of Sri Lanka show tantalizing morphological and behavioural similarities. These similarities led many scientists to believe that they might share a common ancestor. Subsequent genetic studies revealed that they are a classic example of convergent evolution – a process whereby species that are not closely related still develop similar traits as a result of having to adapt to similar ecological pressures. The sky islands have moulded these animals to acquire intricate body modifications that are suited to their specialized lifestyles, making them appear superficially similar. Recurring land bridges in geological history between India and Sri Lanka have also led to floral and faunal exchanges between the two landmasses cross-influencing much of the present day fauna. Faunal elements such as the kangaroo lizards *Otocryptis* sp., Hump-nosed Pit Vipers *Hypnale* sp. are restricted to the lowland forests and the wet forests of both Sri Lanka and the Western Ghats. Due to such recurring land bridges, the lowland and mid-elevation forests of both the Western Ghats and Sri Lanka show similarities in their herpetofauna, with Sri Lankan herpetofauna often tracing back their ancestral relationships to the Western Ghats and vice versa.



Trimeresurus macrolepis, an arboreal pit viper endemic to sky islands in the Western Ghats

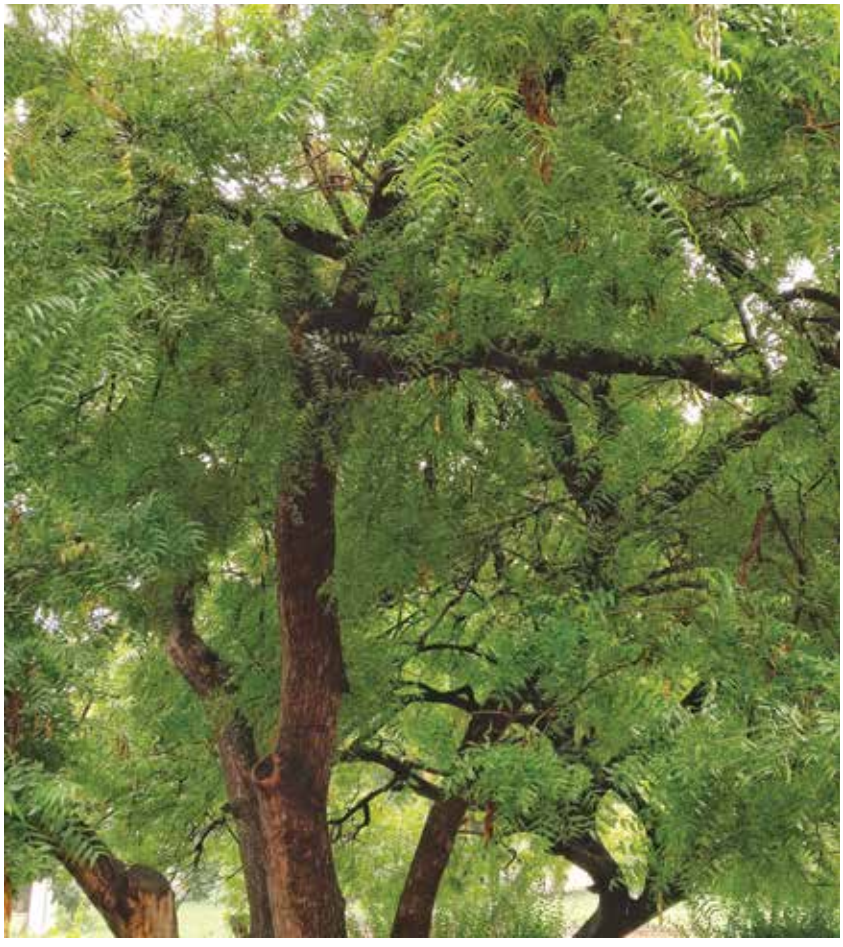
Despite these land connections, the sky islands have stayed isolated, nurturing specialized flora and fauna. These fragile ecosystems continue to reveal new perspectives to biologists with every group of organism being influenced by geological and spatiotemporal events. Unfortunately, in the recent past, anthropocentric activities such as deforestation, tourism, and development have driven most of the megafauna in India and Sri Lanka to small pockets of protected nature reserves, disparate from their original distributions. While the existing sky islands are under protection, paucity of data on these fragmented populations prevents any attempt at meaningful conservation, while our lifetimes are spent watching these cryptic life forms evanesce due to our ignorance. ■

Achyuthan Srikanthan is an evolutionary biologist and is currently associated with the Centre for Ecological Sciences, Indian Institute of Science, Bengaluru.

In the shade of the Neem

One of the most ubiquitous species in India, Neem is propagated naturally by self-seeding, and one hardly notices when a "nimkaudi" (the small green fruit which ripens to a golden yellow) falls to the ground, takes root, and grows into a hardy sapling and then into a large tree. The spreading crown and dense shade of the Neem are an ever present relief on hot, dusty roads in villages, towns, and cities, and an escape from the afternoon sun beating down on agricultural fields. It is a common sight in the Indo-Gangetic plains, but not as easily found, I noticed, in the Western Ghats where I now live, because it prefers to grow in more arid habitats.

This preference has suggested it as a candidate species for afforestation in desert and semi-desert areas, according to the book NEEM, A TREATISE by K.K. Singh, 2009. He says: "Neem is known to increase the soil fertility and water-holding capacity, as it has a unique property of calcium mining, which changes the acidity of soil. Neem has been widely used for afforestation of dry regions, saline soils and reforestation of bare ravines and gullies to check soil erosion and to conserve soil moisture." This property has been exploited to fight desertification, and experimental Neem afforestation has been carried out successfully in Sindh, Pakistan. This is yet another of the numerous ways in which Neem is among the most useful trees in the Indian subcontinent.



GAYATRI W. UGRA

Though it is the Coconut palm which is associated with the mythological *kalpavriksha*, Neem too yields medicinal and useful compounds from practically every part of the tree. The most valuable, Neem oil, which is extracted from the seeds, is used in soap making and in traditional medicine for various applications. It is used in organic farming as a pesticide, and as a repellant against mosquitoes. Neem leaves can be boiled in water and the extract added to bathwater to produce a mild antiseptic. Dried Neem leaves are placed among books to repel book louse and silverfish, both of which are major pests in libraries. The whole fruit is ground and consumed to treat acne and prevent scarring. A paste made of the bark ground in water can be applied for persistent skin infections. The twigs are used to cleanse teeth and cure a number of oral diseases. It is even said that sleeping near a Neem tree tends to be peaceful, as the equally ubiquitous mosquitoes stay away!

The leafy crown of the Neem is a fascinating place to watch birds, squirrels, garden lizards, and numerous other forms of nature. Old trees provide ideal sites for cavity-nesting birds like hornbills, barbets, and parakeets. The shade of the Neem tree is an essential element in the folk culture of India, and is the subject of some beautiful Bhojpuri folk songs. I am racking my memory for a specific Hindi word for the shade of the Neem tree, but it still escapes me. Can any reader help? ■

Vibha Kaul
Mumbai

The Javan Rhino in Junagadh!

On an official tour through Indian provinces, the Viceroy George Nathaniel Curzon visited the State of Kathiawar in 1900. When he reached Junagadh in the afternoon of November 3, 1900, he was received with a royal display of splendour by Nawab Sir Muhammed Rasul Khanji, riding in a solid silver car, preceded by painted elephants, prancing horses, and two harnessed and mounted rhinoceroses. Lady Mary Victoria Curzon could not resist the opportunity and briefly sat on one of the rhinos, posing for an unusual and elegant snapshot.

We don't know when those rhinos came to Junagadh and how long they lived. The photograph reveals that they were actually specimens of the Javan Rhinoceros *Rhinoceros sondaicus*. It is quite possible that they were captured in the Sundarbans region south of Kolkata, where they had already become very rare. Records of Javan Rhinoceros in captivity can be counted on one hand. This photograph gives us a rare insight into animal keeping as a leisure activity by the maharajas of the princely states. ■

Kees Rookmaaker
Netherlands

ABOUT THE POSTER

Commonly called the Dwarf Geckos, this shy group of geckos can be easily missed in the forest. The species in the photograph was observed in Ooty near a farm adjoining a forest. Distinguished by the slender, undilated digits and round pupils, Dwarf Geckos occur in various colours, often spotted or marbled with darker colour blotches. In some species of this genus, a light coloured vertebral band is present.

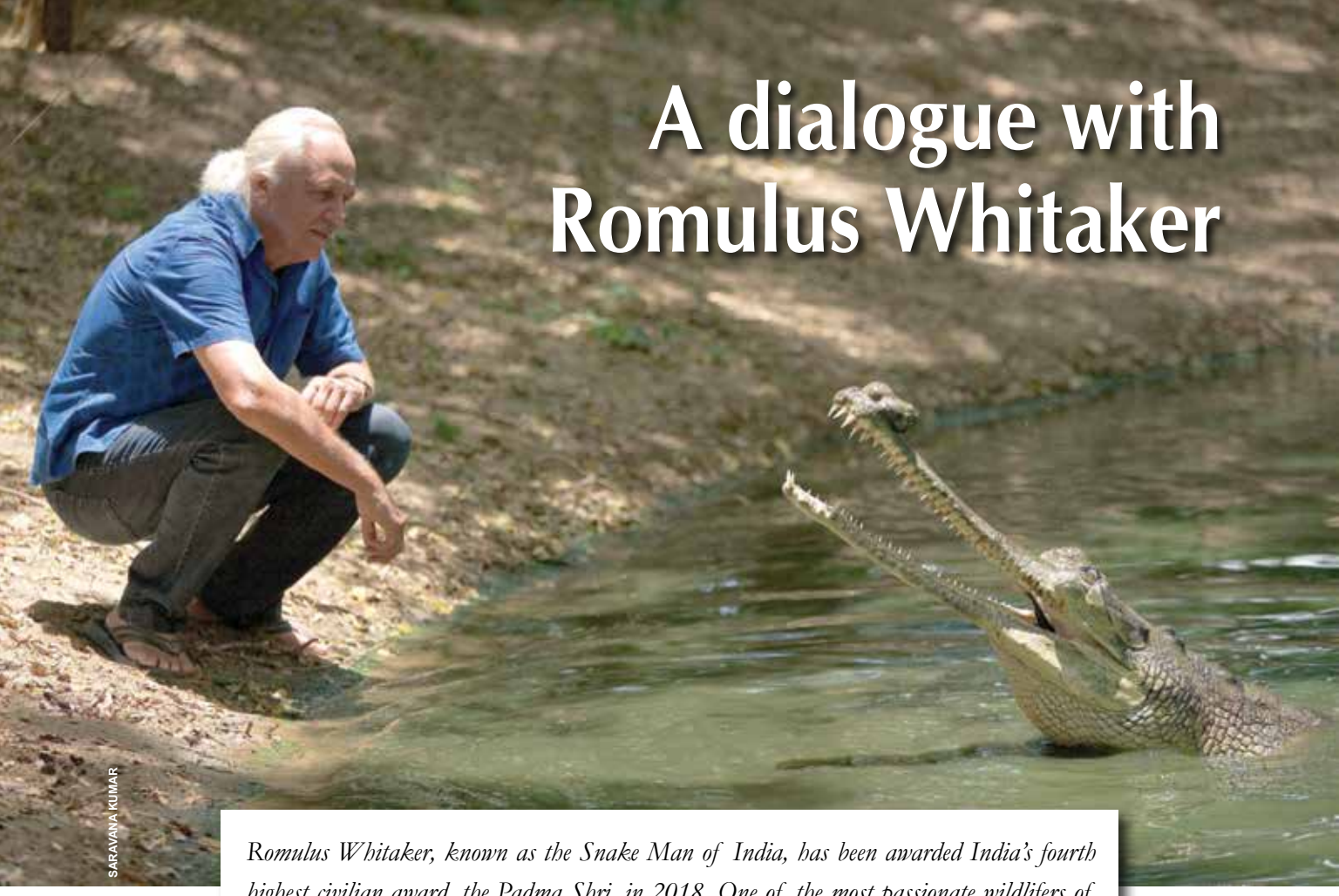
Most geckos belonging to the genus *Cnemaspis* are diurnal, i.e. they are active during the day, unlike most of the other common geckos. With over 20 species in the Western Ghats alone, this is one of the most diverse but poorly known groups of lizards, due to their restricted distribution and secretive nature. ■

Dwarf Gecko *Cnemaspis* sp.


H.B. VARUN

Dwarf Gecko *Cnemaspis* sp.

A dialogue with Romulus Whitaker



SARAVANA KUMAR

Romulus Whitaker, known as the Snake Man of India, has been awarded India's fourth highest civilian award, the Padma Shri, in 2018. One of the most passionate wildlifers of India, Whitaker was born in the United States, and became a naturalized Indian citizen. His two 'offspring' – Madras Snake Park and Madras Crocodile Bank Trust – yielded him worldwide recognition. His close-knit bond with the Irula snake catchers in southern India played a major role in establishing a venom production laboratory for the production of life-saving antivenin. His work in popular culture as a filmmaker has been acclaimed worldwide. He has made two dozen wildlife films, including an excellent documentary on the natural history of the King Cobra in 1996, for which he received an Emmy Award.

Romulus Whitaker became a conservationist because of his realization that species cannot survive without their habitats. To that end, he set up a rainforest research station at Agumbe, Karnataka (ARRS), in order to study and protect the declining rainforests in India. As he emphasizes, "The rainforests of India are the origin of all the major rivers in the south and the north-east." The research station he set up in the Andaman Islands (ANET) is now the island's major environmental NGO. Another outcome of his passionate endeavour was a substantial conservation project to save the critically endangered Gharial, a species of Crocodilia, in collaboration with the Ministry of Environment, Forest, and Climate Change. Romulus Whitaker has received numerous other awards (including the Rolex and Whitley Fund for Nature) and is affiliated with many wildlife organizations across the country.

Your first encounter with a snake must be memorable. Could you share it with us?

I was four years old when I caught and brought home my first snake. It was a garter snake and my mother's sort of unbelievable reaction was "How beautiful, do you want to keep it?" We then lived in northern New York state and luckily there were no venomous snakes there, so my mother could be very encouraging. Later, when we moved to India, "the land of cobras", when I was seven (in 1951), I do believe she was a bit worried.

All of us know about your long-term association with the Irula tribe of snake catchers of southern India. Would you share one moment of epiphany with the tribe?

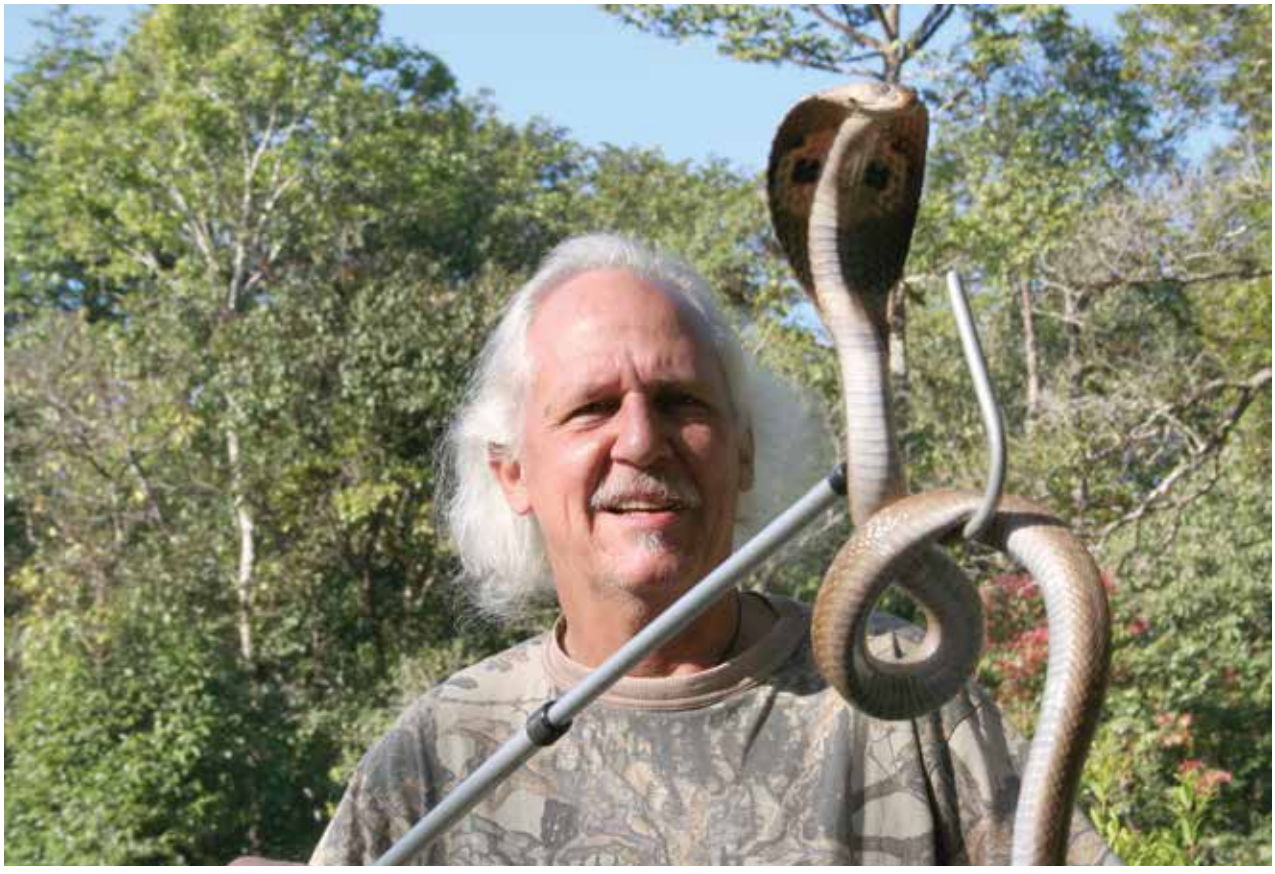
Once, while out snake hunting with my Irula colleague Natesan, he pointed to a shedded skin and said "Krait, there must be one in this brick pile." There was water all around as we were in the middle of the monsoon and the snake must have gotten into the brick pile to escape the flood. We started taking bricks off the pile gingerly and by the time we finished we had found 10 kraits!

You have also played a crucial role in sea turtle conservation. Tell us something peculiar about sea turtles.

I started sea turtle walks on the beaches in south Chennai in 1972 and they are still being carried on by the Students Sea Turtle Network. Watching an Olive Ridley sea turtle dig a hole, lay her 100 eggs, cover them up, and then pound on the nest with her plastron, is a lifetime experience!

When and how did the idea of reptile conservation occur to you, and which species are you most fascinated with?

I was always fascinated with reptiles all the way from extinct dinosaurs to giant anacondas. In my early days, it was just a deep interest which turned into an obsession and conservation was a natural result, since reptiles get such a hard time from humans. The King Cobra is my number one of all the snakes, its beauty, intelligence, total innocence, and reluctance to bite people is awe-inspiring. The Gharial comes next and all you have to do is see it and admire its streamlined shape, long snout, and bulging eyes to be hooked.



JANAKI LENIN

The Snake Man with a Spectacled Cobra at Agumbe, Karnataka

JANAKI LENIN

Examining the biggest crocodile skull in India at Bhitarkanika, Odisha

Please share an interesting story or two about your almost six decades in reptile conservation work.

When I set up the Madras Snake Park I knew I needed a King Cobra. Then I met the wildlife author Kenneth Anderson in Bangalore and he said "If you want to see and catch a King Cobra go to the rainiest place in southern India, a place called Agumbe, near Mangalore." I took his advice and caught a train to Mangalore and from there a bus to Agumbe. Dressed in a loin cloth with a hornbill feather in my hair I walked the Agumbe rainforests for two days and was rewarded with a male and a female King Cobra for the Madras Snake Park, what excitement!

What message would you give to wildlife enthusiasts?

My main message to wildlifers is to steer away from the animal welfare kind of activism and concentrate on helping the people living in and around our Protected Areas, so that they too appreciate our wildlife heritage and the need for conservation. Saving individual animals in distress is fine and dandy, but it's much more important to save a species and its habitat.

What are your views on climate change?

In Kodaikanal, in the Palni Hills of southern India where I spent eight years as a school student half a century ago, there were no mosquitoes, no crows, and no cobras to be seen. Now you can see all three. Sure, there could be other reasons for the changes, but I suspect the best explanation is climate change.

What do you feel are the effects of climate change on herpetofauna? Any policy changes you would like to suggest in this regard?

Well, it's already being predicted that reptiles which have temperature-dependent sex ratios (TDS), such as sea turtles, are soon going to have greatly skewed sex ratios. I can see the next generation of conservationists having to collect eggs from the wild and incubate them to make sure the sex ratios are balanced.

What else do you do besides being a passionate wildlifer?

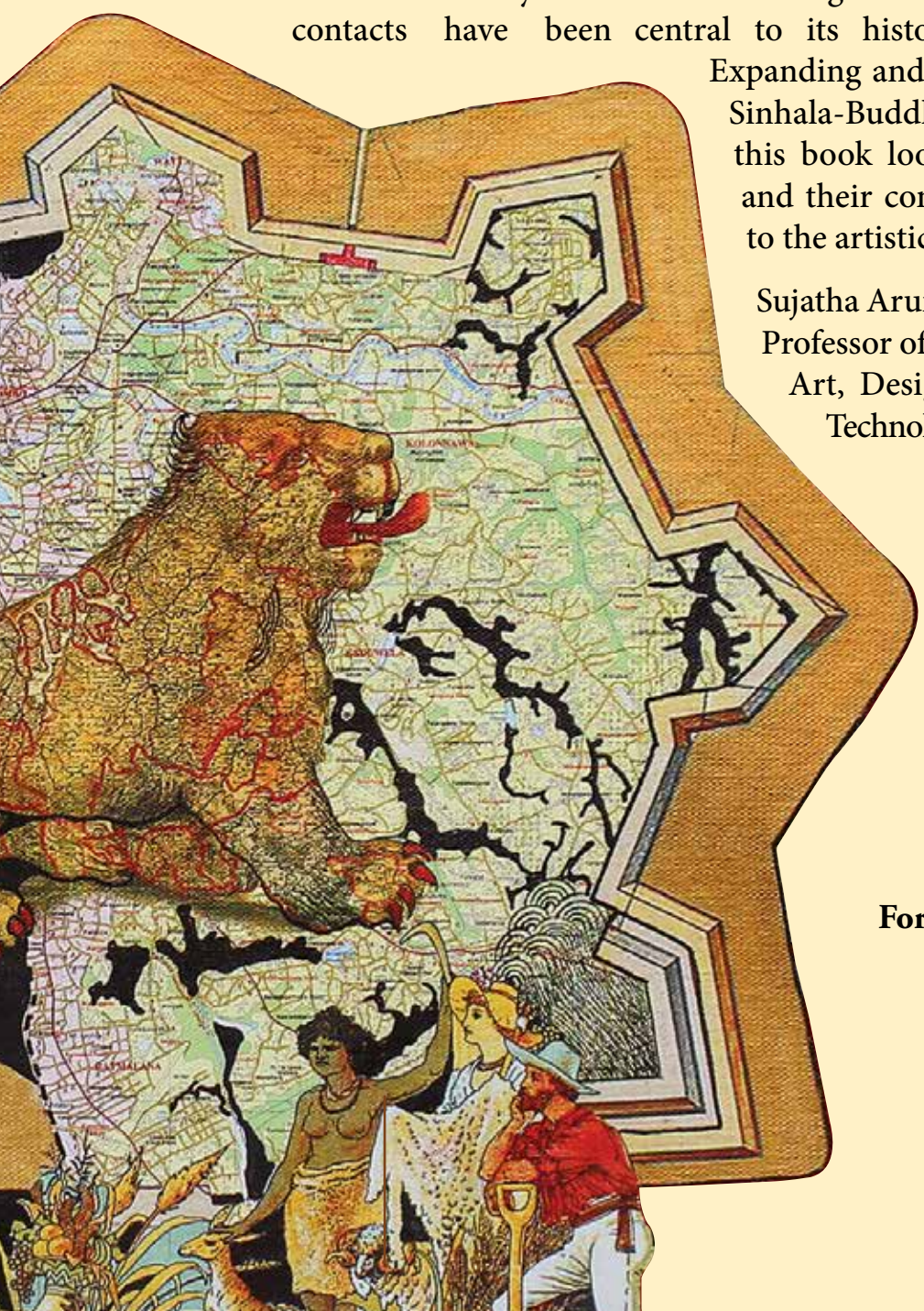
My work gives me such a delight that I do little else. Living on the edge of a forest with my partner Janaki, our four dogs plus a big friendly pig and an opinionated emu, is what I always wanted. But I can't sleep too peacefully while the snakes I love so much are killing 50,000 people a year in India and maiming thousands more. So my colleagues and I have embarked on a very serious "Snake Conservation and Snakebite Mitigation" mission. Wish us luck! ■

Marg

SRI LANKA
Connected Art Histories

edited by Sujatha Arundathi Meegama

Ceylon, Ilangai, Lanka, Lakdiva, Seilan, Serendib, Simhaladvipa, Tambapanni, Taprobane—the island's various names suggest that Sri Lanka has clearly meant different things to different people, and external contacts have been central to its history and conceptualization. Expanding and going beyond the standard Sinhala-Buddhist narratives, the essays in this book look at resident communities and their contesting cultures and claims to the artistic heritages of this island.

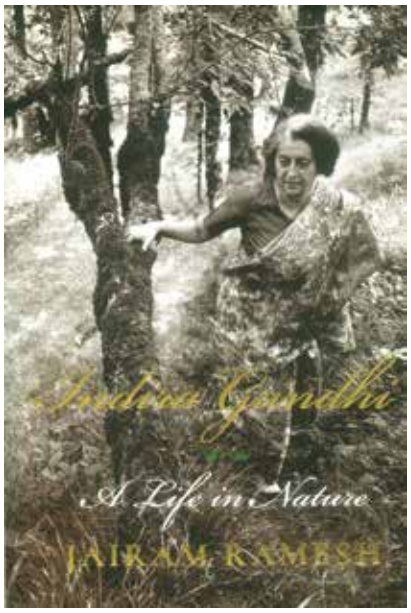


Sujatha Arundathi Meegama is Assistant Professor of Art History at the School of Art, Design, and Media at Nanyang Technological University in Singapore.

December 2017
ISBN: 978-93-83243-18-1
Price: ₹ 2800.00 /
US$69.95 / £35.00
Hardcover: 305 x 241 mm
Pages: 148
Illustrations: 130

For copies of the book contact:

The Marg Foundation,
Army & Navy Building, 3rd Floor,
148 M.G. Road, Mumbai 400001.
Phone: 022-22842520, 22821151,
22045947
Email: margfound@vsnl.net
Or visit: www.marg-art.org



Indira Gandhi – A Life in Nature
By Jairam Ramesh
Published by: Simon & Schuster, India, 2017
Size: 24 x 16 cm
Pages: 437
Price: Rs. 799/-
Hardback

Reviewed by:
Lieut. Gen. (Retd) Baljit Singh

INDIRA GANDHI – A LIFE IN NATURE is a book which is tailor-made for readers of *Hornbill*. From the outset, which the author calls "A First Word", onward to "A Final Word", the narrative is an absorbing account of how Indira Nehru, the nature loving child, sustained a passion through adulthood till, in the last twenty years of her lifespan, she was unequivocally feted by conservationists in India and the world over as the "Naturalist Prime Minister"!

It is generally accepted that the domestic environment is among the more dominant influences which have a pronounced and un-erasable impact on the psyche of a child. And that phase of Indira Nehru's life from infancy to adulthood, so sensitively and factually recorded by her biographer Jairam Ramesh, provides a perfect testimony to this belief. For instance, her mother's youngest brother, Kailas Nath Kaul, was a brilliant botanist from Cambridge University and also a smitten herpetologist, and Indira was to profit hugely in the time she spent in her maternal uncle's company.

However, in the first 25 years of Indira's life, the more dominant, almost iconic influence was of her doting father. Even though Jawaharlal Nehru spent that phase in their lives mostly in prison, he retained touch with "Priyadarshini" through a steady stream of 272 lengthy letters. The first five, collectively termed *The Book of Nature*, focused on the evolution of planet earth and of "man's awareness of himself". As she entered her teens, his letters were supplemented with gifts of books, notably THE LIFE OF THE BEE, THE LIFE OF THE ANT, THE BOOK OF BABY BIRDS, LIFE OF BUTTERFLIES, FAR AWAY AND LONG AGO (autobiography of the famous naturalist William Henry Hudson), and FLOWERING EARTH. Their correspondence details Indira's growing kinship with the natural world; not just did she read these books diligently but carried on a lively discourse on each with her doting father.

There are biographies which so hold the reader captive that one lingers over each sentence, unmindful and uncaring of the time factor. And in the instant case, the poignant narrative unravels the "how, where, when, and what" that shaped the delicate infant Indira Nehru into a strong-willed but compassionate adult Indira Gandhi with an extraordinary and empathetic understanding of the natural world which, two decades later in the mid 1970s, the scientific community would call "The Living Planet, Mankind's Only Home". In the foreword she wrote for the Smithsonian book OUR GREEN AND LIVING WORLD: THE WISDOM TO SAVE IT, she said "My own involvement with flora and fauna preceded any ideas of Conservation ..."

But the book of books which would irrevocably baptize (by then a bride) Indira Gandhi as the messiah of India's natural world and wildlife was THE BOOK OF INDIAN BIRDS. Nehru had had a copy autographed by the author Sálim Ali, before gifting it to her within days of its release! This marked the beginning of a lifelong, cherished friendship between Nehru and Indira on one hand, and with Sálim Ali and the BNHS on the other. In a letter to a friend she wrote, *"... Like most Indians I took birds for granted until my father sent me Dr. Sálim Ali's delightful book ... did I realise ... that birds are also individuals each with his own characteristics ... I noted the sounds ... was able to identify the birds from the book."*

Another letter provides the depth of her masterly communion with animals. Her way of appreciating the beauty of wildlife was intricate and indefinable. *"The winter birds are coming. I saw a Redstart yesterday. Rather an amusing little fellow, the way he shivers his tail all the time. His call is exactly like the squeak of an unoiled bicycle wheel. There is even a slight pause between one squeak and the next, just enough for one revolution of the wheel! This morning a Blue Jay caught a baby mouse and sat and devoured it on our porch."*

Without robbing you of the pleasure of reading and discovering Indira Gandhi, the besotted naturalist, let me simply state that no another Indian has accomplished quite as much in twenty years for

preserving India's animals, their habitats and our ecosystems at large as she did; The Wildlife (Protection) Act, Forest Conservation Act, Environment (Protection) Act, Air Pollution (Control) Act, Project Tiger, Project Lion, Project Crocodile & Gharial, Pygmy Hog Initiative, Water (Prevention and Control of) Pollution Act, Central Pollution Control Board, creation of MoEF, Ganga Cleaning Project, the entire network of National Parks/Reserves/ Sanctuaries/Biosphere Reserves, and so on.

Indira Gandhi became the darling of conservationists globally on delivering the keynote address to the United Nations Conference on Human Environment, held at Stockholm in June 1972. And most deservedly, she would be recipient of Smithsonian Institution's first Medal for Conservation instituted in 1985, The Most Exalted Order of the Golden Ark, Chairmanship of IUCN Commission on Education (the only head of government before or since), IUCN's first John C. Phillips Memorial Medal, Patron of the BNHS (one and only Prime Minister to hold that position!) and the list goes on.

And how did her mentor Sálim Ali measure her? Well, here is his text sponsoring her for the Paul Getty Award:

"For some time now I have been seriously thinking of nominating Mrs Indira Gandhi for the Paul Getty Prize. I feel that within recent years no one known to me has done more for Nature Conservation in India (and indirectly elsewhere in the world) than Mrs Gandhi ..."

But for her deep-rooted love of animals, the Tiger, Brow-antlered Deer, and Lion-tailed Macaque (Silent Valley ecosystem) would have moved onto the extinct species list. One of her deep regrets was that the migration of Siberian Cranes in India could not be revived, despite efforts to do so in her personal collaboration with Dr. George Archibald's International Crane Foundation's captive breeding programme. As a tribute to her involvement, the second Siberian chick incubated at the IFC facility was named Indira!

On the global scale, when the IUCN chose Indira Gandhi for its highest accolade in June 1983, the citation called her a "gifted naturalist from her earliest years" and concluded that "no other political leader or statesman of modern times has had a greater influence on world conservation."

At a personal level, Guy Mountford who headed WWF International's Project Tiger has provided a deeply sensitive reflection on Indira Gandhi as a person and statesman "Prime Minister Gandhi is a remarkable woman, with a genuine interest in both wildlife and conservation ... her manner in discussion alternates between feminine charm and impressively masculine decisiveness ... she was determined that everything possible should be done to save the tiger ... to everyone's astonishment the task force was formed the next morning and it met the following day." And when Guy Mountford published his magnificent book WILD INDIA in 1988, its dedication read "To the memory of Smt Indira Gandhi who throughout her long service as PM of India set a shining example to the world with her dedication to protect the rich heritage of her country's wildlife."

Without the baggage of formal education in the natural or the physical sciences, she better understood the beauty and infinite unity coalescing the natural world and was at her utmost happiness when rambling through forest thickets, strolling up mountainsides, listening to the message in birdsong, watching 'wild' animals in their true, untamed wilderness refuges, but all of it preferably in solitude! Yet, she made and sustained many lifelong friendships. She was a precious human being. ■

Man often forgets that he is part of this earth, so full of beauty and wonder, and that his survival depends on the maintenance of nature's balance. Thus the utilization of natural resources must go hand in hand with conservation. The reckless manner in which resources have been consumed and wasted has created alarming problems.

India is not yet highly industrialized, so the petering out of minerals is not the most immediate danger. But the increasing needs of our population are fast encroaching upon forests and pasture areas. Our forests must be preserved because of a variety of benefits as well as their crucial influence on climate. They are the chief habitat for our wildlife, which deserves protection as much as any other resource. A widespread campaign is necessary to bring home to our people the need to conserve the land, its mineral and plant resources and its animal life.

– Indira Gandhi

Parashuram Mahadev Lad
(29.12.1934–17.01.2018)

Mr. P.M. Lad is no more. It was so hard for me to believe this that I was tempted to dial his cell number to confirm the tragic news! The man whom I always counted as close to my heart (and I presume he felt the same). I used to get regular phone calls from him, at least once a week, if not more. Such was my connection with him. We used to talk about his latest birding trips, their uniqueness and highlights. I was the sole beneficiary of his field experiences and gained from his wealth of knowledge through his detailed analysis of observations.

Our several long calls in 2017 left me disturbed due to the unresolved and ambiguous answers that I gave to his questions. His calls pertained to the sale of land in Sailana, home of the Lesser Florican. "How can the office of Chief Secretary of Madhya Pradesh impose a ban on sale of private lands inside Sailana Sanctuary without thinking about the implications of these orders?" His sharp criticism was well-intended. I connected him to the legal experts and my IAS friend Praveensingh Pardeshi. However, he was still unhappy, as there was no concrete outcome.

He wrote emails to forest authorities many times, on occasions when researchers tried to capture the Forest Owlet (once believed to be extinct) by a crude method, and also when the Government of Maharashtra was about to declare the Forest Owlet as the State Bird. He made earnest efforts out of his love and empathy for birds to save them from danger and for their survival.

He was born in a small village Khedi Sawaligadh in Betul district of Madhya Pradesh. After completing B.Sc. in Mathematics from Science College Nagpur, he was selected in the first batch of IFS trainees to complete the course in forestry at Indira Gandhi National Forest Academy, Dehradun, during 1956–59. After returning, he served at Harda and Rewa districts of Madhya Pradesh. He had done Narmada expedition (Parikrama) by boat and on foot for studying flora and fauna along the river. He was posted in Madhya Pradesh (MP) when Maharashtra and MP states were separated in 1961 and later worked in the forests of Bilaspur, Shahdol, Sidhi, Khargon, and Dewas. He was lucky to become Chief Wildlife Warden of MP at a time when it included today's Chhattisgarh state, as he could travel the vast forest stretches. He had shown his courage as a Chief Wildlife Warden when Kanha was in the grip of naxalites. For forest staff, local villagers, and colleagues, Mr. Lad was someone who would be the first to rush for help in your emergency, health, or monetary problems.

P.M. Lad should be known as a birdman, though he simultaneously carried an equally deep knowledge of endangered species of other taxa, such as the central Indian Wild Buffalo population in Bastar and Barasingha in Kanha. In 1996, when the pugmark method was discarded by scientists, Mr. Lad welcomed camera traps, but requested field staff not to ignore pugmarks for tracking tigers.

He had complete faith, love, trust, and respect for his then boss, Mr. J.J. Dutta, PCCF of Madhya Pradesh, which remained till the end. On Mr. Dutta's and Dr. M.K. Ranjitsinh's request, he completed the crucial task of land acquisition for setting up Van Vihar Zoo at Bhopal for rescued and orphaned wild animals. He reared an orphaned tiger cub (probably brought from Bandhavgarh) at home in Bhopal. The grown up tiger in the house later imposed an undeclared restriction on visitors to Mr. Lad. It prompted him to release this tiger named *Chiku* in Van Vihar.

His love for birds and knowledge of bird habitats in Madhya Pradesh was acknowledged by Dr. Sálim Ali. Dr. Ali was very particular about planning his field trips, but when his visit was to Madhya Pradesh, he left the planning to Mr. Lad. He was always available to huge numbers of birders across India for expert advice and feedback. His guidance was helpful to Dr. Asad R. Rahmani, the late Dr. Ravi Sankaran, and many other birders.

Mr. Lad was a life member of the BNHS and contributed many articles on birds in magazines like *Hornbill* and *Sanctuary Asia*. He got an opportunity to become the Director, Project Tiger, as well as the first Director of Wildlife Institute of India (WII) in 1985, which he could not accept due to some personal commitments, but for which he had no regret.

After retirement in December 1992, he chose a path different from most IFS officers. He bought a huge

800 mm telephoto lens, as well as an ambulance to carry the lens! On several occasions, I accompanied him on expeditions including Pujari Kanker, Indrawati, and Pamed in Bastar; Sailana, Sardarpur, and Pench sanctuaries in Madhya Pradesh; Navegaon National Park and Melghat in Maharashtra.

He was a true nature lover and in his routine trips, he used to witness very rare or special moments like the arboreal green-pigeons landing on the ground, and woodpeckers grabbing an opportunity to sip on the sap oozing from trees during a hot summer evening. He was awarded the *Vasundhara Sanman* in 2013 at Amravati for lifetime service.

As recently as 2016, he travelled a lot, from Tamil Nadu in the south to Jaisalmer in Rajasthan and to the Northeast, in his passionate search for birds and their habitats. He was a legend. My last telephonic discussion with him was in November 2017 regarding leopard safaris in Sanjay Gandhi National Park, Mumbai. Finally, I was intimated of his departure by Dr. Rahmani.

So that is the end of this *parindo ka masiha*. He leaves behind his wife, son, and the entire birders fraternity. For me, he was no less than Dr. Sálim Ali. I had requested him to write a book, which he answered with a laugh. He only believed in conservation, conservation, and more conservation. ■

Kishor Rithe

S. Manikandan, IFS
Conservator of Forests and Director,
Nagarahole Tiger Reserve

Bombay Natural History Society offers condolences to the family, friends, and colleagues of Mr. S. Manikandan, who died under tragic circumstances at the age of 46, while on duty on World Wildlife Day, March 03, 2018. He was attacked by a tusker in DB Kuppe Forest Range, close to Kabini backwaters in the Nagarahole Tiger Reserve. Mr. Manikandan had visited the site to inspect the damage done by a mild fire in a part of the forest reserve. At the time of his demise, he was serving as Conservator and Director of Nagarahole Tiger Reserve. He was a devoted officer and a field man always on the frontline of wildlife conservation.

Mr. Manikandan had studied Agricultural Sciences at the Tamil Nadu Agricultural University before pursuing his Master's and then Ph.D. in Agricultural Entomology. Before securing a rank in the IFS, he served as a faculty in the Institute of Wood Science and Technology for a brief period.

He was a favourite among villagers from the surrounding areas for his efforts to conserve nature and in the process to reduce incidents of man-animal conflict. He had worked extensively to limit instances of cattle smuggling and elephant killing.

Principal Chief Conservator of Forests (Wildlife) Punnati Sridhar adds for his colleague: "This is an extremely unfortunate incident. He was a sincere, honest, hardworking officer. More than that, he was totally committed to conservation. He contained most of the problems in Nagarahole. Earlier too, he did an excellent job in Ballari despite political pressure. He would go only by the rule book. He was very good with people, and also bridged the gap between the locals and the department." ■

We are grateful to

SETH PURSHOTAMDAS THAKURDAS & DIVALIBA CHARITABLE TRUST

for a generous donation to the

Pratap Saraiya Hornbill Fund

to support the publication of *Hornbill*

The General who saved Wroughton's Free-tailed Bat

Text: **Lieut. Gen. (Retd) Baljit Singh**

Names of Indian Army Officers such as Major General Thomas Hardwicke, Surgeon Major T.C. Jerdon, Major General Sir Harry Tytler, Brigadier W.H. Evans, Colonel Frank Wall, Colonel Charles Swinhoe, Lieutenant Colonels R.S. Tickell, R.S.P. Bates, A.H.E. Mosse, L.L. Fenton and Richard Burton, and Major R.W.G. Hingston are bywords both in the annals of the Natural History of India as also in the creation and consolidation of the Bombay Natural History Society (BNHS). There are countless other Indian Army Officers whose names fill up many, many pages of the membership rolls of the BNHS, whose direct and indirect observations provided meaningful data to the wildlife scientific community in India and abroad, for envisioning the "bigger picture" of the mysteries and marvels of the natural world in the Indian subcontinent.

And there are others who defy "type" classification as wildlifers, but nevertheless they too were diehard nature enthusiasts who would not hesitate to even bend rules if need be, in genuine cases of the nature conservation cause. One such man was Lt. Gen. J.F.R. Jacob, PVSM who passed away at the ripe old age of 93, in January, 2016. I had known him since 1965 when I was cutting my teeth as an Instructor-in-Gunnery and he had arrived from Leh (a Brigadier, then) to assume command of his *alma mater*, The School of Artillery, Deolali.

Perhaps not known to many in the BNHS, the late Mr. J.C. Daniel had one significant engagement with him at Panjim in 1998–99 to prevent the looming threat of extinction of an endemic faunal species, when Goa was under a spell of President's rule and General Jacob, the Governor, became the *de jure* Head of Goa State. For some years, many naturalists had known that the entire surviving population of about 40 Wroughton's Free-tailed Bats was confined to the Barapeda cave*, smack on the Goa-Karnataka boundary. This faunal rarity needed to be saved at any cost. My good friend J.C. Daniel, one among India's unassuming but most knowledgeable nature scientists, had requested me to facilitate his meeting with the Governor.

Barapeda cave is about 40 m deep, 25 m wide, and 6 to 7 m high, and has permanent pools of water at the base of the cave. However, as may be imagined from the dimensions of the cave, it is no bigger than a boulder, and it was a matter of speculation for geographers whether it lay in Goa or Karnataka. So it occurred to me to prime J.C. Daniel to muster his persuasive skills, such that the Governor would feel he was back in his three star General's skin and "go for the kill"!

The meeting between the two took place on the last day before General Jacob's departure to

*Little is still known on the ecology, behaviour, and other aspects of this insectivorous bat, however, since their numbers fluctuate during the breeding season, it suggests that there may be other colonies in the area. Recently, new populations have been discovered in Meghalaya and Cambodia.

Wroughton's Free-tailed Bat

assume the same appointment in Punjab. Once Daniel concluded his case, the Governor sensed that this was a moment when push becomes shove, and so he sent for a map of Goa showing its wildlife sanctuaries. Noticing that the Barapeda Cave is almost contiguous with Mhadei Sanctuary, the Governor had a notification prepared to include the Cave within the boundary of the Sanctuary, which he was empowered to do under the Wildlife (Protection) Act 1972, signed it and handed a copy to J.C. Daniel! Maybe, we have a perfect case here to memorialize the General by giving this bat (*Otomops wroughtoni*) a compound name, that is *"Otomops wroughtoni-jacobi*".

This was not an isolated case of General Jacob's deep understanding of the role of biodiversity in mankind's survival strategies, as he had also provided significant support to Professor Madhav Gadgil during his surveys for drafting the blueprint for the conservation of the Western Ghats, listed by the UNO among the world's top ten mega biodiversity hotspots. ■

Lieut. Gen. (Retd) Baljit Singh served in the Indian Army for over 36 years. Concomitantly, he strove to promote conservation of wildlife as a way of life within and by the Indian Army.

Blackbuck

A day at Jayamangali grassland

Text: **Tapash Roy** and **Moon Jana Roy**
Photographs: **Tapash Roy**

It was my long pending dream to visit Jayamangali Blackbuck Reserve, one of the two grasslands in Karnataka where the Blackbuck is found. When I first called my friend Tridip and told him about my plan to visit the place, after a long pause and in a confused tone, he replied: "Wait, what did you say? Which place? I've never heard about it." To convince him that such a place did exist, I sent him a few links from the internet. Actually, his response was to be expected because Jayamangali, previously called Maidenahalli – meaning the village of open meadows – is one of the lesser known wildlife places in Karnataka.

Finally on January 24, 2016, Tridip, my wife Moon, and I left for

Jayamangali. The grassland, situated in Tumkur district of Karnataka, is a part of the plains of Deccan Plateau and borders Anantapur district of Andhra Pradesh. It lies at a distance of 130 km from Bengaluru.

Around 10:30 a.m., we entered into the land of *Krishna Mriga*, the Blackbuck. We parked our car near the entrance and started walking on the clay road with open grasslands on both sides. After almost half an hour, we spotted a herd of Blackbuck (two males and around 10–15 females) grazing in the grassland. It was such a visual treat for us to see these magnificent animals. Blackbuck are very shy and do not let you get near them. When we tried to approach them carefully, they sensed our presence and disappeared into the bushes. Another two hours of walking through the grassland area, we were only able to see a few solitary Blackbuck. The area is also rich in avian life. We sighted Grey Francolin, Indian Roller, Common Hawk-Cuckoo, various species of shrike, Montagu's Harrier, Indian Robin, Indian Silverbill, Tricoloured Munia, Indian Peafowl, Black-shouldered Kite, Green Bee-eater, Brahminy and Rosy starlings, and many more.

In the afternoon, the weather became extremely hot, and all the animals and birds disappeared. We returned to the watchtower and had lunch. Around 3:30 p.m., we decided to start the last leg of our tour. During the evening trip, we saw only two male Blackbuck. Apart from them, we were lucky to see foxes and hares.

After an entire day walking through hot and dry grassland, we felt exhausted and sat under a small tree. A pleasant evening breeze was blowing over the grassland. A big flock of around 40–50 Indian Silverbill landed just beside us and began eating grass seeds. It was really a wonderful experience to see these small creatures so close up. Dusk was falling fast, the western horizon became reddish-orange with the last rays of the setting sun; a full moon was rising over the eastern horizon. Around 5:00 p.m., we started our journey back to Bengaluru.

Areas of Concern

- Due to the absence of a demarcated boundary for the Reserve, every road that we took ended up in a village. Human presence was rampant, and some areas of the grassland were under agriculture or cattle grazing.
- During our visit we encountered only one forest department

Laughing Dove has a soft melodious *coo-rooroo-rooroo* call

Indian Silverbill is usually found in flocks, in dry scrub habitats

Grey Francolin has a swift and 'gamey' gait

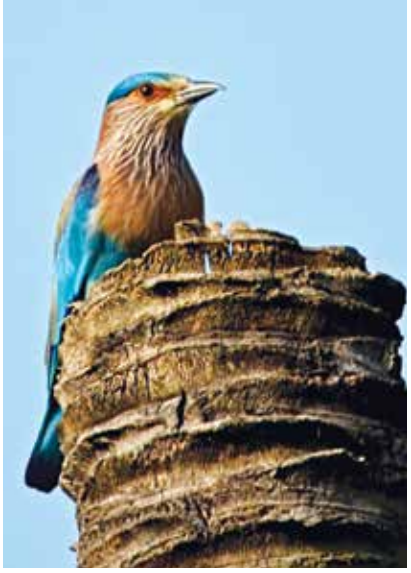
personnel in this entire grassland. We asked him about the issues of human-animal conflict and poaching in the area, but language barrier was a problem.

- There is no entry fee, no records kept, or checks made of visitors to the Reserve.
- Heavy vehicles, cars, and bikes rip through the Reserve at very high speed. This not only impacts the habitat but also poses significant risk of road kill to Blackbuck and other wildlife.

All these are hardly the characteristics of a reserve dedicated for a protected species. If immediate and effective steps are not taken by the forest department to address the situation, the day may not be very far when these magnificent grasslands get converted to farmlands by the surrounding villagers.

Useful tips for visitors

- Convenient route to reach Jayamangali: Bengaluru – Hebbal – Yahalanka – Dodaballapur – Thondevai – Gowribidhanur – Kodigenahalli – Maidenahalli. It is advisable to travel in your own vehicle as public transport is scarce in the area.
- Carry sufficient food and water as there is no restaurant or shop nearby. Please do not litter the place!
- There is a guest house inside the Reserve; for bookings contact Karnataka Forest Department.
- Beware of spiny grasses and other prickly plants while walking through the grassland, their seeds are an irritant when they get into your shoes and socks.
- Winter seems to be the best season to visit the area. ■



Indian Roller is often spotted perched on telegraph wires

Common Hawk-Cuckoo is also called Brainfever Bird from its call

Tapash Roy is a Manager (ICT Application) with Rallis India Ltd.

Moon Jana Roy is a Research Scholar at the Centre for Journalism and Mass Communication, Visva Bharati University.


Infinity resorts
Closer to Nature
www.infinityresorts.com
Nature is not a place to visit...
...It's Home
EXPERIENCE
INFINITY
COLLECTION
of WILDLIFE
RESORTS
Corbett
Bandhavgarh
Rann of Kutch
Kanha
Kaziranga
travel operators for tigers
For Reservation: 9650193662/664/665/667

GANESH PALLELA

Great Knot

Regional Collaboration for Conserving birds in South Asia

Text: **P. Sathiyaselvam** and **Tuhina Katti**

with inputs from: **Girish Jathar** and **Parveen Shaikh**

In many cultures, the influx of migratory birds is associated with the arrival of spring and the rebirth of nature associated with it. Migratory birds cover vast distances and rely on a series of habitats in which they can rest and feed on their journey. If any link in this chain of sites is lost for a species, it could lead to major declines or even extinction.

Rapid human population growth and development has dramatically increased globally, resulting in the degradation and loss of habitats, posing a serious threat to migratory birds. The threats to migratory birds present a shared challenge that calls for collective and collaborative

D. MAHESH BABU

Waders depend on large mud-flats and shorelines for their survival. Developmental activities in many of the sites in their migratory routes are posing serious threats to this fragile group

action, as migratory birds often cross the political boundaries of countries. Protected areas are usually designated on a national scale towards this end, but collaborative international partnerships and concerted inter-governmental coordination and action are crucial to safeguard migratory species.

Stemming from this realization, several international treaties have been signed to protect migratory species. Great Britain and United States signed the Migratory Bird Treaty in 1916 to adopt a uniform system of protection for nearly all migratory bird species that inhabit, and often migrate, between the United States and Canada. Three more international conventions happened subsequently, in Mexico (1936), Japan (1972), and Russia (1976), for the protection of migratory birds common to these nations. Later, the Convention on Conservation of Migratory Wild Animals (CMS), an environmental treaty under the aegis of the United Nations Environment Programme, was adopted. Currently, the CMS (otherwise called Bonn Convention), through its agreements and memoranda of understanding, is the leading multilateral platform for coordination of conservation across countries.

CMS brought together countries through which migratory animals pass, and laid the legal foundation for internationally coordinated

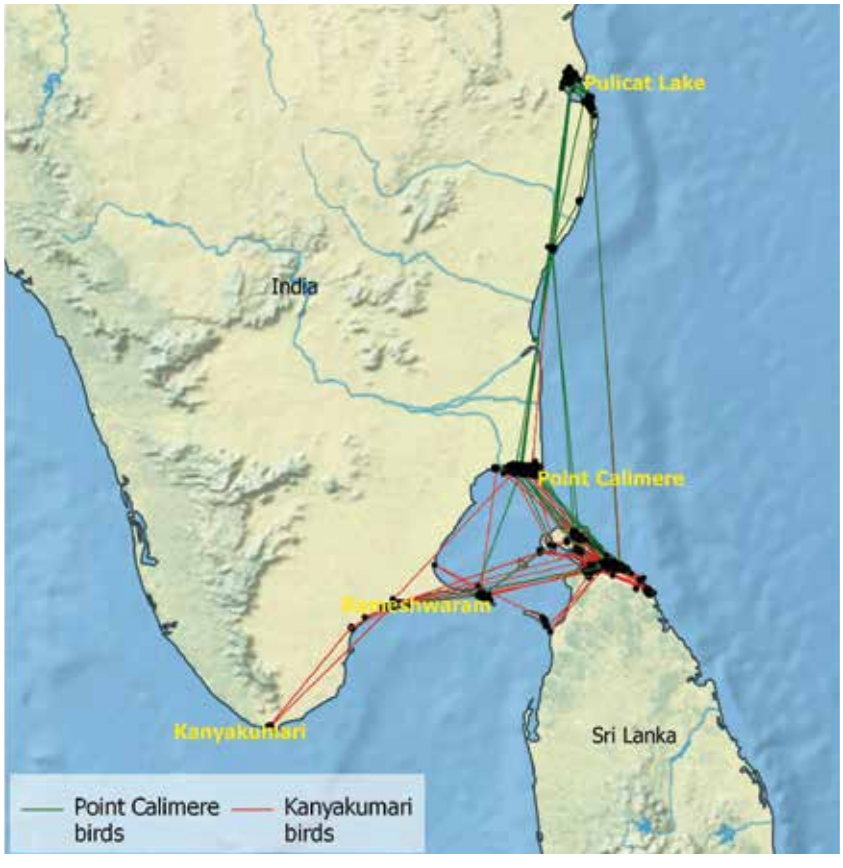
BRISTLED GRASSBIRD

Bristled Grassbird *Chaetornis striata* is a Vulnerable species endemic to the Indian Subcontinent. This species is patchily distributed across the Gangetic and Brahmaputra floodplains. It is known from India, Nepal, Bangladesh, and parts of Pakistan. This rare bird is confined to lowland grasslands in riverine plains, especially in reed beds and elephant grass patches. It is threatened by conversion of its habitat to agriculture, by uncontrolled livestock grazing, and drainage of wetlands. Very little information is available about its movements and breeding biology. Transboundary collaboration between India, Nepal, and Bangladesh would be essential for its conservation.

conservation measures throughout a migratory range. Later, flyway concepts were introduced to conserve migratory birds, especially waterbirds. In all, nine flyways were recognized, of which South Asia (or the Indian subcontinent) falls under the Central Asian Flyway (CAF). The Central Asian Flyway Action Plan to Conserve Migratory Waterbirds and their habitats was adopted in 2006. The Action Plan sets the agenda for enhanced regional environmental cooperation among the 30 CAF countries (officially called Range States) to promote the conservation of migratory waterbirds and their habitats. The Action Plan provides the basis for countries to undertake individual and coordinated region-wide activities. It builds on and complements actions that are being undertaken by national governments to promote conservation.

South Asia is home to 13–15% of the world's biodiversity, and hosts some of the most charismatic and endangered species on Earth. It is home to a diversity of wetland types, ranging from high altitude glacial lakes to near-shore coral reefs, as well as man-made irrigation networks, rice fields, and aquaculture ponds. These habitats are crucial ecosystems sustaining livelihoods and food security for millions of people, while also being important for the survival of many globally and nationally threatened species. Around 182 species of waterbirds, including 44 globally threatened and near threatened species, breed, migrate, and spend the non-breeding (winter) period in the wetlands in the CAF region. Of these, 171 species occur in the Indian subcontinent.

The identification of key habitats and threatened bird species of the South Asian countries that are included in flyway action plans, and the identification of major threats facing species as a whole, could be the first step in developing regional action plans in collaboration with the respective government agencies. Specific action plans could be developed for migratory species such as the Critically Endangered Sociable Lapwing *Vanellus gregarius*. Or for the charismatic Greater Flamingo *Phoenicopterus roseus*, which is highly subject to migratory and nomadic movements within the Indian subcontinent, as borne out by BNHS studies. Four Greater Flamingos satellite-tagged in Kanyakumari and Point Calimere on the southeastern coast of India in 2011 and 2012, to understand migratory movement, were recorded moving between Kanyakumari, Rameswaram, Point Calimere, and Pulicat Lake during winter; and were recorded near Chavakachcheri Lagoon in the Northern Province of Sri Lanka throughout summer. Collaborative studies between these two countries could help to determine the habitat requirements of flamingos during different seasons, and the possibility of their breeding in Sri Lanka due to their 'extended' stay there. Other than flamingo migration, the movements of Little Stint *Calidris minuta* and Eurasian Curlew *Numenius arquata* between the wetlands in India and Sri Lanka have been established through ring recoveries. Therefore, collaborative action needs to be taken by India and Sri Lanka for conserving the species.



MAP RECONSTRUCTED: TUHINA KATTI/©BNHS

BNHS recorded the movements of satellite-tagged Greater Flamingo between India and Sri Lanka. Collaborative activities between these two countries are needed to protect important coastal areas for conserving this bird

The Indian Skimmer is another Vulnerable species covered by the CAF Action Plan. It once had its distribution range up to Laos, Cambodia, and Vietnam in Southeast Asia. Iran was the westernmost site of its distribution range. Its present distribution is restricted mainly to India, Pakistan, and Bangladesh. If coordinated research and collaborative measures are not undertaken by these countries to conserve this species and its habitats, the survival of such an important habitat specialist is questionable.

Other than waterbirds, many threatened forest and grassland birds also extend into the boundaries of neighbouring countries of the South Asia region, e.g., the Vulnerable Finn's Weaver *Ploceus megarhynchus* and Near Threatened Satyr Tragopan *Tragopan satyra*. A landscape level approach across political boundaries is required to understand the relationship between these species and factors determining their movements to various locations along the migratory route; where their critical habitats occur; and how their distribution and abundance is changing as a result of development and land conversion. When such single-species oriented conservation efforts are being implemented in cooperation with species-specialist groups, regional cooperation is essential and can add value to national efforts in the conservation and wise use of natural resources.

Landbirds are now covered through initiatives such as the African-Eurasian Migratory Landbird Action Plan (AEMLAP) being developed under the CMS. However, grassland birds of South Asia are still not covered under any convention or agreement. Some of them are habitat specialists, threatened, and with their numbers declining rapidly due to habitat loss. Species like Bengal Florican *Houbaropsis bengalensis*, Great Indian Bustard *Ardeotis nigriceps*, and Lesser Florican *Sypheotides indicus* also move across the political boundaries of South Asian countries to some extent, so collaborative and coordinated

INDIAN SKIMMER CONSERVATION INITIATIVE (ISCI)

Indian Skimmer *Rynchops albicollis* is listed as a Vulnerable species whose population is declining rapidly as a result of widespread degradation and disturbance of lowland rivers and lakes. Once widespread in the Indian subcontinent, Myanmar, and along the Mekong river in Indochina, it is now confined to Bangladesh, India, and Pakistan. It is a rare visitor to Nepal. The population was estimated to be 10,000 individuals in 1994, but a BirdLife International report in 2001 mentions that it may well have fallen below this level, given the evidence of declines throughout its range. Asad R. Rahmani reported a 50% population decline in National Chambal Sanctuary from 1994 to 2010, while Das reported 30% breeding site declines in 2015 from National Chambal Sanctuary in India. Recently, Indian Skimmer was listed as Critically Endangered in Bangladesh and conservation initiatives are being implemented. BirdLife International and other organizations have recommended a population census in its range, especially in Bangladesh, India, and Pakistan. International collaborative research across these nations and other countries is crucial for conserving Indian Skimmer.

BNHS has taken many initiatives like protecting breeding grounds in Narora; identifying current nesting sites in Chambal sanctuary and threats to the nesting birds; colour tagging to understand the movements of the bird from its breeding habitats in River Mahanadhi, Odisha; identifying the important wetlands, to protect and conserve the Indian Skimmer. BNHS is preparing the National Species Action Plan for Indian Skimmer for conserving the species.

S. BALACHANDRAN

RAJAT BHARGAVA

SATYR TRAGOPAN

The brilliantly plumaged Satyr Tragopan *Tragopan satyra* is a Near Threatened species endemic to the Himalaya, covering parts of India, Nepal, and Bhutan. This species is confined to broadleaf forest between 2,400 m and 4,250 m. In India and Nepal, the population seems to be declining owing to large-scale conversion of its habitat, but it appears to be stable in Bhutan. In addition to habitat conversion, climate change seems to be a major challenge in the near future for the species, as changing dynamics in the broadleaf forests in response to warmer temperature could restrict the availability of suitable habitats for the species. Therefore, a transboundary collaborative effort is essential to safeguard the habitat of the species.

initiatives are needed to reverse the bleak future of these species.

Raptors are another group of birds covered separately under the Memorandum of Agreement for Raptors, popularly called the Raptor MoU. 106 species of raptors are recorded in the South Asian region, including 45 migratory species from lands across the Himalaya. Loss of habitat is the single greatest threat to raptor populations, while collision with wind turbines, power-lines, and towers are other major threats. Conservation initiatives along the major raptor habitats and knowledge sharing among the host countries are essential to reduce threats to raptors.

Poaching is a widely diffused practice in South Asian countries, where people are dependent on biodiversity for their livelihoods. Abrar Ahmed, an authority on the bird trade in India, writes that due to stringent action taken in India under the Wildlife (Protection) Act, 1972, professional bird-selling tribes have changed their tactics, taking to underground markets. Now the focus is mainly on munias and parakeets for the (illegal) pet trade, on waterbirds and galliforms for food, and on other species that can be easily sold without the need for transportation. Though tackling the challenge of poaching involves a regional approach, a specialized bird crime prevention cell to monitor and share sensitive information by government agencies and NGOs in the South Asian region would be a worthwhile initiative, akin to the existing 'Intergovernmental

Task Force on Illegal Killing, Taking and Trade of Migratory Birds' in the Mediterranean (MIKT).

Some attempts have already been made to strengthen regional collaboration in the South Asian region. WWF-India, Ministry of Environment, Forest & Climate Change, Government of India, Bombay Natural History Society (BNHS), and Indian Bird Conservation Network (IBCN) organized a two-day workshop for Bhutan, China, and India in 2011, called 'Cranes Calling: Regional cooperation for conservation of Black-necked Crane'. The primary objectives of the workshop were to facilitate knowledge-sharing and information exchange among conservation experts on the Black-necked Crane, to foster international cooperation among India, China, and Bhutan, and to explore the opportunities of community exchange programmes between these countries.

Another initiative was a dedicated project carried out between 2012 and 2016 for "Strengthening Regional Cooperation in Wildlife Protection in Asia" with financial assistance from the World Bank. Further to this, TRAFFIC has been encouraging regional cooperation as a basis for fighting wildlife crime and curbing the illegal trade of endangered wildlife. It actively brings together the eight South Asian countries to form the South Asia Wildlife Enforcement Network (SAWEN). SAWEN was formally launched on January 30, 2012, opening a new chapter in regional cooperation in South Asia, to strengthen wildlife law enforcement, to identify trade hotspots and priority species in wildlife trade across South Asia, and to undertake periodic analyses of priority wildlife trade routes in member countries and across the region. However, attention has been focused only on endangered flagship species such as tiger, rhinoceros, snow leopard, and elephant.

As migratory bird species move across international borders, ensuring their protection is necessarily a shared responsibility. All countries in the South Asian region have their own legal framework, policies, and conservation plans to protect and conserve bird species. Despite their tremendous ecological and economic importance, and the existence of policy and regulatory frameworks, all wetland, grassland, and forest ecosystems in the South Asian region are still under high threat. Numerous direct and indirect pressures arising from different types of economic development and associated activities are making adverse impacts on bird habitats across the region. To overcome the problem and to conserve bird species and their habitats, a South Asian regional arrangement is required. This could be the existence of a strong common institutional framework with collaborative efforts between the governments and other major stakeholders involved in wildlife related initiatives. Institutional framework (maybe in the form of a secretariat) is required to facilitate cooperation between countries in South Asia in areas of mutual interest for bird conservation. ■

BENGAL FLORICAN

K.S. SAJWAN

Bengal Florican *Houbaropsis bengalensis* is a Critically Endangered species restricted to lowland, dry or seasonally inundated alluvial grasslands. It is patchily distributed along the border of Nepal with India, and into the Gangetic and Brahmaputra floodplains. Another subspecies *H. b. blandini* is restricted to Cambodia and parts of Vietnam. Satellite tracking studies in India and Nepal suggest that the bird undertakes local movements during the breeding and non-breeding seasons. The species faces major challenges in terms of conversion of its habitat for human use. As this florican is found in the border areas of both Nepal and India, transboundary collaboration is important for the future conservation of the species. This is also applicable to the subspecies found in both Cambodia and Vietnam.

P. Sathiyaselvam, Scientist "C" of the BNHS, is trained in satellite tracking, and has been involved in Bird Migration studies since 2002.

Tuhina Katti, Scientist A, BNHS, is associated with the Wetlands Programme. She has been involved in bird migration studies of the BNHS since 2013.

Hon'ble CM of Maharashtra visits BNHS

The Hon'ble Chief Minister of Maharashtra, Mr. Devendra Fadnavis, visited Hornbill House on March 5, 2018. He visited the Collection Department of the Society and interacted with the Governing Council members and senior scientists. Mr. Fadnavis commended BNHS's efforts towards biodiversity conservation and assured government support to digitize its invaluable, collection for convenient access to the public. BNHS has a vast collection of animal specimens which includes 30,000 bird, 5,000 bird eggs, 20,000 mammal, 15,000 amphibian and reptile, and 50,000 insect specimens. This national heritage collection is a valuable resource to researchers for taxonomy and other related studies.

He assured that the State Government would renew the lease for CEC-Mumbai at a rate suitable for non-profit activity within a few days. The 33 acre land in Goregaon that houses the BNHS CEC receives about 20,000 visitors annually spanning all age groups, most of them being school children.

Mr. Fadnavis released the INDIAN BIRD MIGRATION ATLAS authored by BNHS scientists Dr. S. Balachandran, Ms. Tuhina Katti, and Dr. Ranjit Manakadan. This monumental body of scientific work, capturing the bird migration data from about half a million birds of BNHS bird ringing/banding studies in various parts of the country since 1927, gives an illustrated summary of 3,000 ring recoveries of over 100 species from 29 countries spanning five continents (Asia, Europe, Africa, Australia, and Antarctica). Accounts of the findings from satellite tracking and geolocator studies on 'Indian' birds by BNHS or other organizations, Indian or foreign, are also provided in the document. The document provides information on the origins, migration routes, and stopover sites of birds (waterbirds as well as passerines) migrating to and from the Indian subcontinent, which is a crucial part of the Central Asian Flyway. Owing to the vast experience in bird ringing and training volunteers for these studies, BNHS was recently designated as the State Nodal Agency for bird ringing studies by the Maharashtra Forest Department.

Dr. Deepak Apte, Director, BNHS, stated "The visit by Hon'ble Chief Minister Shri Devendra Fadnavis is a morale booster for our efforts to save wilderness, at the same time finding ways and means of sustainable development. The assurance given by CM to help BNHS for digitization of our collections will go a long way in bringing the vast collections and information in the public domain and give people online access to the vast repository of knowledge that rests in Hornbill House. Renewal of CEC lease will allow us to pursue our agenda of environmental education to masses."

BNHS PHOTO LIBRARY

The Chief Minister examining the BNHS collection, with Director Dr. Deepak Apte and Curator Mr. Rahul Khot

BNHS PHOTO LIBRARY

Mr. Devendra Fadnavis (3rd from right) launched THE INDIAN BIRD MIGRATION ATLAS, a new publication of the BNHS

Mr. Praveensingh Pardeshi, Chief Secretary to the CM was also present along with dignitaries including Mr. Vikas Kharage, Secretary (Forests), Mr. Rajendra Kshirsagar, Jt. Secretary (Revenue), Mr. Bhushan Gagarani, Managing Director CIDCO, Mr. N. Vasudevan, APCCF Mangrove Foundation, among others. The event concluded on a positive note in the presence of the members of the Governing Council and BNHS staff. ■

Dr. Deepak Apte awarded 'Green Teacher Honour'

BNHS PHOTO LIBRARY

Dr. Deepak Apte receiving 'Green Teacher Honour' award at KVIFF

Dr. Deepak Apte, Director, BNHS, was awarded the 'Kirloskar Vasundhara Green Teacher Honour' on January 08, 2018, during the Kirloskar Vasundhara International Film Festival (KVIFF) held at Pune. Organized by the Kirloskar Group and Vasundhara Club, KVIFF is a non-commercial festival that combines film screening and activities related to environment. It is an innovative attempt to explore nature and analyze topical issues related to environment, wildlife, energy, air, and water. Dr. Apte was awarded for his exemplary contribution towards nature conservation, education, and research. The felicitation included a ceremonial 'Puneri pagadi', 'Uparana', citation, and memento. Dr. Apte also expressed his thoughts and delivered a lecture for students during the festival. ■

Screening of 'Elephants in the Coffee'

BNHS PHOTO LIBRARY

Mr. D.K. Bhaskar interacting with the audience on human-animal conflict

A documentary by Mr. D.K. Bhaskar, international photographer, author, and explorer, and Dr. Thomas Grant, journalist, titled 'Elephants in the Coffee' was screened at BNHS on January 19, 2018. The 58-minute documentary, which offers an insight into the issue of human-elephant conflict, sheds light on the relationship between humans and elephants. The documentary, which was shot mainly around Nagarhole National Park in Karnataka and surrounding coffee estates, explores and highlights the views of all stakeholders, including villagers, coffee estate owners, naturalists, government, and even the mahouts or elephant caretakers. This documentary has garnered national and international appreciation and won multiple awards at film festivals. The screening was followed by an engaging discussion with Mr. Bhaskar, which elicited active participation from the audience. ■

Japanese delegation visits Hornbill House

BNHS PHOTO LIBRARY

The delegates being shown the collection by Mr. Rahul Khot with Mr. Homi Khusrokhan, President, and Dr. Ashok Kothari, Honorary Secretary, BNHS

A delegation from Japan, led by H.E. Mr. Yoshinobu Nisaka, Governor of Wakayama, visited Hornbill House on January 31, 2018. The delegation was welcomed by Mr. Homi Khusrokhan, President, and the Governing Council of the BNHS, and was followed by an interesting discussion on nature conservation. The delegation was shown around the Collection Department, where BNHS Curator Mr. Rahul Khot demonstrated some rare specimens. The Governor showed a special interest in the butterfly collection. The delegation was accompanied by the Consul General of Japan in Mumbai, along with officials from MTDC who coordinated the visit to Mumbai and to BNHS. The visit concluded on a hopeful note for a fruitful association in the future. ■

BNHS @ bamboo crafts mela

Tadoba Bamboo Craft, a self-help group supported by BNHS, won a 'special contribution' prize for their bamboo crafts stall at the Orange City Craft Mela organized recently in Nagpur. This is one of the biggest craft festivals organized by the South Central Cultural Zone under the Ministry of Culture, Government of India.

Bamboo is a livelihood option in many villages around Tadoba-Andhari Tiger Reserve (TATR). Out of 79 villages in the buffer, 40% villages use bamboo for their livelihood, however, the use is limited to traditional items of daily use. BNHS established a bamboo craft unit in one of the buffer villages of Tadoba with the support of Born Free Foundation, Tata Steel, and National Payment Corporation of India. Tadoba Bamboo Craft, a self-help group (SHG) has been established under the guidance of BNHS in Palasgaon village of Tadoba Andhari Tiger Reserve.

BNHS PHOTO LIBRARY

Visitors buying bamboo crafts at Orange City Craft Mela in Nagpur

The bamboo craft stall, one among the 145 stalls this year, was installed at the mela through the SHG. Visitors appreciated the items on display and invited the group for other exhibitions. ■

Competitions at Raj Bhavan, Nagpur

BNHS and Raj Bhavan, Nagpur, jointly organized a photography competition, nature fete, and drawing competition recently. The photography competition was organized for both amateurs and professionals, in which 60 photographers participated. Painting, collage, *van* rangoli, face painting, and paper bag making competitions were arranged for school students during this nature fete; the making of bird nests and feeders was demonstrated. Around 150 students from 14 schools participated in the event, while more than 600 students participated in the painting competition. Shri Dilip Dharurkar, Commissioner of Right to Information, Nagpur, was the Chief Guest for the prize distribution that followed. The winners of the photography competition were felicitated with certificates and cash prizes. The winners of the nature fete and drawing competition were presented gifts, books, and certificates. This project is funded by Dr. Mrudula Thakkar in the memory of Late Rashmi Thakkar. ■

BNHS PHOTO LIBRARY

Active participation of school students in a drawing competition, organized by BNHS at Nagpur

Published on March 19, 2018, by Dr. Ashok Kothari for Bombay Natural History Society, Hornbill House, Dr. Sálim Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 001, Maharashtra, India.

Online Courses

BNHS Conservation Education Centre (CEC) announces six online hybrid courses for wildlife enthusiasts. Grab the opportunity to learn from BNHS scientists.

Leadership Course in Biodiversity Conservation
Duration: 11 months (June 2018 to April 2019)
Fees: Rs. 12,000/-*
Course Leader: Dr. Raju Kasambe, Ornithologist

Certificate Course in Butterfly Studies
Duration: 6 months (August 2018 to January 2019)
Fees: Rs. 8,000/-*
Course Leader: Dr. Raju Kasambe, Ornithologist

Basic Course in Ornithology
Duration: 11 months (August 2018 to June 2019)
Fees: Rs. 12,000/-*
Course Leader: Dr. Raju Kasambe, Ornithologist

Basic Course in Marine Biology
Duration: 2 months (December 2018 to January 2019)
Fees: Rs. 6,000/-*
Course Leader: Dr. Deepak Apte, Director, BNHS, and Marine Biologist

Basic Course in Herpetology
Duration: 3 months (June 2018 to August 2018)
Fees: Rs. 8,000/-*
Course Leader: Mr. Mrugank Prabhu, Herpetologist

Field Course in Botany
Duration: 2 months (August 2018 to September 2018)
Fees: Rs. 6,000/-*
Course Leader: Dr. Rajdeo Singh, Botanist

BNHS India CONSERVING NATURE SINCE 1883

For details:
Write to cec-mumbai@bnhs.org or call 022-22821811 / 9594953425
* All course fees given above exclude the camp fees.

Registered with Registrar of Newspapers under No. **RN 35749/79**

BALDOTA
WE ARE LIFE

We believe in giving back what we take. This stems from our founder's philosophy that "I am not the owner, but a privileged trustee." Since the first sapling planted in 1977, MSPL has planted 18 lakh trees in the last 40 years and was awarded Indira Priyadarshini Vrikshamitra Award in 2004. These trees are expected to be absorbing approximately 34,000 Tons of CO_2 and releasing approximately 1,87,200 Tons of Oxygen every year.

At MSPL, we are conscious about the impacts of our activities on surrounding nature and environment. **We are committed to creating a sustainable environment by conserving our bio-diversity.**

www.baldota.co.in

Exploration | Mining | Pelletisation | Wind Power | Aviation | Shipping | Gases | Environment Solutions