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Long-horned Beetle *Eucomatocera vittata*  
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**Pranav Trivedi** successfully transports us to KTT plateau – Ladakh through his tête-à-tête with the Tibetan Gazelle Gowa. Sharing an incredible experience of his brush-up with this high altitude ungulate's habitat, breeding and feeding habits, this story turns out to be an eye opener! Read on...

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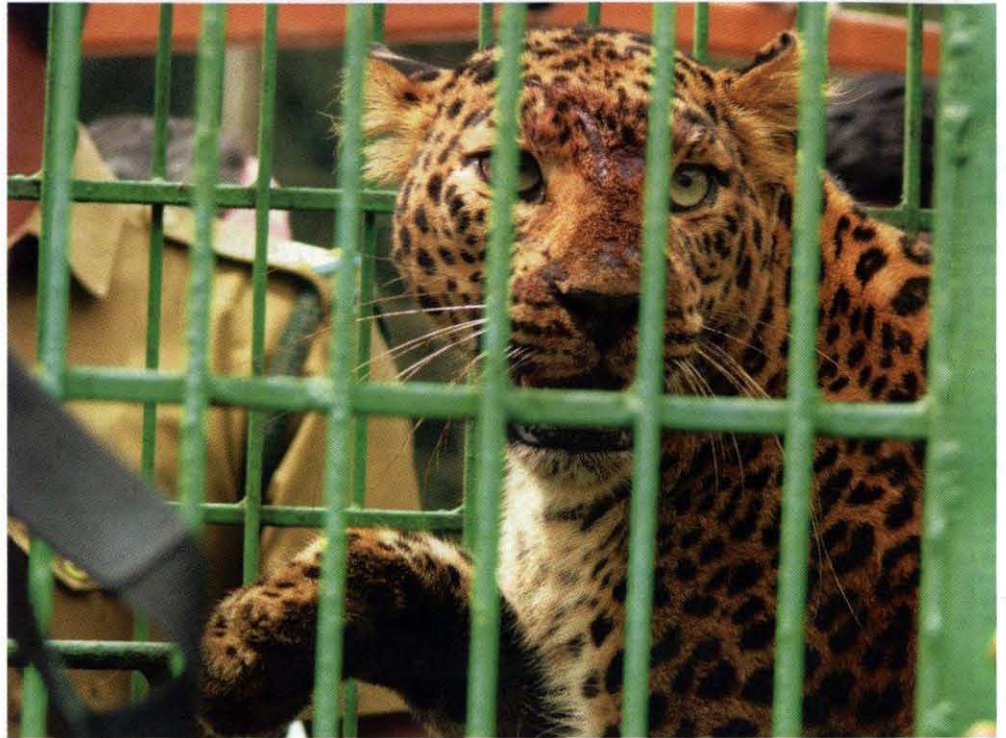


Vast expanses of forests are not just shelter to the diverse fauna and flora that survives within; it is home to the forest species themselves! **Swapna Prabhu** takes you on a tour of forest species, exclusive to their habitat – which if lost, will make the species extinct!

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## PRINCE OF THE INDIAN JUNGLES



VIDYA ATHREYA

Nearly 25 years ago, while working at the Dudhwa National Park in Uttar Pradesh, I happened to meet the legendary conservationist Arjan Singh, popularly known as 'Billy', in his farm 'Tiger Haven' right outside the Park. Over the course of our association, I got the opportunity to read his book *PRINCE OF CATS*, a book about the leopard. Since then whenever I read about leopards (which is quite often now), I recall the name 'Prince' that Mr. Arjan Singh had given his pet leopard.

While the Asiatic Lion safely roams the Gir forests and its surrounding areas in Gujarat, and the Tiger struggles to survive in the diminishing forests of India, it is the Leopard that is still holding on to most of its range, despite poaching and onslaught in its habitat. It is clever, adaptable and literally street smart. When I say that the leopard is 'street smart', I mean it. Today, it is often sighted in the by-lanes of bigger cities such as Mumbai, Guwahati and Nagpur to name a few!

Most people are unable to handle Prince's presence in their vicinity: they corner it, throw stones at it and block its escape routes. In short, a perfect trap laid to invite tragedy. All it wants is to be left alone so that, it can find its way back into the forest cover. The leopard generally makes an appearance in and around human habitation to steal a stray dog (which we have in plenty) or a goat because we have diminished its natural prey. Looking at this ordeal we have subjected Prince to, should he be jailed in a small zoo-cage or pay for his life for this supposed misdemeanour?

Human conflict with Leopards is becoming increasingly common, or at least they are now reported widely. I do not use the term 'man-animal conflict' as I do not think animals are in conflict with us, it is we human beings that are in conflict with animals, particularly the large cats, elephants, rhino etc. Whenever animals try to regain their lost land, the conflict begins.

Recently, the Ministry of Environment and Forests, Government of India, prepared a document – *Guidelines for Human-Leopard Conflict Management* – to deal with leopards that stray in human areas or when they turn man-eaters. As the MoEF said in its press note of April 18, 2011, "The capture





DHARMENDRA KHANDAL

and translocation of problem leopards has been a common practice in various parts of the country. However, such measures did not alleviate the intensity of conflict in the affected areas. Recent scientific studies on leopards in human-dominated landscapes show that capture-translocation is an ineffective way of dealing with free-ranging large carnivores. Leopards exhibit amazing homing instincts and many animals will traverse through other densely populated landscapes to reach back to their original territories. As a result, translocation often results in shifting the conflict to unaffected areas. In addition, being territorial animals, the space vacated by a translocated animal is likely to be soon taken up by another wild leopard. The complexity of the situation calls for a more nuanced and scientific approach.”

The Guidelines have outlined a three-pronged strategy route: (a) establishing trained teams, termed the Primary Response Team and the Emergency Response Team to handle conflict emergencies; (b) awareness generation amongst local communities, media and officials of various government departments; and (c) the use of latest technology and scientific know-how to improve efficacy of capture, handling, care, translocation (if necessary) of the animal, and to design locale specific mitigation measures. There is also an emphasis on scientific monitoring of problem leopards and feedback monitoring of the efficacy of mitigations measures, with independent scientists and experts.

Recognizing the severe situation we have put Prince into, various measures are being undertaken to improve the current scenario, with leopards being under the tremendous pressure of poaching. There is a high likelihood of this status rising further with the tiger’s disappearance. We do not want any more retaliatory killing of leopard by the general public as it is happening frequently from Jammu and Kashmir to Tamil Nadu.

The Guidelines are available on the MoEF website. I hope the state governments will use these guidelines to design situation-specific mitigation measures, to deal with the complex issue of man-leopard conflict and the incidence of leopards straying into human settlements causing livestock or human death and retaliatory killing of leopards will decrease. I think the Prince of the Indian jungle needs better treatment from us.

Asad R. Rahmani

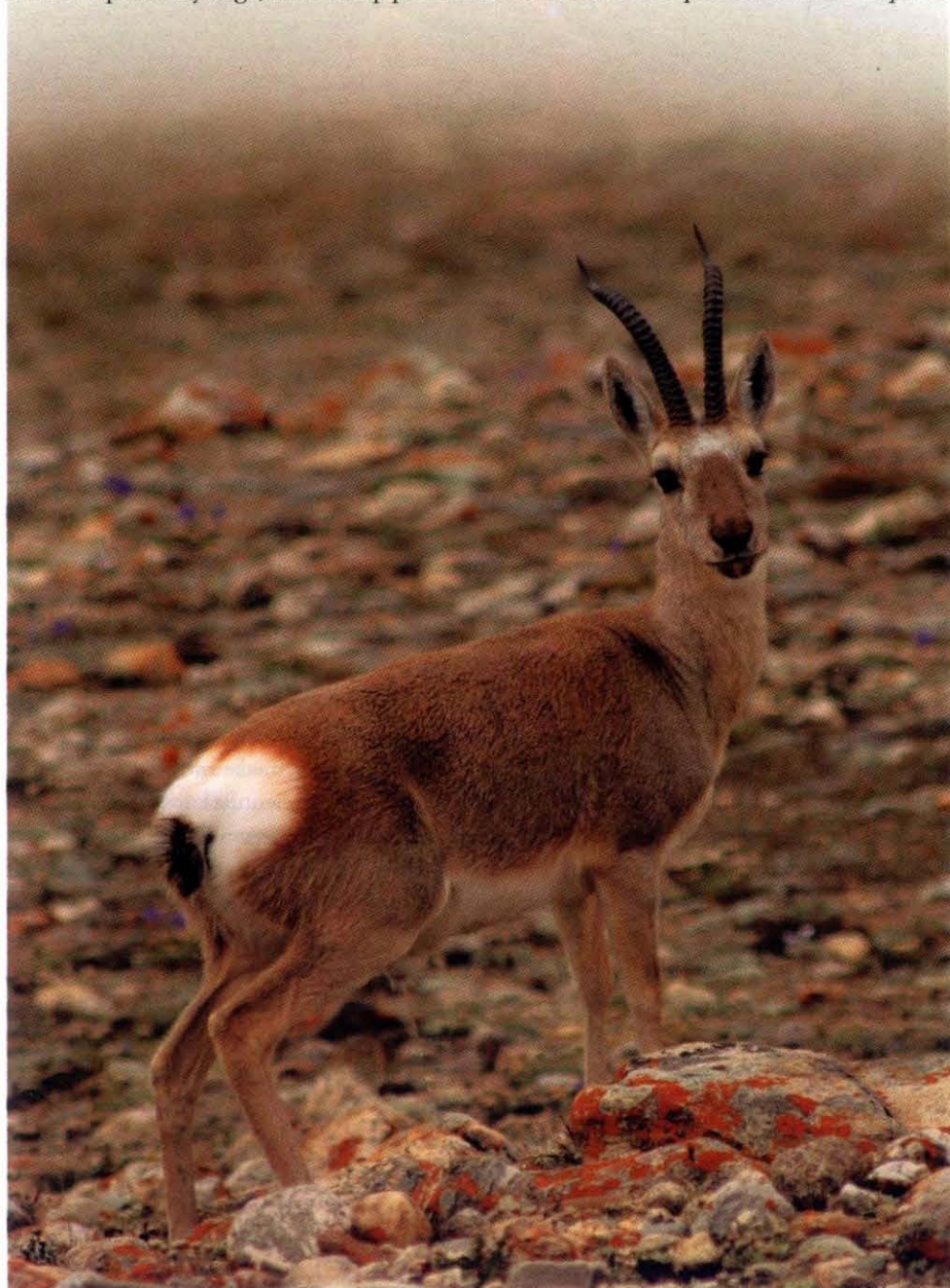
# From Cashmere to Gowa

Text: **Pranav Trivedi**

The wind was forceful and the only shelter was my woollen cap, which seemed inadequate to stop the impact of this element of nature. I knew it was a particularly wrong time to remember the quote “there is no such thing as bad weather, only bad clothes and bad attitude” that I’d read somewhere long time back. A bright turquoise sky sparkled above, reminding me of my first visit to *Kalak Tar Tar* (Sand haven in *Ladakh*) four years back in 2006. Unfortunately, during that trip, we did not see any Tibetan Gazelle *Gowa*. A high altitude ungulate aptly named *Procapra picticaudata* by scientists, the Tibetan Gazelle has a conspicuously large, white rump patch that can be seen from quite a distance. *Procapra* of



Pranav Trivedi is currently Head of Education & Outreach and Senior Scientist with Nature Conservation Foundation (NCF), Mysore, and Director of Conservation, Snow Leopard Trust (India Programme). He is interested in understanding human-nature relationship along with its improvement and restoration using experiential and outdoor education.



PRANAV CHANCHANI

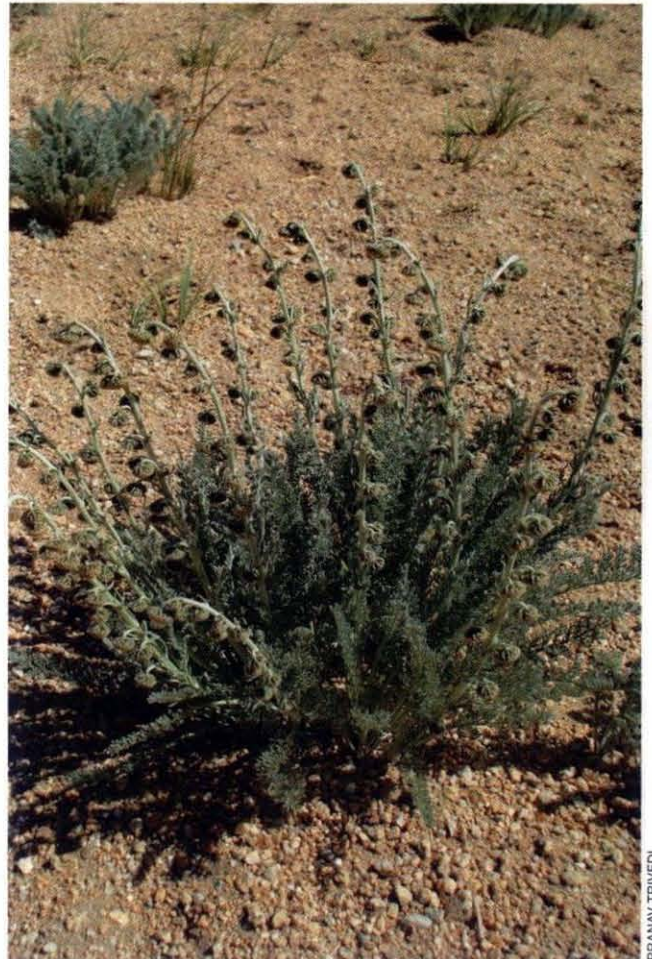
Tibetan Gazelle *Gowa* is known to survive without water for long periods



The open, dry mountainous habitat of the *Gowa*

course hints at its primitive character as a precursor of goats and related creatures. Most of the existing gazelles are all named *Gazella*, but this one is different and yet a gazelle! Not going into more details about its name and affinities, let me come straight to the point. I was strongly desirous of seeing this species, for this year I was directly involved in facilitating its conservation. And to the less mortal ones, it's difficult to imagine working for something that one has not seen!

So, here we were looking for the *Gowa* in its last stronghold in India – *Kalak Tar Tar* (KTT) plateau in the Hanle area of Changthang – the great Tibetan high altitude plain that stretches at its extreme south-western and south-eastern edges into India in Ladakh and Sikkim respectively. It was 7:30 a.m. and we had just started drifting slowly on the plateau. It was cold, but sunny and that was the only relief. We had stopped on spotting a bird of prey a bit farther to our left and debating its identity, frantically looking for clues. Losing interest in the bird (these raptors!), we drifted forward towards a lone Kiang or Tibetan Wild Ass standing at a distance and scanned the landscape with binoculars rather aimlessly. From nowhere out of the stark space in front of me, appeared three greyish shapes with shining white rumps as the sun illuminated their backs. “*Gowa*, gazelle, Karma, please see fast!” were the words that blurted out spontaneously. Karma confirmed soon and we were really excited. Well, the *Gowa* weren't as excited on seeing us, or the vehicle and sprang into action trotting off at a brisk pace away from us till they merged with their brown-



*Artemisia*: a fragrant and common herb on the *Kalak Tar Tar* plateau

grey background, their flashy, white rumps dissolving in the Himalayan infinity.

Karma – our field programme co-ordinator in Ladakh – soon announced that the Buzzard (as we made out later, it was an Upland Buzzard) was a good omen and it was time that we had some tea. As he and his assistant Palzor – a local herder started to dig for sugar, tea leaves and milk powder in our luggage at the back of the vehicle; I started observing the vegetation around. It was dominated by a species of *Artemisia* – a fragrant herb locally called *Burse* or *Burna* (in Spiti) and used by the local Buddhist communities as incense for religious purposes. There were at least two species of sedges, a grass called *Stipa* – regarded as a nutritious and important food item for wildlife, a rather abundant herb *Salsola* and a species of *Oxytropis*, a forb with beautiful purple, violet and pink flowers and one that most ungulates – domestic and wild avoid (though I've seen donkeys indifferently devouring their inflorescence). The greens of these herbs were as different as their names and formed a lovely, short mat over the gently undulating plateau. On the dirt track where we stood, lay dozens of foot-prints of the gazelles apparently having moved along this route earlier during the day.

My colleagues Yash Veer Bhatnagar, Charudutt Mishra and a Ph.D. student Tsewang Namgail were already involved in research and conservation work on this species for a while now, Yash Veer having started it way back in early 2000.

And they had revealed some facets of the animal's ecology and conservation status. An animal that existed a few decades back in hundreds, distributed over 20,000 sq. km area in Ladakh, was on its way to extinction. Yes, there are not more than 200 Tibetan Gazelle left in India in fragmented populations at two places, so far apart as Ladakh and Sikkim. In Ladakh, its range is now reduced to about 100 sq. km and its real stronghold here was this lovely 40 sq. km plateau close to the Indo-China border. The population in KTT could be at the most 60 to 70 animals, with the highest count in recent times being 68 (in 2004 by Otto Pfister). Most counts later, however, were closer to 40 or 50.

After a short and welcome tea break, we decided to continue along the dirt road and skirt around the Zado ridge, and have a good look at the plateau. As we gently moved ahead, we spotted at least 10 white rumps further down the path. We watched with our binoculars, 11 shapes could be seen now, but I felt there were more behind the low fold of the earth. Gliding slowly, we fervently hoped that neither the shine of the silver colour of our vehicle, nor its sound would disturb them. They allowed this fallacy to sustain for a while, but were soon alarmed. When we saw them they were all busy feeding. But, the minute we got noticed, one after the other head kept turning back nervously. One wonders whether they have always been like this, or is it this hard grind of near-extinction that has made them like this. Sensing the danger they took off immediately, a neat line of



Kiang, the king of Hanle marshes

PRANAV TRIVEDI



12 galloping shapes – greyish with prominent white rumps and most shapely, sharp, backward curving horns. To my surprise all individuals seen so far were males, so 15 males in all. This was possibly a broken up bachelor herd, which one encounters in most ungulate societies after calving/fawning has taken place. Where are the females, away to fawn or somewhere around with babies was the question lingering on my mind...? The herd had moved quite far; they were now at least 250 m or more from our vehicle. We investigated their foraging area and looked for feeding signs. Except *Stipa*, no other plant bore any such signs, or we were

Such contrasting masterpieces of advertisement and camouflage! The little gullies and ridges on the plateau also swallowed them suddenly, thus making it very difficult to keep track of them. As we went about the usual business of scanning, we noticed two more gazelles to our left and further behind us. Karma had now put the spotting scope on ground. As he watched through, he jubilantly declared, “there are fawns!” It was absolutely overwhelming to see the two small shapes - nimble and lithe wrapped around their mothers, often both fawns followed one of the two females. The mothers were wary and tried to keep the young in control,



A nomadic herder with Pashmina (Cashmere-yielding) goats

probably not looking at the right area. All three of us looked in different parts and found no feeding sign on any of the herbs/forbs, though sharp-eyed Karma did pick a clipped *Artemisia*, which on closer investigation revealed that pikas had been at it – preparing for the great “winter food fest” when they will hibernate and eat this stored stuff to sustain their almost aimless winter sleep.

We watched the gazelles feed, now quite far and safe. Some were even resting now. As their positions changed or when they sat to rest, the white rumps were far less striking and with their backs pointing towards us they could be missed even when we knew where they were a minute ago.

but the ‘naughty’ fellows kept going up and down. There were depressions in which they disappeared at times and we found them again a little later.

The place where we saw these fawns with their mothers lay just a few hundred yards from the grazing-free reserve that my colleagues had successfully negotiated with local nomadic herding communities called the *Changpas* a couple of years back. We had agreed to compensate them for the loss of grazing in this rather small reserve, which turned out to be an important area as established by our earlier studies. My thoughts were now running faster, “is it possible that the reserve has helped in fawning?” No one probably had

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exact answers as these creatures are secretive (for obvious reasons) when and where they give birth to their young. Though the young are capable of moving right away after birth, a dodged predator like wolf or even domestic dogs (which often accompany the local herders) can easily chase and kill them. Much later, after a few months, Karma added to this list of potential fawn-predators, Golden Eagle – a pair of which he saw trying to attack what presumably was the mother with a four month-old fawn.

But, sure enough breeding of the species was a positive sign. The last known reference to fawns was made by Yash Veer, who had reported six fawns in his much earlier work. So, this was the second time in ten years and the first after the creation of the Reserve that our team was documenting fawns. I saw rays of hope spreading and getting scattered ... with the next question "How can we ensure a sound future for these fawns?" We continued further, noting down the information that flowed from Karma's understanding and experience. There used to be three main herding groups, namely *Dique*, *Raque* and *Maque* (pronounced di cue, raa cue) meaning yak herders, goat herders and sheep herders respectively. This fascinating system was disturbed and is now almost disrupted largely due to the influx of Tibetan Refugees during 1960s and a concomitant, but disproportionate rise in the livestock numbers.

Now, they have the additional human and livestock population of the settlers. Majority are "changra" goats yielding the fine, superior quality wool known as 'cashmere', or more commonly as *pashmina*. The former word has come from the artisans of Kashmir weaving this wool to prepare shawls and other clothing. The Government of Jammu and Kashmir is promoting this trade following which the number of goats has risen manifold dramatically in response to the demand for *pashmina*. The number of sheep in contrast has gone down and yaks too have dwindled resulting in marked changes in the overall composition of livestock. There is one conspicuous animal that has increased – it feeds on petrol and diesel – *vehicles!* Many changpa families now own two-wheelers or four-wheelers instead of the lovely *Zangskari* or *Chumurti* (famous, indigenous breeds of Ladakh and Pin Valley) horses.



The ever vigilant Karma Sonam

PRANAV TRIVEDI

Originally nomads, many of the Changpas now lead a semi-settled, semi-nomadic life. Hanle region has five such settlements, namely *Raique* (mainly *Tibetan* refugees), *Kbaldu*, *Sbaado*, *Punguk* (mainly *Tibetan* refugees) and *Zing Soma*. But, several of the occupants keep moving with their livestock to their summer and winter camps. These herder camps are spread all over the region. Around the grazing-free reserve created for *Gowa*, there are at least three such camps. With over 5,000 heads of goats and sheep, and the herders with their guarding *changti* dogs around, the *Gowa* obviously has no choice, but to keep a distance from these and loose good pasture.

Our past studies had shown that *Gowa* shows more tolerance in sharing the pastures with larger bodied (and those with broader niche and diet spectrum) species such as Kiang and domestic Yak. The latter is not herded. Further, Kiang show local movements with their highest concentration in KTT during winter gradually giving way towards peak summer. Counts carried out by *Palgor* and *Eshey Gyatso* – the two local community members involved with us in the monitoring of *Gowa* and Kiang since 2008 show that the latter numbering over 100 to 200 during winter and spring, generally plummet to around half, or less during summer. Thus, *Gowa* is relatively free when it has fawns as Kiang, with much of wet, moist meadows having dried up in KTT, move further down to the marshes along the Hanle and Indus rivers. Whether this is a consistent, and an annual pattern remains to be seen. But, the goats and sheep remain, just like the demand for *Cashmere*; largely emanating from the European countries and the USA. The changra goats – smaller, domestic herbivores create a year-round competition with the gazelles. A total livestock population of about 25,000 (with majority being the *Cashmere* yielding goats), thus exerts pressure on the last stronghold of *Gowa*.


So, what is happening for its conservation and safeguarding its future, one may wonder. The efforts of the Forest Department were worthy of applause when they tried to supplement fodder for the gazelle, but these wild denizens of the high Himalaya decided not to show interest in it! Creation of the sprawling Changthang Wildlife Sanctuary also cannot yield a secure future to the gazelle as it is now

well-known that if the population of a large mammal goes below a certain threshold, it is indeed very difficult to stage recovery. To add to this, KTT lies in a sensitive border zone, where movement of the armed forces is inevitable. Thankfully, the past records of hunting of *Gowa* in huge numbers by these agencies are only a bad memory; the present troops are far more aware and sensitive, apart from having good supplies and infrastructure. But, the movement of vehicles need roads and roads need migrant labour to build and maintain them. And this is often disastrous for local wildlife. KTT already had two roads, one touching it and another literally bisecting it. Now, another road leading to a small settlement called *Kyul* close to the Indo-China border has snaked its way through KTT's pastures – the home of the gazelle. That the migrant labourers have finished off Marmots, Woolly Hare and even fishes in several of the high altitude regions of Indian Himalaya is well-known to both locals and researchers. Unfortunately, this displaced lot that works in very harsh and testing conditions is the last one to care for local wildlife since their employers hardly care for them as humans.

Emanating from our past work, many ideas have been floated as options for the *Gowa's* conservation including captive breeding, vaccination of domestic livestock to prevent spread of diseases, establishing a community-based gazelle protection force, securing and restoring its habitat in at least 100 sq. km area around the Hanle region by fencing-off some areas and preventing grazing by local livestock. Some of the steps that we have initiated include periodic monitoring, awareness activities with schools and youth groups and establishing Grazing-free Reserves with support of the local communities. A Grazing-free Reserve does provide a safe refuge, but since its area is about 2.5 sq. km, covering only a small part of the KTT plateau, it leaves a lot to be done to safeguard this species. Also, we need to understand the dynamics of the year-round habitat use and movements of the species by further studies and intensification of our present monitoring framework.

Regarding *pashmina*, one realises that only 'more is good',

but there's a ray of hope. And that is the changing lifestyle of the *changpas*. The present herding style is physically arduous and deterring to the young generation who are already exposed to city-life and school education (with both its *pros* and *cons*). Opportunities elsewhere and continued exposure to global forces (including tourism) and comforts will undoubtedly lead the local semi-nomadic population to 'better pastures' outside and to exploring other options such as Government jobs. How long will it take for the transformation and how many will it sustain remains to be seen. But, this certainly will lead to reduction in livetsock and direct competition with the *Gowa*. Who knows, a synthetic alternative of the *pashmina* may do the trick! The armed forces can also be motivated to play a pro-active role.

But, the single-most powerful and pervading influence is the local herders. They are both - the producers of Cashmere and custodians of *Gowa*, in the true sense. One could see the shine in some eyes when they inquire about *Gowa* and how it is faring, while many are either ignorant or indifferent. Here, mention must be made of - Eshey Gyatso, who is a committee member of the *Gowa* Reserve. A man of few words and (or because of) a lot of experiential wisdom. He also helps us with the monitoring of *Gowa* as he keeps moving on his horseback (resisting the temptation of a Gypsy, which Karma apparently is trying to convince him not to go for). In his short conversation, he told me that it is after almost eight years that he's seen Tibetan Gazelle fawns and to my delight he says, he saw six of them this year! His eyes shone all the time when he spoke about *Gowa*. He also announced about a sure wintering site of the gazelle that another group of herders had reported. Further, he apprised us of a meeting that they held to reprimand the herder whose yaks had been observed recently in the Grazing-free Reserve. In the meeting the committee had agreed that henceforth, such trespassing will face a heavy fine. This was a spontaneous gesture and indicated the commitment of the *changpa* community to protect the *Gowa*. I jokingly asked him, "how much *pashmina* would you like to produce; enough to buy one car or more?" He smiled with a sparkle in his eyes and I thought he said "may be one" ... 

We are grateful to

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# Wildlife of the Himalayas

Editors: Dr. Ashok S. Kothari and Dr. Boman F. Chhapparg



After successfully unveiling its coffee table book *JEWELS FROM THE INDIAN JUNGLE* in 2009, the Bombay Natural History Society is slated to bring out its next coffee-table book *WILDLIFE OF THE HIMALAYAS*.

This book will include reproductions of lithographs of Himalayan birds, plants and animals selected from precious books by John Gould, J. Forbes Royle, J.D. Hooker, Nathaniel Wallich, E.C. Stuart Baker, E.P. Gee, T.C. Jerdon, R. Lydekker, Francis Younghusband and many others, introducing readers to a blend of some of the most exquisite species. This book with 60 single page plates and 10 double spread plates will be an interesting read with articles culled out from old issues of the *Journal of the Bombay Natural History Society*, *Journal of the Darjeeling Natural History Society*, *Journal of the Bengal Natural History Society*, a few from the precious books in the Society's possession and from Dr. Ashok Kothari's collection. We urge nature enthusiasts to sponsor this initiative; the sponsorship charges will be as follows:

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# Of Black Stork, Politicians and Terrorism

Text: Sujit Narwade

**T**he New Odyssey Project of the Czech Radio, with cooperation from other organizations, including BNHS – in the Asian region, has been studying the migratory patterns of Black Stork *Ciconia nigra* since 2002. Scientists from the Czech Republic, through this project, have been tracking the geographical and temporal course of migration of Black Storks in Asia, the fidelity to flight routes, and choice of wintering grounds and protection of stop-over sites. For scientists who are an integral part of this project, Black Stork represents a model species, which can help understand flight mechanisms.

At the start of the project, the breeding birds were fitted with Platform Transmitter Terminals (PTTs) in Siberia, and their movements along the wintering parts of Southern Asia were tracked. Dr. G. Maheswaran, Scientist, BNHS, had in 2002-2004 accompanied the Czech

researchers during the monitoring of the Black Stork in Madhya Pradesh and Gujarat states of India (see *Hornbill* April-June, 2005: 18-22). The focus of this study later shifted to the Southern region of India, especially to the eastern parts of Maharashtra. In 2007, the Czech scientists decided to tag two Black Storks in its wintering grounds in India. This was a difficult task as storks, in their wintering grounds, keep changing locations very fast and behave much less conservatively. The Czech team, however, was able to fit PTTs on two Black Storks in 2007, in the Akola district of Maharashtra with the aid of Dr. Girish Jathar, Scientist, BNHS and Dr. Jayant Deshmukh, Akola, Maharashtra, after getting permission from the forest department.

In December 2008, as a continuation of this project, three scientists from the Czech Republic – Dr. Lubomir Peske, Mr. Khalil Balbaki and Dr. Kamil Cihak – visited India with the aim of tagging at least four Black Storks from its wintering ground. It was during



Sujit Narwade is the Scientist-in-Charge of the Environmental Information Systems (ENVIS) Centre on Avian Ecology at BNHS since 2008



Roosting habitat of Black Storks at Jalkot, Latur

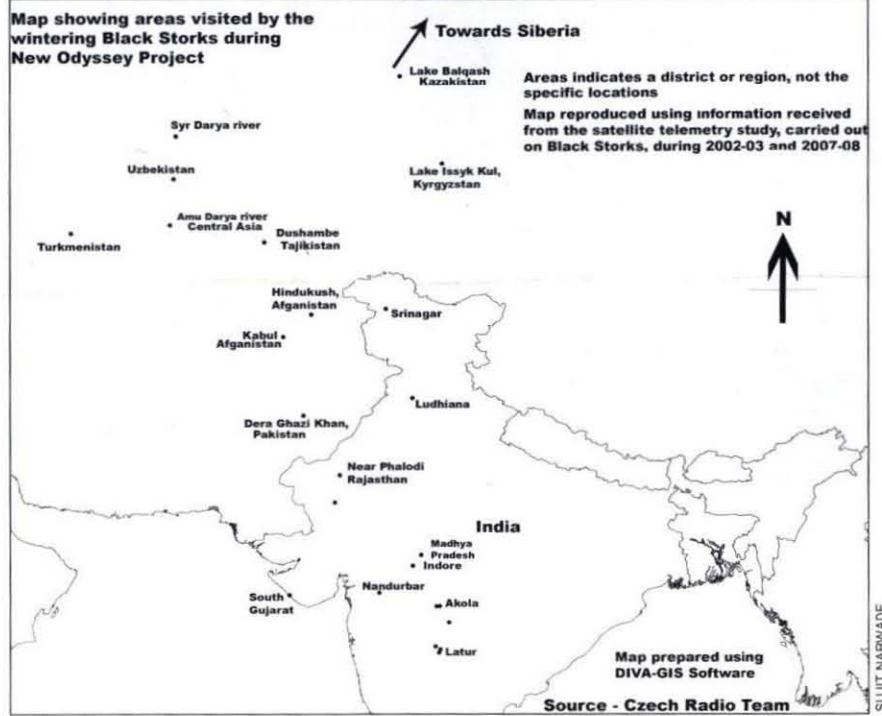
SUJIT NARWADE

this visit, that I got an opportunity to accompany them in their endeavour, and gain one of the most memorable field experiences of my life.

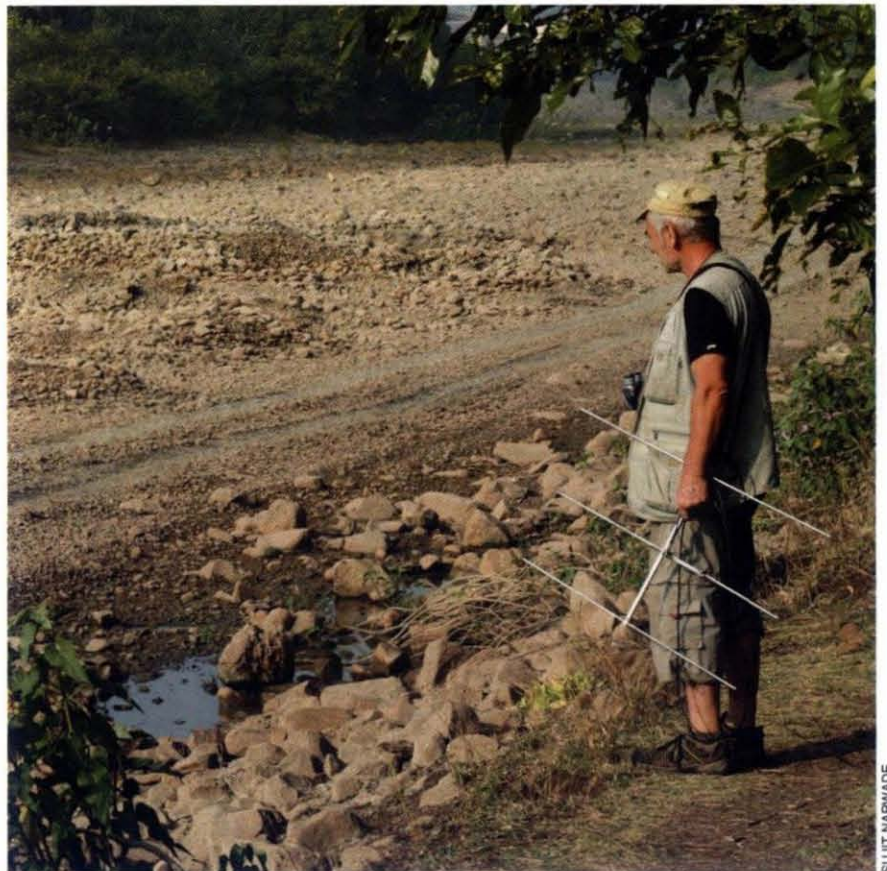
We began the study with tracking of birds tagged in 2007, as it was these birds that would lead us to the flock of Black Storks where we could capture and tag four more individuals, the objective of this phase of the project. PTT tagged birds relay regular updates on their movements via data that one can receive from a satellite. However, to ascertain information such as the number of its companions, behaviour, etc. one needs to locate the bird physically in the field. The Global Positioning System (GPS) assists a tracker to reach the last location of the tagged bird communicated by the satellite. Further, a ground tracker (antenna) that captures signals of the tagged bird within a 4 km radius is used to determine the exact location of the bird. In spite of being well-equipped with all the necessary devices and information, it took us an extensive survey of four days to locate a tagged bird. The bird was found near a river flowing through the mountains of Marsangavi village, Latur district in Maharashtra. But our joy was short-lived, as it managed to evade us once again!

During our passage from one site to the other we brushed-off the stares of the locals assuming that it was mere curiosity. Their frightened expressions and reluctance to talk on our approach for information made us realize that there was more than what we believed. We should have stopped and probed ... the villagers had mistaken us to be 'terrorists' and the telephoto lens for machine guns! The Czech scientists besides tracking and photographing the bird, and its habitat had been capturing the sights and sounds of the village in their camera, which had a huge telephoto lens.

On the second last day of the expedition, we left the hotel early in the



Migratory route of Black Storks tagged in India during 2002-2003 and 2007-2008



Dr. Lubomir Peske surveying a site before laying a trap for the Black Stork



ANANT KHOT

(L-R): Dr. Lubomir Peske and Sujit Narwade laying the trap to capture a Black Stork

morning to locate the feeding sites of the storks in the area, as such sites are ideal for capturing the birds. Black Storks usually prefer small wetlands for roosting and tiny water-bodies, such as puddles and drying water channels with small fish for feeding.

From a small hilly region, we observed six birds near a puddle that had developed in a drying river bed at Tiruka village. It was difficult to reach the river in the vehicle, so we decided to take a detour through the village with the help of some locals. We informed them about our visit before heading towards the feeding site of the Black Stork. After examining the site, Dr. Lubomir Peske, the team leader, decided to take a chance

and lay a trap. As per the design (which took almost an entire day to prepare) of the trap, the puddle, now a virtual rectangle, was divided into two halves with a spring trap embedded in the soil of one half. Due care was taken to camouflage the trap. Anand, our driver, and I caught small fishes from the nearby puddles to use them as bait for the birds. A CCTV camera was installed at about 15 m from the capture site in a camouflaged hide, so that one could remote operate it as soon as the birds began fishing.

While we were doing all this, we heard some unusual noise and movements around us. Engrossed in our work, we decided to investigate the happenings in

our surroundings after installing the trap. We were wrong; we should have stopped and checked then. It was almost 9:00 p.m. when we finished work; there was a nip in the air when we headed towards our vehicle. We were hungry and tired, and looked forward to some hot food and rest. But what lay in store was a mid-night drama ... as soon as we turned the torch towards our vehicle we noticed that all its tyres were punctured. And almost simultaneously, we saw four individuals behind bushes with guns in their hands and shouting, "hands up". Within a minute, we were surrounded by a mob of more than 40 people and four policemen flashing their torches into our face. I started walking towards them with my hands raised; assuring them that I was a native of the area. I explained the nature of our visit to the crowd, and that we had come from their village, with help from the villagers. After listening to us, the crowd seemed a bit convinced. While talking to the police, we understood that one of the local politicians had misinformed the Jalkot Police station about us. The fact that we had not given him enough attention had resulted in this drama! The agitated politician had misguided the villagers and spread rumours about terrorist activities near the river valley! Triggered off by a local politician's juvenile ego issue, these villagers took us to be terrorists (the 26/11 Mumbai terror strike being the latest update, then)! Surprised by such baseless allegation, we finally convinced the police that it was not possible to inform each individual from the area while travelling through thousands of kilometres in a short duration during field survey!

One of the young native villagers who worked in Mumbai and was home for a family function, got friendly with us and informed us about the various rumours spread in the village. Some of the ladies had chosen longer routes to reach the village due to our presence in the river bed, while others believed that



KAMIL CHAK

Sujit and Dr. Peske explain the nature of their research to a local



we were gang members of 'a kidney racket'! And so, the children had been restricted from stepping outside their homes. An elderly lady thought that we were buffalo thieves and had shifted her buffaloes from the farm to the house! It was some of the courageous and enthusiastic villagers that had come to fight the 'terrorists' with armed policemen. Even after an exhaustive clarification, the police, after updating their seniors, asked us to visit the police station in the morning.

The drama of the previous night did not, however, deter us from our work. We took our positions from 5:00 a.m., and heard the first sound of the trap snapping at 6:30 a.m. I rushed to the spot, where Dr. Lubomir was already trying to remove a bird from the trap. Our excitement on the new catch was short-lived as we soon realized that we had captured a tagged bird. The good news, however, was that its PTT battery was due for expiry in a couple of months and was replaced.

The villagers had begun gathering at the spot as we released the bird. It was amusing to see that the villagers had brought a bicycle pump to fill air in the tyre tubes they had punctured the previous night. Some even helped us remove the tyres and made arrangements to take them to the taluka, to get them fixed. It was afternoon by the time we visited the police station and later the *tehsil* office, to complete the necessary formalities for our previous night's adventure.

After a quick brunch, we returned to locate the recently tagged bird to check its behaviour at *Halad Vadhavane* village. With the help of a well-wisher, Mr. H.S. Bhosale, a teacher of the Agricultural College of the village, we also gave a small talk on Black Stork to the students and teachers at the college. Everything was fine, until a trustee cum local politician walked in and began making enquiries as if we were 'terrorists'.

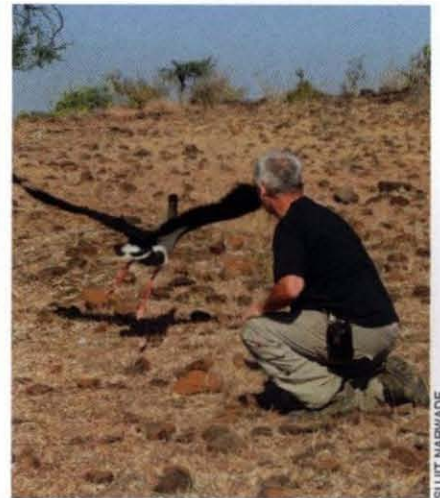


The New Odyssey team alongwith locals and the tagged bird which was later released

He made phone calls to at least five individuals and insisted that we explain our work to all of them; this was his way of expressing his concern as a 'patriot'. Though he was happy to see foreigners in the college premises, his ego was creating an embarrassing situation for the college. Who can explain to such politicians that things need not always be as one believes them to be!

Finally, by the end of this expedition, we were able to replace a PTT of the earlier tagged bird but the embarrassing experience, had led the Czech Radio team to decide against extending the New Odyssey Project in India from 2008.

Unfortunately, I cannot say that 'all is well that ends well'. This adventurous expedition of the New Odyssey Project was the most memorable learning experience of my life. I learnt from Dr. Deshmukh, how a person can silently make major contributions to nature conservation and from Dr. Lubomir that research should continue despite obstacles. In fact, had we halted in a town instead of the open sky at Tiruka village, we would have certainly missed tagging the bird. I am grateful to everyone who



A tagged bird being released by Dr. Lubomir Peske

helped us during the project as it was they who led to the successful completion of this study.

I would like to thank Dr. Asad R. Rahmani, Director, BNHS, for giving me the opportunity to be part of the New Odyssey Project, and would also like to extend my sincere gratitude to Mr. B. Majumdar, PCCF, Forest Department, Maharashtra for providing us the necessary permissions to carry out the satellite telemetry study. 🐦

# Discovering Fruit-Birds ...!

Text: Patrick David

After describing fruits and fruit-eating birds and their food resources in Sriharikota, in my previous piece (*Hornbill* April-June, 2008), this article brings into limelight, the behaviour and habitat of diurnal fruit-eating birds, based on my studies in the rainforests of Kalakad-Mundanthurai Tiger Reserve (KMTR) in southern Western Ghats, the Dry Tropical Evergreen Forest of Sriharikota on the Coromandel Coast, supplemented with some birding done from the Hornbill House (BNHS headquarters at Mumbai) terrace, the adjoining Museum compound and the surrounds (the Colaba area).

In the Indian subcontinent, the major fruit-eating birds comprise of barbets, bulbuls, parakeets, fruit-eating species of pigeons, and

hornbills. Barbets are generally small and greenish birds with conspicuous calls. The bulbuls are the songbirds among the frugivores, small, noisy and many sport crests. Some species live around the human habitat, but others can survive only in the forest. The parakeets come in a dazzling assortment of colours, mostly of green and blue. They are social, highly vocal with screeching or pleasant calls, and have zygodactyl feet (two toes pointing forwards and two backwards). The fruit-eating pigeons comprise of the green-pigeons, wood-pigeons and imperial-pigeons. They mostly restrict themselves to the forested areas with tall trees and are inconspicuous, feeding quietly among the green foliage. They move around in flocks from one forest patch to another in search of fruit



Patrick David is a Ph. D. scholar interested in Natural History



Copper Smith Barbets are commonly found around fruiting trees, especially the fig species in the plains

resources. The hornbills are large birds with thick curved bills; ten species are found in Indian forests, of which the largest and intensively studied species is the Great Pied Hornbill *Buceros bicornis*, this is the only species found both in the Western Ghats and north-east Indian hills. They are specialist fig-eaters and travel great distances in search of fruiting fig trees. Their numbers are on the decline due to hunting and habitat loss, as they require large and old trees with large cavities to nest in.

Fruit-eating birds do not exclusively feed on fruits, but fruits form a major portion of their diet. They supplement their fruit diet with a lot of 'non-vegetarian' food, including insects and reptiles. The diet of nestlings of most fruit-eating birds also comprise of insects for rapid growth, except for pigeons, which are fed 'mouth to mouth' on a milk-like secretion from the crop by their parents. Unfortunately for frugivorous birds, fruits are not available or abundant in all areas or throughout the year, so they either fly to other areas in search of fruits or depend on flowers, nectar, leaves or even insects to survive periods of fruit shortages.

Let me begin with some of the familiar fruit-eating birds in our midst. If one stands on the terrace of Hornbill House during early mornings, one invariably sees Rose-ringed Parakeets *Psittacula krameri* flying past as they call out to each other; their aerodynamic sleek body makes them fast fliers. We can also hear the *tuk tuk tuk* call of the Coppersmith Barbet *Megalaima haemacephala*. The barbets are here for the plenty of fig trees in Colaba. One can spot them usually perched on top of a *Ficus* tree, puffing their throat as they call. They are quite difficult to spot as their green plumage merges with the foliage. One morning, I saw two young

barbets sparring with each other – probably a fight for territory. They locked feet and almost tumbled down to the water tank, but recovered and flew around the building in a circle, circling again and again. Coppersmith Barbets are common in Colaba due to the abundance of fig trees, on the fruits of which they primarily feed. They are the specialist species – 'if figs go, they go too'.

If the barbets are here for the figs, then what are the parakeets feeding on? I found at least one of their food items in front of Hornbill House – the attractive Kadamb *Anthocephalus chinensis* with its yellowish-green ball-shaped flowers and green soft spiky fruits. When the *Anthocephalus* fruits are unripe, the parakeets assemble in groups to feed on them. As I watched, I saw one bird remove a fruit with its



Most familiar of Indian birds, Rose-ringed Parakeets are often found in large flocks thriving on crops and orchard fruits

CLEMENT FRANCIS



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beak and hold it in its left leg to feed, a peculiar feature of these birds 'left-handedness'. Why does a parakeet mostly use its left feet to hold its food? Nobody knows for sure. Scientists have tried to answer this behaviour, but unsuccessfully. Unlike the barbets, the parakeets are here for the seeds and not the pulp. They are seed-eaters, and cause immense damage to agricultural crops. Incidentally, the fruit of *Anthocephalus*, when ripe, is also voraciously consumed by the Indian Flying Fox *Pteropus giganteus*.

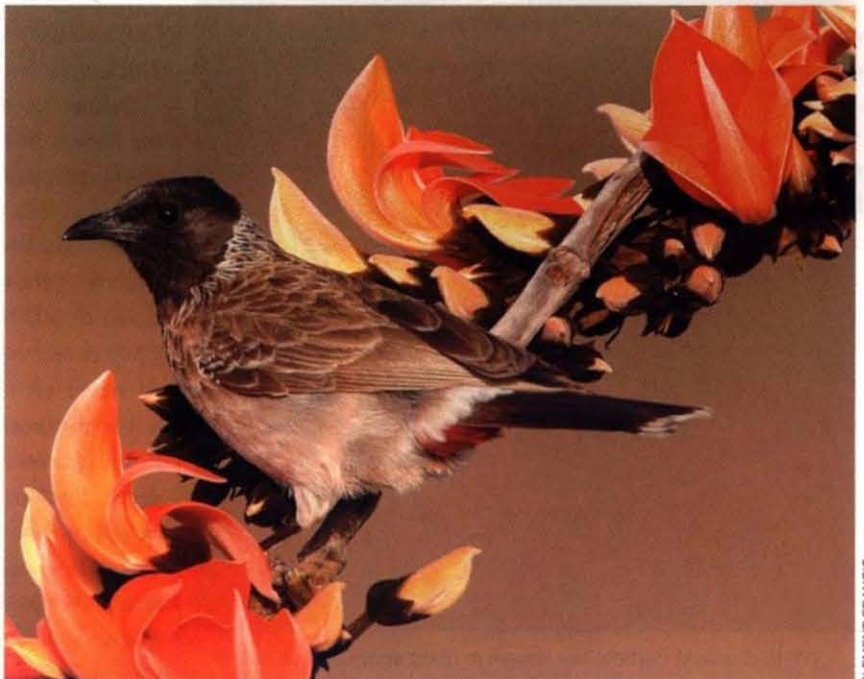
Villages too like the urban sprawl held similar experiences for me. The familiar calls of parakeets this time were from Palm trees *Borassus flabellifer*. No, they were not eating Palm fruits, but nesting in the cavities in dead trunks. In villages, besides feeding on fruits, especially seeds (hence classified as seed predators), they depend either on crop fields or raid orchards, and are considered as pests. The Coppersmith Barbet, which excavates its own nest-holes in trees, too finds a number of fig trees in village surrounds to feed on, as Indian villages are abound with Pipal *Ficus religiosa* and Banyan trees *Ficus benghalensis*, especially in temple compounds, village squares and markets.

At the foothills of scrub jungles, two conspicuous species of bulbuls are encountered: the Red-whiskered *Pycnonotus jocosus* and Red-vented *Pycnonotus cafer*. They tend to perch and feed on top of bushes and short trees. But then there were two more species in these forests, the White-browed *Pycnonotus luteolus* and Yellow-throated bulbul *Pycnonotus xantholaemus*. We don't see these in our backyard, unlike the other two species. They are true scrubland birds, skulking and preferring to move in the thick cover of the bushes and at low heights.

The birding trip becomes more



Red-whiskered Bulbuls are highly adaptable and have even colonized disturbed habitats at higher elevations



Red-vented Bulbuls are important frugivores in scrub jungles and human habitations



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Nilgiri Woodpigeon is an endangered avian frugivores found in the mid-storey of wet evergreen forests



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White-cheeked Barbets are known to congregate on fruit laden trees; and consume wild figs, cultivated fruits, especially coffee berries

difficult as one ascends hills! One bird seems to have plenty of it, as it keeps calling most of the day: the monotonous and reverberating loud *utroo utroo utroo* call of the Brown-headed Barbet *Megalaima zeylanica*! It is the second most familiar species of barbet found throughout the country except in the north-east and north-west. At lower altitudes (100-400 m above msl), the home of the Brown-headed Barbet is shared by two species of fruit-eating pigeons belonging to the genus *Treron* (*Treron* = green) – the Orange-breasted Green Pigeon *Treron bicincta* and the Yellow-footed Green Pigeon *Treron phoenicoptera*. I am more familiar with the former, as I have seen it in Sriharikota. It is an occasional visitor to the island from the nearby forest in the Eastern Ghats and comes mainly to feed on fig fruits. Fig, along with other species such as Palm, Neem, Mango and Tamarind are abundant in former village areas, which were abandoned after ISRO took over the island during the 1970s. The first time I saw it, it was feeding on the fruits of *Ficus amplissima*. I had just started walking along a transect when I saw a flock feeding on the fruits of this tree. As soon as I lifted my binoculars to take a closer look, they noticed me and took off immediately. I counted more than 30 birds, an awesome sight and number. Subsequently, I saw them feeding on the fruits of another species of fig *Ficus microcarpa*, Jamun *Syzygium cumini*, a smaller black species of Ber *Ziziphus oenophia* and Bush Weed *Securinega leucopyrus* (a 1-2 m tall shrub producing small white fruits). The last two observations were unusual as pigeons are known to feed on tall trees, but here they were, feeding on a shrub and climber of 2 m height and that too in an open sandy area.

As we ascend further up the (forested) hills, the call of the Brown-headed Barbet continues to accompany us. But at a certain altitude, the call of this Barbet is challenged by the noisy call of the gregarious Black Bulbul *Hypsipetous leucocephalus*, which are usually seen in flocks of 10-15 while feeding. Black bulbuls are altitudinal migrants and will come down to 500 m depending on the weather and for food. They prefer open habitats, along roads and forest edges — never venture into deep forest. The deeper forest is home to another species of Bulbul, the Yellow-browed Bulbul *Iole indica*, a species inhabiting mid and under-storey vegetation. I have seen this species in Upper Kodayar (1,300 m above msl) in Kalakad-Mundanthurai Tiger Reserve. They are usually found in mixed flocks with the Brown-cheeked Fulvetta *Alcippe poioicephala*, White-cheeked Barbet *Megalaima viridis*, Velvet-fronted Nuthatch *Sitta frontalis* and Oriental White-eye *Zosterops palpebrosus* feeding on small berries from small trees and shrubs.

Sharing the home along with bulbuls and barbets at these mid and high altitudes are the Mountain Imperial Pigeon *Ducula badia* and the endangered Nilgiri Wood Pigeon *Columba elphinstonii*. These birds are difficult to spot, one is numerically rare (Nilgiri Wood Pigeon), and the other prefers the top layer of the forest, the forest canopy. Once, I was asked to keep watch on a fruiting *Belishmedia* sp. tree deep inside an undisturbed rainforest patch in KMTR. Early in the morning, at around 7:00; a couple of Mountain Imperial Pigeons arrived. Before beginning to feed, they scanned the forest floor and somehow spotted me sitting under a shrub. One of them descended to about 10 m from the ground, took a close look at me and flew away in search of another tree. I sat there till 6:00 in the evening, hoping they would return, but they never did. Such is the difficulty in observing canopy birds. They are very shy and all fruit-eating birds scan the surroundings and the fruiting tree for predators.

My colleague, Senthil Murugan, had an interesting incident to narrate that occurred in Sriharikota. He was in a hide, watching birds feeding on the fruits of *Cordia dichotoma*, a 5 m tall tree common in Sriharikota. Suddenly the birds went into a frenzy moving hastily among the branches instead of feeding. On observing closely, he saw a rat snake in the tree. The birds had noticed the snake approach and begun mocking it. They lured the snake by perching close to it and flew off as it came too close! They repeated this till the snake got frustrated and started vigorously chasing the birds around. The birds were smart and the snake soon had to call it a day; it descended the tree and made its way into the thick undergrowth. Maybe, the snake would be lucky the next time and an unwary bird would fall prey as that is the way with nature. In the wild, one has to be



*Tinospora cordifolia* is a commonly found woody climber; with its berries forming a preferred diet of many birds

very alert. My colleague was alert and so was able to notice this action. A casual observer would have dismissed it as usual commotion.

I would have written more on the other species of fruit-eating birds, if only I had got the opportunity to observe them. Several species of bulbuls, barbets, parakeets, hornbills and pigeons are found in the Western Ghats, Himalayas, and in other parts of the world. For people who crave to read and see more on these groups of birds, there is the spectacular book *HANDBOOK OF THE BIRDS OF THE WORLD*. How much variety and colour! All expertly described and brilliantly photographed. I never thought there was such variety among avian frugivores until I saw the book. It also saddens me to know that this rich diversity of life is being so thoughtlessly exterminated or lost.

Just like the birds, the fruits that the birds feed on, known as 'bird fruits' in avian frugivory studies, come in a spectacular variety of colours (red, black, yellow, green, etc.), sizes (big, small, intermediate), and shapes (round, oblong and oval), to attract the fruit-birds. So why are birds attracted to fruits? Fruit pulp is rich in sugars and lipids, and they also provide moisture for the birds. In addition, fruits are easy to get, as they are immobile and advertise themselves to be eaten. And why not, birds help trees to disperse their seeds. But if fruits are an easy and nutritious source of food, and birds are an agent for dispersing seeds, then why don't all birds eat fruits? I leave you with a question. The truth is out there; some known and the rest in the process of being unravelled. This and other mysteries of fruit birds is another story that waits to be told. 🐦

## Where are the sparrows?

Some childhood memories live forever! I cherish the memory of a sparrow that would pay me a visit every morning and nibble on grains which I would feed her. The time that I spent watching the sparrow feed against a small mirror I had placed there (to map her behaviour) will live with me forever. After pecking at the grains she would always look into the mirror, peck at her own image a few times and fly away! I often wondered what would be playing on her mind when she did that – pride or jealousy! Whatever it was, I liked the guest and her chirping!

So many years have passed by, but the memories of this friend refuse to fade. Actually, in hindsight, as I remember sparrows – these birds were so much a part of our lives, but they are no longer that plentiful! Where have the sparrows disappeared? Have we driven them out?

Sadly, our lifestyle is subject to constant change, one of the prime factors for the onset of decline in sparrow population. Their shelters are vanishing; pruned trees and exotic gardens are almost a thing of the past. Rice and other grains are now available in polythene bags, ready to be cooked, and not from gunny bags, which they would peck on. Combustion of modern fuel, the unleaded petrol produces methyl nitrate, a highly toxic compound for insects which form a vital part of the chick's diet. Organophosphates used in pesticides have driven them away from their adapted world, and emerging mobile tower emissions have begun to affect their hatching process.


This leaves us with one question, why do we need Sparrows? So what, if the sparrows disappear? Sparrows are primarily “opportunistic feeders”, they eat fruits and berries, an activity that

facilitates movement of plant seeds to larger areas. They also eat insects such as caterpillars, beetles, certain flies and aphids. Keeping the insect population in check is an important ecosystem function to which sparrows contribute hugely.

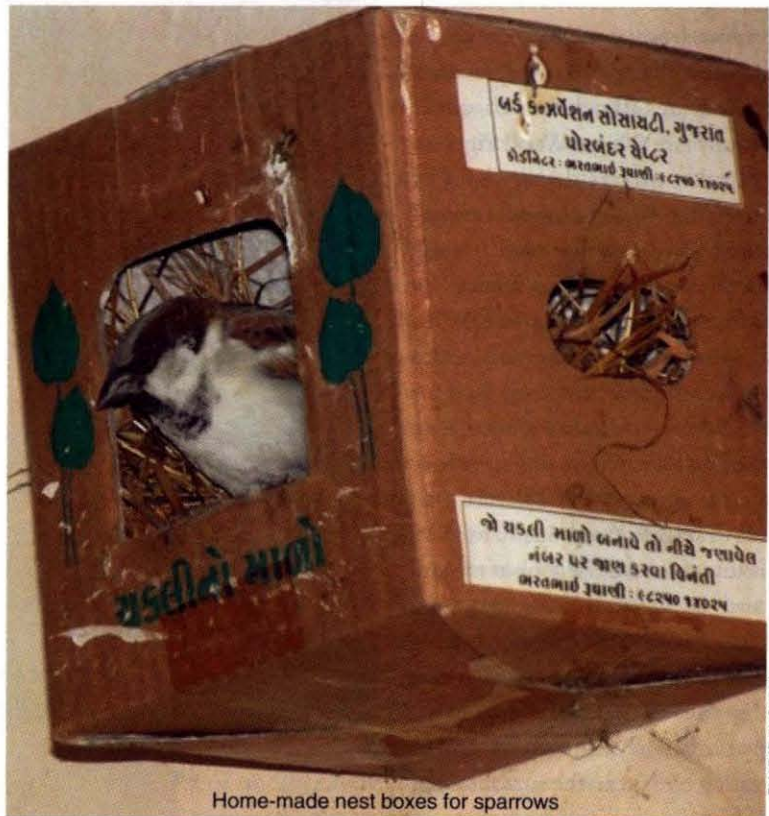
Commemorating our symbiotic association with our winged friends, World Sparrow Day is observed on March 20<sup>th</sup> in many parts of the world. The celebrations are attended by enthusiastic birdwatchers, students and NGOs likewise. This initiative is linked with the endeavour to spread awareness on the alarming rate of decline in Sparrow population due to lack of provision of nesting spaces in urban constructions, lack of insect food for the young ones, decrease in agricultural land to mention a few.

The Bird Conservation Society of Gujarat (BCSG), Porbandar Chapter,

ushered in the revelry this year by celebrating World Sparrow Day at Shri Dutt Sai School. Sustaining this initiative, members of the BCSG, visited homes and offices of Porbandar residents, to distribute and install about 1,000 sparrow nests in an effort to save the House Sparrow from going extinct, an act that has resulted in a noticeable increase in the breeding rate of house sparrow up by 90%!

One can sprinkle grains on the terrace, keep out nest boxes and clean water, avoid chemical pesticides and insecticides – opt for organic ones, place a sparrow nest box at the porch, window parapet, balcony or any place safe for sparrows to protect themselves and their young ones. Let us help the sparrow survive! 

Bharat Rughani  
Jodhpur




Home-made nest boxes for sparrows

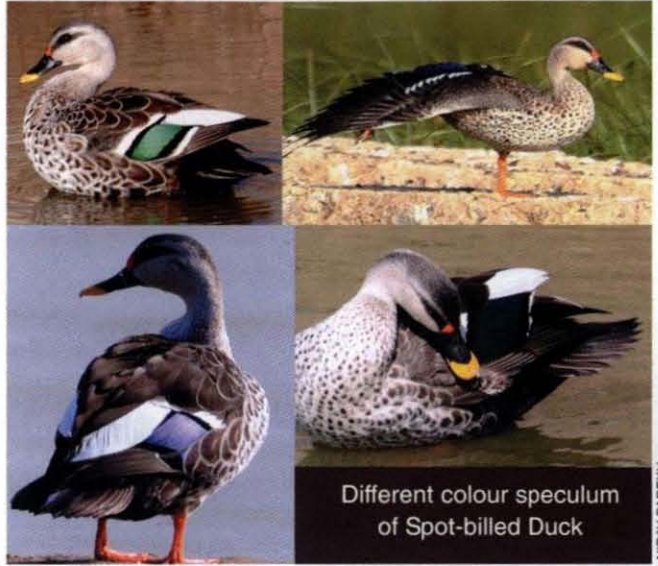


## Iridescence in Birds

During a birding trip to Lakhota, Jamnagar, on January 07, 2011, I saw a flock of Spot-billed Ducks, nothing unusual as they are found in large numbers here. What caught my attention though that day, was the colour of speculum in the gathering. Though most of the birds present had a metallic green speculum, like they usually do, some showcased a blue or purple speculum.

I photographed the birds for about 20-30 minutes from the same position and wondered why the speculum colour looked different. Was the sun playing tricks on my eyes? 

Jaysukh Parekh  
Bhuj, Kutch



Different colour speculum of Spot-billed Duck

NIRAV PAREKH

**Editor's Note:** The colours in the feathers of a bird are formed in two different ways, either from pigments or from Iridescence – light refraction caused by the microscopic structure of the feather. However, not all structural colours are iridescent. Tiny air pockets in the barbs of feathers can scatter incoming light, resulting in a specific, non-iridescent colour. In some cases feather colours are the result of a combination of pigment and structural colours.

When using iridescent plumage to help identify a bird, it is best to observe the bird's plumage in moderate to bright sunlight, that will best highlight the colour. Watch as the bird moves to see how the colour changes, and note the overall base colour of the iridescence – in many cases, one dominant colour will show in the iridescence, such as blue, purple or green.

## ABOUT THE POSTER

Blood Pheasant's are small pheasants with a short occipital crest, square unmarked tail and reddish legs. The male pheasant dons a red cere and facial skin, blood-red chin and throat, black streaked fore neck and a bold pale shaft streaked plumage, whereas the female is overall a bright rufous brown. Mostly sighted at higher altitudes, blood pheasants are generally found in Himalayas from WC Nepal to NE Arunachal (Mishmi Hills) at 3,600-4,700 m in snow clad ranges. These birds generally keep near snow, moving up and down as it recedes or advances. Also spotted in fir, rhododendron woods and the scrub above, Blood Pheasants come into the open to feed, mostly on moss, fern, pine shoots and lichen.

Gregarious; Blood pheasants are usually found in coveys of 5 to 10, sometimes up to 30 and more. These birds feed in open patches, scratching the ground like domestic fowl, often digging deep into the snow with their stout, grouse-like bill. Tame and fearless to the point of stupidity, the members of a covey venture out inquisitively to a fluttering companion that has been shot at, allowing bird after bird to be killed by the hidden hunter! These birds seldom fly except to roost at night, and rely on their legs to escape. ■



DHIRTIMAN MUKHERJEE

Blood Pheasant *Ithaginis cruentus*

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**Blood Pheasant**  
*Ithaginis cruentus*

# Right to Survive!!

Text: Swapna Prabhu

**F**orests are not merely a random assemblage of species. Each forest type holds its unique set of biodiversity, which is a repercussion of ages of successions; each stage appropriately adapted to the temporal conditions, such as climatic and soil conditions, disturbance levels, natural catastrophes, etc. Thus, though the forests appear to be stable on our timescale, these are highly dynamic entities, one stage giving rise to the other until they reach "climax". On the other hand habitat preference of species is not uniform in a given forest type. Some species are highly habitat specific called "specialist", while those that can thrive well in a wide range of habitats are known as "generalist". Specialist species are indicator of their habitat type as they are very selective about their requirements of altitudinal range, temperature, rainfall, humidity, light or shady canopy cover, associated species and privacy too. Some species are so fragile that a slight disturbance to their habitat may force them to disappear. Most of the species featured here have narrow geographical distribution and high habitat specificity. They are dependent on one type of forest (habitat) as their home which if lost, the species will be extinct.



N.A. NASEER

**Tree fern *Cyathia* sp.**

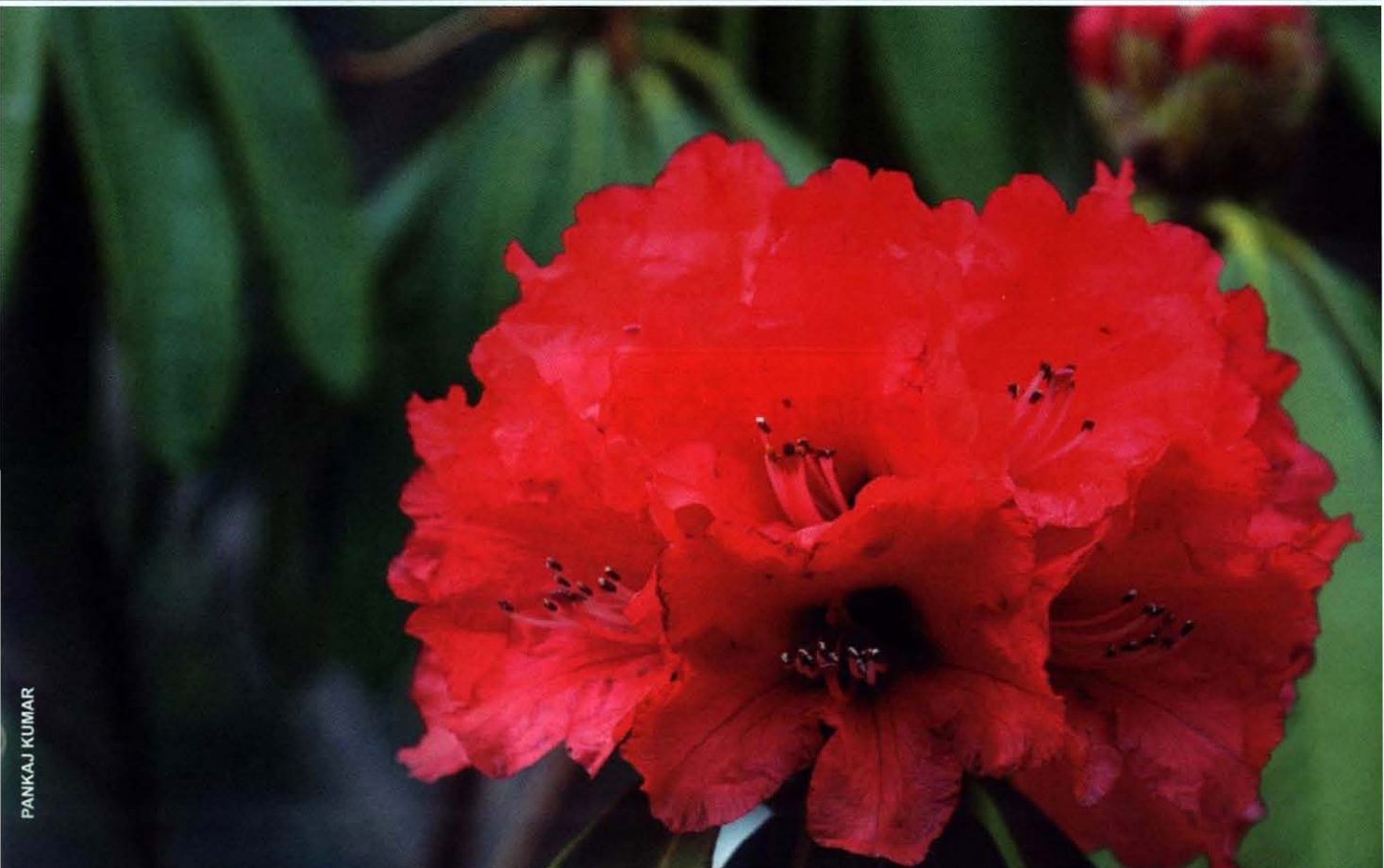
Tree ferns (non-flowering group) grow as tall as trees. Their trunk-like part is actually a non-woody rhizome, which grows vertically. Having more than 400 species distributed globally, this group is highly restricted to forested areas. They have lengthy fossil records stretching back to the Triassic period (250 to 199.6 million years), and were apparently affected by mass extinction at the end of the Cretaceous period.



VIDYA ATHREYA

**Himalayan Sapria *Sapria himalayana***

Though much smaller in size (20 cm across) Himalayan Sapria resembles its big brother *Rafflesia arnoldii* or the corpse flower (the world's largest flower) in all other traits. Brightly coloured flowers is the only visible plant part. This curious plant has a narrow range of distribution and is found only in Thailand and in a few small pockets in north-east India.



PANKAJ KUMAR

***Rhododendron arboreum***

This near-threatened species is restricted to the forests of temperate to alpine zones, usually temperate broad-leaved forests. Rhododendrons are facing over-exploitation due to their exotic flowers and medicinal properties which are used in both, Ayurveda as well as folk medicines.



***Balanophora* sp.**

*Balanophora* sp. are found in undisturbed evergreen forests of north-east and south India. *Balanophora* are parasitic plants. The new plants look like ugly dark stubs covered with several leaf-like structures. As the plant grows, flowers which form the major plant body are unveiled from these coverings showing off their bright colours. Male and female flowers are borne separately.



***Rosa* sp.**

Mount Abu is known for its unique diversity and habitats with a major portion comprising of tropical deciduous and sub-tropical evergreen forest on hills and exposed slopes. Several places in the lower slopes of the valleys and thickets of the forest where conditions are cooler, isolated pockets of semi-evergreen forests occur, harbouring their own unique flora and fauna. *Rosa moschata* and *R. involucrata*, are the wild rose species of this area and are cultivated worldwide for their beauty, fragrance and medicinal properties.



N.A. NASEER

**Neel Kurinji *Strobilanthes kunthianus***

Once in 12 years the Nilgiris (Blue Mountains) truly turn blue because of a bushy shrub Neel Kurinji. Grasslands associated with shola forests of these mountains are the abode of this species. There are hundreds of *Strobilanthes* species, almost all with vibrant blue shades, and associated with forest habitats. However, Neel Kurinji is restricted to sholas at 1,800-2,100 m

There is continuous increase in rate of reduction in forest cover all over the country during last few decades and specialist species are surviving in small pockets of their remnant habitats. Their fate now is largely depending on the conservation of these pockets!

NIKHIL BHOPALE



**Pitcher plant *Nepenthes khasiana***

This is the only species of pitcher plant that occurs in India. It is distributed naturally in small patches in the sub-tropical forests of Meghalaya, north-eastern India. Being a hard core insectivorous its body parts are highly modified. Pitcher plants are collected illicitly due to its curious shape and by scientific fraternity for research which has pushed the species to a threatened status.

Swapna Prabhu is the Systematic Botanist at BNHS and is involved in various research and educational activities.



**Birds of the Indian Subcontinent**  
A FIELD GUIDE

Ranjit Manakadan, J.C. Daniel & Nikhil Bhopale  
Illustrations:  
John Henry Dick



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# Mysterious Mudskippers



BHAVIK PATEL

Mudskippers have an excellent eyesight, which allows them to sight prey and predator from a distance

Text: **Manan Shukla and Bhavik Patel**



Manan Shukla (L) is associated with BNHS since 2007 as Project Officer on Project Mangrove, based at the Vadodara field office.

Bhavik Patel (R) looks after the project Taxonomy of Mollusca at the Vadodara field office, Gujarat. Bhavik is associated with BNHS since 2008 as Education Officer with Project Mangrove.

**O**n a number of occasions man has discovered life in an environment that could be considered harsh for any species to survive in, but life still exists! One wonders if such life form was designed to survive in extreme conditions or did it gradually evolve with the changing environment to adapt to a set of conditions that other forms could not adapt to? One such interesting life form that we came across during a visit to a mangrove patch in Gujarat was the Mudskipper.

We still remember our first encounter with the mudskipper; a host of weird looking

creatures, jumping and crawling around the vegetation. It was later on examining that we realized that these slimy animals belonging to the fish family were mudskippers!

The first fish may have crawled onto land during Devonian times (350 million years ago) and it probably did so in response to drying swamps, which required two of the most basic problems to be tackled for survival, i.e., move without the support of water and obtain oxygen from air rather than water – the Mudskipper have crossed to both these hurdles.

Mudskippers spend a lot of time out of water and are perhaps the most conspicuous



BHAVIK PATEL

Mudskippers are an integral part of the mangrove ecosystem; they are adapted for living on dry land when the tide goes out

fish of the mangroves. You will find them, as their name implies, moving around in a series of skips across the mud using their stiff front fins as crutches, in fact larger species can move faster than a human.

Mudskippers live chiefly on mudflats and in brackish mangrove swamps and are adapted for surviving on dry land when the tide goes out. They have no special air-breathing organs, instead they absorb oxygen through the skin and gill chambers, as long as these remain moist. This mode of breathing, similar to that employed by amphibians, is known as cutaneous air breathing. Another important adaptation that aids breathing while out of water are their enlarged gill chambers, where they retain a bubble of air. These large gill

chambers close tightly when the fish is above water, keeping the gills moist, and allowing them to function.

The generic name of the mudskipper – *Periophthalmus* spp. (meaning round eyes) is very apt as its eyes are perched on top of the head and can move independently of each other, offering a 360° vision both on land and in water. They have excellent eyesight which allows them to spot prey and predators from afar. At the slightest hint of danger they move into their water-filled burrows and use their eyes as a periscope to keep watch until it is safe to resurface.

Mudskippers feed on shrimps, insects, worms, at times diatoms (microscopic algae) found in mud, and crabs – despite their thick shells.

However, this predator does sometimes itself fall prey to larger crabs!

Mudskippers dig burrows that are 20 inches or deeper by spitting large mouthfuls of mud away from the burrow's entrance. They don't move with the tide, instead, spend most of their time out of water, but during high tide can remain completely submerged in their burrows for up to two hours!

The male mudskipper is known to prepare a burrow before setting out to find a mate. The male turns unusually aggressive toward other males during this period, biting and raising his dorsal fins. At low tide, during spawning season, which runs from late May through early August, males perform an enticing courtship dance for the female





MANAN SHUKLA

Mudskippers dig burrows that are 20 inches or deeper by spitting large mouthfuls of mud away from the burrow's entrance

audience. As if dressing for their performance, the males turn from drab brown to a pale beige colour that contrasts with the darker mud. Males do what appear to be push-ups, leaps and flips in the air and even stand on their tails – all to attract a female. Each male tries to lure an egg-swollen female to his territory and down into his burrow. In his effort to capture a female's attention, he puffs out his cheeks, mouth, and gill chambers by filling them with air; he also arches his back, points his tail fin, and sinuously wriggles his body. As a potential mate draws near, he continues to display, slowly drawing her to his burrow and pausing periodically to be sure she has not lost interest and fallen under the spell of a

rival male! The suitor then dips into the burrow only to quickly reappear, inviting the female, so it seems, to come and enjoy the comforts of his accommodations. If the female is attracted to the male, she does her own mating ritual with distinctive movements. She then enters the burrow where she lays her eggs in a special part build by the male for her. The male then fertilizes the eggs and takes over their responsibility.

Mudskippers lay their clutch of eggs on the walls of an air-filled mud burrow. However, what was not known, until recently, was how the eggs could survive in the estuarine water, which can be almost completely devoid of oxygen. A recent study found that male

mudskippers, which guard the eggs from predators, took regular mouthfuls of air and released them into the burrow to prevent the eggs from suffocating due to lack of oxygen.

Once the eggs had developed, the males waited for the next night-time rising tide and then removed the air from the egg chamber causing it to flood with water. The flood of water induces the eggs to hatch and the fry can then swim free once they have broken free from their eggs.

The study also reported that mudskippers have developed a reproductive strategy that allows it to nurture eggs in this severe habitat rather than migrating away from the mudflat.

This requires that mudskipper eggs be specialized to develop in air and that the air-breathing capacity of the egg-guarding male be integrated in a complex behavioural repertoire that includes egg guarding, ferrying air to and from the egg chamber, and sensing  $O_2$  levels therein, all in concert with the tidal cycle.

In contrast to activities on the mudflat surface, little is known about mudskipper behaviour in burrows during high tide. Most mudskippers excavate burrows and use them as a refuge from predators, for protection from desiccation and temperature extremes, and for nesting. Mudskippers are generally very territorial and even build walls around their burrows to keep their neighbours out. But it is probably a matter of time when we could say that the mysteries surrounding the mudskipper are now completely unravelled.

Throughout our field visits we have been highly fascinated by this small creature and hope the next time whenever you visit any mangrove area you will take special interest to observe mudskippers' behaviour! 🍀



## When a Beetle preyed on a vulnerable Common Wolf Snake!

Text and Photograph: Devdatta Naik

On a late night, after settling accounts with the canteen manager, I and Siddhesh Shirsat were walking on the road leading towards the youth hostel complex in Tadoba National Park. The road is perfectly nestled in the heart of the jungle with a lake in the vicinity, home of about 100 crocodiles who often walk at night near the road! We were scanning the path with our torch lights, looking over our shoulders for any danger. We were almost 150 m away from the canteen when I noticed something moving frantically on the road and hurried towards the spot. What we saw here will be embedded in my memory forever!

On the road was a mating pair of Six-spotted Ground Beetle *Anthia sexguttata*, and the female beetle was holding a small snake in her mouth, which appeared to have been caught just before we spotted it. The snake was fighting hard to escape, but the grip of the female beetle (c. 3½ inch of the male) was strong. The snake, c. 6½ to 7 inch,

looked like a Wolf Snake (*Lycodon* sp.), fighting its fate, trying to escape from the jaws of the female. By about 11:13 p.m. the snake appeared half dead, it was breathing but could not move any further. The female started dragging it off-road, while the male continued mounting her. By 11:17 p.m. the female had successfully dragged the nearly dead snake into the soil c. 0.61 m (2 ft) away from the road. After successfully tearing the snake almost at the middle of its body, the beetle started sucking into the inner parts; this continued till 11:34 p.m. As a final act, marking the end of the event, the female abandoned the snake, crossed the road and headed towards the lake-side slope. The male *Anthia sexguttata* had in the meanwhile dismounted the female and vanished into the leaf litter.

On examining the dead snake, we identified it as a Common Wolf Snake (*Lycodon aulicus*) whose skin and skeleton were all that was remaining; all the other parts, except some pieces, were eaten up by the female beetle. ♀

According to 'THE BOOK OF INDIAN REPTILES AND AMPHIBIANS' by J.C. Daniel: a young Wolf Snake at birth is c. 7 inch long, thus, the snake which was killed and eaten by the female Six-spotted Ground Beetle may be a hatchling.

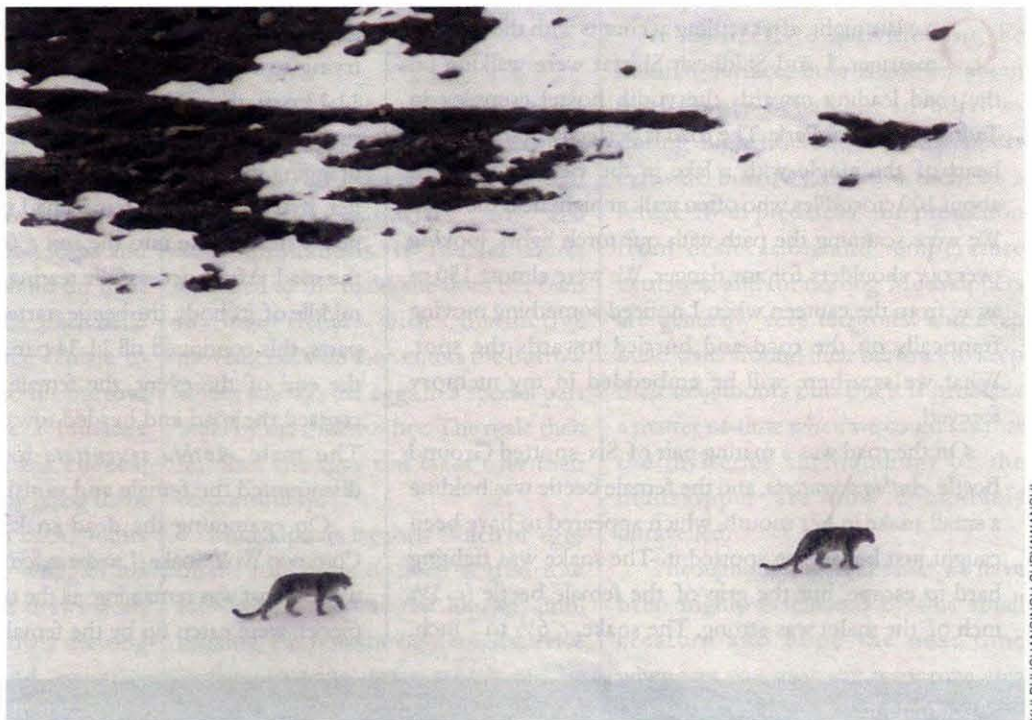
# Sunshine and the Shadow

Text: Kulbhushansingh Suryawanshi

‘**What** could it be that the boy had confused for a sheep stuck in the snow?’ Curious, I had peered through the spotting scope. There were two of them ... was it *Sunshine*? But who was that with her? Why were they here in broad daylight...? *Sunshine* was afar in the low resolution photograph that my friend Charu had sent to me. But, she, was one of the most beautiful beings that I had ever seen. Though the photograph was not too clear, one couldn’t miss the striking features of this elusive cat – a Snow Leopard. Charu’s email read “results from last summer’s camera trapping exercise in Spiti”. The camera traps had captured many images of four different snow leopards. He had attached few low resolution images of all the four snow leopards. The first was a large male who had lost his tail; he had been named ‘Tail cut’. The second was another male but not as large as Tail cut; he had been named ‘Eureka’. And finally there was a photograph of a mother and her cub. The mother had been named ‘Sunshine’ and her cub had been left unnamed.



Currently pursuing his Ph. D. on livestock depredation by Snow Leopards in the Trans-Himalaya at Nature Conservation Foundation, Mysore, Kulbhushan is the alumni of WCS-NCBS Masters Course in Wildlife Biology and Conservation and has studied the blue sheep for his Masters thesis.



KULBHUSHANSINGH SURYAWANSHI

Sunshine and her cub in the vast expanse of snow surrounding Spiti, Himachal Pradesh

This fall winter I had set off on a mission to Spiti, Himachal Pradesh, with the hope of studying the foraging behaviour and eating habits of the blue sheep (*Pseudois nayaur*), one of the most important preys of the white cat, the snow leopard.

Spiti which lies in the rain shadow area of the Trans-Himalayan region is subject to harsh winters (the temperature drops down to  $-35^{\circ}\text{C}$ ). The ground is covered with over two feet of snow with gale forced winds blowing throughout. Following the blue sheep in such weather conditions was a tough task, but I was geared up to rough it out.

On reaching Spiti in early December at the camp, a remote village of Tashigang, I was feeling strange to set base in a village comprising of merely

6 homes and 18 people. The winter had already set in and the night time temperature would drop to  $-20^{\circ}\text{C}$ . Takpa and Kalzang, two local guys were to help me with my data collection alongwith Sushil, Thillay, Kalzang Gurmet and Sheru working in the Nature Conservation Foundation for wildlife conservation in the region. Together we set up the camp; my home for the next six months!

Thus, began my quest of running the camp and working in the fields with the aid of Kalzang and Takpa. I began to follow the blue sheep, spending days and nights watching and taking meticulous notes on their foraging behaviour. One fine day on our way from the camp to the area, where I had last seen the blue sheep, we came across a dead blue sheep

alongwith two sets of snow leopard pug marks around the kill. On following the tracks for a little while, we came to a site where the pair had rested, and then the tracks disappeared into the craggy cliffs, which we could not follow.

My routine was pretty much in flow, I would take a day off once every ten days. On one of those idle days, I was lazing around the terrace of our camp with my spotting scope, sipping on a hot tea, imploring lady luck as I hadn't spotted anything yet. Time passed by ... a little boy from the village walked up to the roof of the camp and started peering through the spotting scope. He saw something and concluded that it was a blue sheep stuck in the snow. I laughed his remark off, "blue sheep are adapted to living in these conditions and would



Bharal graze on open undulating grassy slopes, but do not hesitate to take to precipitous cliffs when disturbed

KULBHUSHANSINGH SURYAWANSHI



Sunshine's cub peering out of his rocky hideout

called by some as 'ghost of the mountains'. And here they were two of them, in bright day light, barely a few hundred meters from us.

One was clearly older than the other. It had to be them! Sunshine and her cub ... they were the only mother-cub pair existing in the area! It was unlikely that another mother-cub pair would have its home range overlapping that of Sunshine. While Sunshine lay in the snow, her cub played with her tail. All of a sudden both were still and alert, we could feel the tension in the air. Further away, on the same slope, we noticed movement ... immediately we focussed our lenses ... another snow leopard! We couldn't believe our eyes. One of most elusive wild cat of the world and we were watching three together! Trans-fixed by this development we failed to notice the tension building up, around Sunshine and her cub. The cub's movements softened; it crouched, belly brushing the floor, almost disappearing into the surrounding.

The third snow leopard appeared to be a large male. He stayed about 100 m from Sunshine and her cub, hidden in a rock crevasse by now. The tension persisted for over an hour, throughout which Sunshine while basking in the open sunny slope kept a close watch on the new male, while her cub stayed put in its rocky hideout, peeping outside at regular intervals. There was no doubt in my mind that the large male was aware of the cub's presence and location, but never displayed any aggression. In many large cat species, males are known to be aggressive towards cubs that are not their own, sometimes even killing them. That explained the undercurrent here ... but why was the large male so calm? Was he the cub's father? I will never know...

Our insufficient observations didn't allow us to pick up details on the male, we couldn't even confirm if he was one of the resident leopards or a new visitor

not get stuck in the snow"! He acknowledged my argument, and did not pursue the subject any further. But then, my curiosity got the better of me. What could it be that the boy had confused for a blue sheep stuck in snow? I peered through the spotting scope. What I saw was one of the biggest surprise of my life. It was a snow leopard, a kilometre away, silently plodding through about two feet of powder snow; with only the head showing it seemed as if it was swimming in the deep snow! I kept my spotting scope focused and tried hard to see where the snow leopard was headed. Suddenly, I noticed another movement through the corner of the spotting scope. There were two snow leopards, walking parallel to each other maintaining a distance of about twenty

feet! Enthralled, I decided to get a closer look and ran downstairs, calling Sushil, Kalzang and Thillay on the way. The next moment the four of us and a couple of boys from the village headed to a place where we could hide and wait for the approaching snow leopards to take a closer look and note the direction in which they were headed.

Soon we were positioned at the right spot and the two snow leopards arrived without any further delay. They were across a deep gorge from us but the distance as the crow flies was less than a few hundred meters. Snow leopards are known for their secretive behaviour. The first photograph of a snow leopard was taken in the 1970s. They are nocturnal, live in extremely rugged terrain and are very well camouflaged; appropriately

to the area. By now it had been over 5 hours since the first leopard was spotted, soon it was evening and the sun dipped below the ridge-line in the west and the temperatures started to dip rapidly, a signal for us to leave soon (I was unable to hold the binoculars due to the cold). We left the snow leopards after it became too dark to notice any movement; even against the bright snow.

That night I stayed up wondering about what must have happened after we left. Who was the large male? Would he attack the cub in the dark or would they just be fine together? What about Sunshine? This was the breeding season of the snow leopards. Would she mate with this large male? Was her cub old enough to wean off and look after himself? The next day, at the first light of the day, we were back at the site; but they were gone! The wind had cleaned whatever little remained to be read of the footprints. There was no evidence of the presence of the animals from the previous day, just uniform snow cover all across.

That day onwards I was much more optimistic about sighting a snow leopard, I was watchful and rewarded soon. A few weeks later, while observing a herd of blue sheep over the deep gorge formed by the Shilla nala (one of Spiti river's tributaries), a rock suddenly moved in the valley below. The movement was not at the bottom of the gorge, but on a ledge on my side of the gorge; only a few hundred metres below me.

A grey shadow slyly slid past a few rocks and settled down again. I focused my binoculars on the exact spot, but it was difficult to spot the shadow. It moved again and kept walking along the ledge and finally ... a beautiful snow leopard emerged from the stealthy shadow. It must have been on the ledge for quite some time but I had noticed it only when it moved, warily it kept




NCF CAMERA TRAP IMAGE

The strikingly beautiful snow leopard reminds one of the most mysterious cats in the world. This wandering cat is rarely sighted by local people. Due to its elusiveness; its accurate population is not known, though the estimates range from 100 to 200. Snow leopards inhabit mountain regions of central Asia. In India, their geographical cover encompasses a large part of the Western Himalaya including the states of Himachal Pradesh, J&K and Uttarakhand with a sizeable population in Ladakh, Sikkim, Arunachal Pradesh in Eastern Himalaya in addition to Nepal, Bhutan and parts of China.

walking. I knew it hadn't noticed me as I was watching it from the top, literally a bird's eye view. The peculiarity of this leopard confirmed my doubts – it was Sunshine's cub. I had often seen pug marks of an adult leopard and a cub in this area ... but where was Sunshine?

I followed the cub along a parallel ledge vertically above it. I lost sight of it for some time but knew where the ledge would lead him; I rushed along the ledge and waited for the cub to emerge at the other end. It took him a while, but he came and startled a herd of blue sheep that were feeding there. Although he walked like a ghostly shadow, his movements were awkward when he approached the blue sheep herd. His hunting techniques were still poor ... which meant that he had not weaned off completely. Maybe Sunshine had gone

hunting and her cub was just trying his luck around their den? The startled blue sheep soon left and the cub sat down under an over hanging rock. After a while, Takpa, my friend and assistant, came looking for me. We just sat there watching the cub sleep. Then just as silently as it appeared, it got up and disappeared like a shadow in the boulders at the bottom of the valley bottom; never a sound nor a glint; always camouflaged in his surroundings.

I saw the cub only one more time before the end of the project, a brief glimpse. It peeped at us from behind some rocks. But now every time I return to the mountains and see a pug mark in the snow, it fills me with joy, hoping that it is the shadow, a little older now ... holding its own territory ... hunting for itself! 

# Glimpses of Kaas

Text: C.S. Lattoo and Arun Narayanan

When a study trip to Kaas, the Valley of Flowers of Sahyadri was envisaged and planned by us, we were not quite sure of what to expect from a place that claims such a nickname. After all, we thought, there is but only one 'Valley of Flowers' – the famous National Park in Uttarakhand.

To our delight and surprise, after a long 12 hour on the road from Mumbai past an undulating path from Satara leading into the Kaas plateau (at 1,310 m), we discovered that this little plateau in Maharashtra deserves its nickname in more ways than one, with a flowing carpet of flowers and plants in hues of yellows, blues, reds, greens and white blanket on both sides of the road along with its lush hills and gentle slopes.

Kaas is adjoined by a huge lateritic plateau with a water body. From mid-monsoon to end October, the entire plateau transforms into a carpet of flowers aptly titled 'Valley of Flowers', with its diverse flora changing almost every fortnight, especially between August and mid-October!

Our visit to this vast expanse of floral territory in 2008, was of great significance; since three plant species – Topli Karvi *Pleocaulus ritchiei*, Pit Karvi *Strobilanthes ixiocephalus* and Karvi *Carvia callosa* – which

flower only once in seven years, were blooming profusely at that time.

Kaas in October becomes a lovely valley bathed in intermittent rain and mild sunshine. The fauna at Kaas too is as diverse and resplendent as its flora. Little patches of water cannot be ignored as they are teeming with life, such as crawling water scorpions, zipping water spiders, small tadpoles and hovering dragonflies. Adding up to the Kaas experience, this stunning valley also reflects a high diversity in the avian, amphibian and insect kingdom owing to the presence of large water bodies and dense evergreen forests. This perfect amalgamation offers nature lovers a glimpse into the most exquisite bird species such as the White-throated Kingfisher, Red-vented Bulbul to name a few alongwith amphibians, insects and reptiles that roam the valley.

Summing up our getaway into this enriching visual treat, we would like to draw a parallel between Kaas and a verse from Wordsworth, signifying beauty at its zenith –

*"For oft, when on my couch I lie,  
In vacant or in pensive mood;  
They flash upon that inward eye,  
Which is the bliss of solitude"*



Dr. C.S. Lattoo (L) is a Ph. D. in Botany from Mumbai University. He is in charge of the Herbarium, Institute of Science and has 40 years experience in Field Botany.

Mr. Arun Narayanan (R) is an engineer by training and a science editor by profession. He is also an avid trekker, an amateur photographer and a bird watcher. His favourite subjects are butterflies and wildflowers.



A glimpse of Kaas' floral carpet

**A GLIMPSE OF THE BIODIVERSITY OF KAAS**

**Among Grasses**

**Insectivores** *Drosera burmanni* and *Drosera indica*

**Bladderworts** *Utricularia* spp.

**Fabaceae** *Geissaspis* sp., *Crotalaria* spp., *Smithia* spp.

**Asteraceae** *Senecio* sp., *Cosmos* sp., *Linum mysorensis*

**Among rocky areas**

*Pogostemon deccanensis*

*Cyanotis tuberosa*

*Murdannia lanuginosa*

*Dipcadi montana*

*Impatiens lawii*

*Rotala densiflora*

*Exacum lawii*

*Heracleum concanensis*

*Lepidagathis cristata*

*Striga densiflora*

*Adelocaryum coelestinum*

*Canscora diffusa*

*Biophytum sensitivum*

*Euphorbia laeta*

**Trees and Shrubs**

*Terminalia chebula*

*Nothopodytes oblonga*

*Memecylon umbellatum*

*Blepharis* sp.

*Girardinia diversifolia*

*Glochidion ellipticum*

*Woodfordia fruticosa*

*Gnidia glauca*

*Scutia* sp.

*Allophyllus cobbe*

*Catunaregam spinosa*

*Meyna laxiflora*

**Climbers**

*Jasminum malabaricum*

*Hemidesmus indicus*

*Polygonum chinensis*

**Epiphytes**

*Oberonia recurvata*

*Habenaria* sp.

**Other biodiversity**

White-throated Kingfisher *Halcyon smyrmensis*

Red-vented Bulbul *Pycnonotus cafer*

Pied Bushchat *Saxicola caprata*

Rufous Turtle Dove *Streptopelia orientalis*

Common Grass Yellows *Eurema hecabe*

Angled Pierrot *Caleta caleta*

Green Vine Snake *Ahaetulla nasuta*

Jewel Bug *Chrysocoris stollii*

Jewel Beetles



ASIF KHAN

*Nymphoides indicum*



VANDAN JHAVERI

*Euphorbia laeta*



C.S. LATTOO

*Carvia callosa*



SWAPNA PRABHU

*Murdannia lanuginosa*



SWAPNA PRABHU

*Cyanotis fasciculata*



SWAPNA PRABHU

*Dipcadi montana*



VANDAN JHAVERI

*Pogostemon deccanensis*



ASIF KHAN

*Halcyon smyrmensis*



SWAPNA PRABHU

*Chrysocoris stollii*



ASIF KHAN

*Ahaetulla nasuta*



## EDITOR'S CHOICE

## An obituary for the tiger

By Avirat V. Shete

Let me tell you the story of a king in crisis,  
 A gentleman known by the name of panthera tigris.  
 A large hearted monarch who once ruled this nation,  
 Now racing towards oblivion as he runs out of ration.  
 Not so long ago he numbered a strong forty thousand  
 Alas, he is now endangered inspite of many a fancy fund  
 Killing His Majesty was a favourite royal sport,  
 Rampant poaching and habitat loss, the king has lost his fort.  
 What a shame it would be to lose him to extinction,  
 National animal which doesn't exist will be our dubious distinction.  
 I've been lucky to see the king in his own domain.  
 Possibly my last few glimpses before he is silently slain.  
 To see a tiger in his own home is an experience amazing.

Even his presence though only felt, will set your pulse racing.  
 The whole jungle reverberates with alert alarm calls,  
 The wily predators' against the wind and a poor prey falls.  
 But before you label him blood thirsty or cruel,  
 Let me make it clear, he hunts only to refuel.  
 Man-eating is also a matter of hopeless compulsion,  
 When we trespass his home, he reacts by consumption.  
 But selfish man is too proud to admit his mistake,  
 Even the Government fools people with a tiger census fake.  
 When the policy makers have him last on their list.  
 The tiger's time is slipping away like sand held in a fist.  
 I am helpless O king so I write this silent obituary,  
 Ending with hope some other world may offer you safe sanctuary.

Reviewed by: **Ashok S. Kothari**

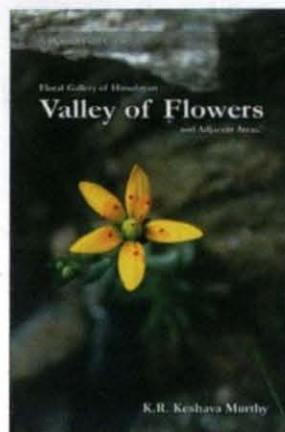
In 1931, Frank S. Smythe and five other British mountaineers climbed Kamet, a mountain 25,447 ft high in the Garhwal Himalayas. While on the way back Frank Smythe along with R.L. Holdsworth, a mountaineer and a botanist, descended to the lush green meadows of Bhyundar Valley. Smythe wrote in his famous book *THE VALLEY OF FLOWERS*, in 1937 "Here our camp was empowered amidst flowers, it was impossible to take a step without crushing a flower! ... The Bhyundar Valley was the most beautiful valley that any of us had seen. We camped in it for two days and remembered it as the Valley of Flowers."

Astounded by its impeccable description, a large number of people visited the Valley, and a number of books have been written on the floral beauty found here including flowering plants of the Himalayan region. Dr. Keshava Murthy's book being the latest one in the list.

Dr. K.R. Keshava Murthy, a well-known plant taxonomist, visited the Valley a number of times, stayed there for days together and successfully collated data on the flowering plants found there. His book contains a number of photographs, descriptions, local names, flowering time, fruiting time, habitat and information about the medicinal value of plants and their harmful effects, if any. Dr. Murthy met the local *pabadi* people, lived with them and with their aid identified the use of plants commonly seen there.

This book also contains information on plants found around Hemkund Saheb, Badrinath, surrounding the Neelkanth base, up to Mana Pass and Vasundhra Falls. It has adequate information to guide a keen botanist, and can also be used as a pictorial guide, a worthy companion for all. Like Dr. Keshava Murthy's other books *FLORA OF COORG* and *MEDICINAL PLANTS OF KARNATAKA*, this book too has drawn wide attention amongst book lovers and plant lovers alike, in a very short time.

The book is available for sale at Hornbill House. 📖



**Floral Gallery of Himalayan Valley of Flowers and Adjacent Areas**

By K.R. Keshava Murthy, 2011  
Published by: Dr. K.R. Keshava Murthy, Karnataka.  
Pp. 339. Size: 22 x 14 cm  
Price: Rs. 950/-  
Paperback.

Reviewed by: **Atul Sathe**

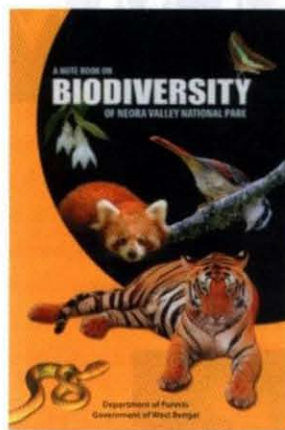
Here is an informative book that also serves as a field guide to a traveller to the Darjeeling district of West Bengal. It is attractive, colourful, and is well-designed; indeed a great initiative by the Forest Department, one that can be emulated for other protected areas of West Bengal, as well as those in other states.

A NOTE BOOK ON BIODIVERSITY OF NEORA VALLEY NATIONAL PARK has a comprehensive checklist of mammals, birds, fishes, amphibians, reptiles, butterflies, wild flowers, trees and medicinal plants found in the Neora Valley National Park (NVNP) of Darjeeling district, along with some interesting images and illustrations.

The book successfully highlights a lesser known aspect of Darjeeling district – its forest wealth and wildlife; it is better known for its extensive tea gardens and tourist attractions. NVNP and its surrounding forests are part of the vital forest corridor between forests of Sikkim, Bhutan and Jalpaigudi district.

This pocket guide would be of interest not only to tourists but also nature lovers visiting Darjeeling district, forest guides, forest staff, researchers, policy makers, and students as it describes at length the landscape, topography and trekking destinations in the area, including camp sites and rooms. The book focuses on the concept of ecotourism, educating the reader significantly. The references in the book include books by BNHS naturalists – Dr. Salim Ali, Mr. J.C. Daniel and Mr. Isaac Kchimkar.

The only area it lacks in is the need for a better map of the Park with geographical zones demarcated and a correct political map of India, wrongly displayed currently. An interesting read, whether one visits Darjeeling hills or not! 📖



**A Note Book on Biodiversity of Neora Valley National Park**

Compiled by Tapas Das, 2010  
Published by: Department of Forests, Government of West Bengal.  
Pp. 256. Size: 17.5 x 11.5 cm  
Price not mentioned.  
Paperback.



## 'DAMMED' AGAIN?

Dhole – A very healthy population of this endangered candid is seen in the Vazhachal – Sholayar belt

Text: **Miriam Abraham**  
Photographs: **N.A. Naseer**



Miriam Abraham is currently working as the Conservation Officer at BNHS.

An often repeated cliché is that forests are the mother of all rivers. *Chalakudyputzha*, the fifth largest river in the state of Kerala is a living example of this ancient wisdom. The very name of the river rekindles nostalgic memories in all *keralites* as it formed the theme of many popular tunes, and also for its cultural and historical significance. The river flows through the forests of Nelliampathis, Parambikulam, Anamalais and Vazhachal-Sholayar regions in the southern Western Ghats. If the first three, a mighty network of highly fragmented forests, are the womb of the river, the last, Vazhachal forests, plays the role of a foster mother by nourishing the river.

Vazhachal is an enchanting wild country gaining popularity by the day resulting in a threat to its serenity. The forests of Vazhachal-Sholayar ranges of central Kerala, a contiguous tropical evergreen forest, forms the riparian vegetation of Chalakudy river in this part. In Kerala, this is the only extent of undamaged riverine forests, and undoubtedly this portion of the river has many ecological highlights. This is the only river system in Kerala where the Marsh Crocodile (*Crocodilus palustris*) is still seen in the wild. Twenty-five years ago a young, promising field biologist J. Vijaya of Madras Crocodile Bank explored Vazhachal forests,

which culminated in the rediscovery of the rare Cochin Forest Cane Turtle (*Vijayachelys silvatica*) after a lapse of 70 years. Vazhachal provides the most important corridor for elephants to move from Parambikulam-Anamalais to Pooyamkutty. It is certainly the backbone of the elephant conservation work in the Anamalai conservation unit.

But, this beautiful river has another sad side. It already has six major dams. There is a proposal to bring one more hydroelectric project – the Athirappilly HEP – for this river! Three dams of Parambikulam-Aliyar project (PAP), lower Sholayar, Poringalkuthu, upper Sholayar and the associated roads, colonies and quarries have already destroyed thousands of acre of biodiversity rich areas in this river basin; the new proposal may be the last straw on the camel's back!

### The past and present of the proposed HEP

The Athirappilly HEP was proposed by the Kerala State Electricity Board (KSEB) in late 1980s, as a 163 MW Project. It

was to include a dam 23 m high and 311 m wide on the Chalakudy river in the Vazhachal Forest Division about 5 km upstream of the famous Athirappilly falls, the second highest in southern India and c. 400 m upstream of Vazhachal Rapids (Vazhachal Falls). With an Full Reservoir Level (FRL) of 241 m and storage of 8.44 Mm<sup>3</sup> this is conceived as a tailrace project of the existing Poringalkuthu HEP, according to the Kerala State Electricity Board (KSEB), the Project Proponent. The installed capacity is 163 MW, with a dam toe powerhouse of 3 MW (2 x 1.5 MW) and a main powerhouse of 160 MW (2 x 80 MW). The annual energy generation as per Central Electricity Authority (CEA) is 233 MU, i.e., 16% of the installed capacity. While trying to gain clearance for this project KSEB as always, considered this just as 'another project'. They failed to assess the larger cumulative impact of a seventh dam on a small river already burdened with six dams, of which four are inter-state diversions. The revised estimated cost for this project as per the 2004 PWD schedule is about Rs. 385.63 crores, but is currently estimated at Rs. 650-700 crore.

The first Environmental Clearance (EC) for the project was granted in 1998 based on a rapid environmental impact assessment carried out by the Tropical Botanic Garden & Research Institute (TBGRI) based in Thiruvananthapuram. However, the clearance had to be suspended following the Kerala High Court judgment in October 2001 citing violations in EIA Notification 1994, under which this project has been considered. The High Court ordered a Public Hearing (PH), which was held on February 6, 2002 at Thrissur. The second EC was granted in February 2005. The EC was given based on the EIA study conducted by Water & Power Consultancy Services India Ltd (WAPCOS). But the second EC was also challenged in the Kerala High Court. The High Court again intervened by nullifying the EC granted in 2005 by its judgment on March 23, 2006. The second court ordered, PH was carried out on June 15, 2006, at Chalakudy. The Project was granted EC for a third time in 2007. The third EC has also been challenged in the Kerala High Court and the case is still pending.

### Present catchment status of Chalakudy river basin

The 144 km Chalakudy river originates in the Anamalais. After the initial course of the river (15 km stretch) in the Western Ghats in Tamil Nadu, the rest of the river and its catchment falls within the southern Western Ghats in Kerala. The 1,704 sq. km Chalakudy river basin has four main tributaries, namely Sholayar originating from the Anamalais, Parambikulam and its smaller catchments of Peruvareppallam and Thunakkadavu from the Parambikulam Plateau, Kuriyarkutty, and its sub-catchments of Veetiar and Thekkadiar from Chammanampathy Hills, and Karappara from Nelliampathy hills.

## Dismembered river flow

The stretch of the river up to 90 km from the source presently has six dams and a major river diversion scheme (the Chalakudy River Diversion Scheme, CRDS) that has an Ayacut of 14,000 ha of agricultural land. About 30% of river flow up to Poringalkuthu is already diverted to neighbouring Tamil Nadu by the Inter-State Inter-basin Parambikulam Aliyar Treaty. Considerable quantity of monsoon flow is diverted from downstream Poringalkuthu HEP to the adjacent Idamalayar reservoir in the Periyar river basin to meet its downstream needs. Periyar is the most dammed river in Kerala. The proposed Athirappilly Project is planned just below the Poringalkuthu HEP at the 70 km mark from the source making it the seventh dam in 70 km. The Chalakudy river channel is presently highly dismembered and converted to a chain of reservoirs with no



Malabar Grey Hornbill – a species endemic to the Western Ghats

river flow in between. The Parambikulam catchment is already degraded due to Monoculture Teak Plantations and contributes very less to the river flow. Even the waterflow in the largest undammed tributary of Chalakudy river namely Karappara river practically totally stops flowing during summer due to excessive withdrawal in the upstream tea, coffee and cardamom estates and also due to ongoing deforestation.

## Impact on biodiversity and ecology

According to the Biodiversity Conservation Strategy and Action Plan for Kerala prepared by the French Institute, Pondicherry, the conservation value of the Vazhachal (project area) is as high as 75%, (one of the highest!) (floristic species richness, floristic endemic zone, unique ecosystems, faunal endemic zone and mammal density together gives a composite

picture of conservation value), which itself justifies the importance of the area for conservation. The riparian vegetation along the Chalakudy river system offers a unique ecosystem. In fact, there is no such ecosystem with such composition in Kerala and even in the country. Further, it serves as a link between the varied habitats at lower and higher elevations.

There is a very high number of endemic species in the area. Threatened species such as Travancore Flying Squirrel (*Petinomys fuscocapillus*), Nilgiri Tahr (*Hemitragus hylocrius*), Nilgiri Langur (*Trachypithecus johnii*), Lion-tailed Macaque (*Macaca silenus*) are regularly seen here.

The Project area is the habitat of the rarest and highly endangered herpetofauna; the Cochin Forest Cane turtle (*Vijayachelys silvatica*). The moist evergreen and riparian forests of Vazhachal hold many rare reptiles and amphibians.

National Bureau of Fish Genetic Resources (NBFGR) has recommended that upstream areas of the Chalakudy river be declared as a 'fish sanctuary'. 104 species of fishes have been recorded here, which is the highest diversity among any river of Kerala, and one of the richest in India in terms of species abundance. Five species new to science have been discovered namely (*Horabagrus nigricollaris*, *Travancorea elongata*, *Osteochelichthys longidorsalis*, *Puntius chalakudiensis* and *Garra surendranathanii*). Nine species are critically endangered and 22 species are vulnerable as per IUCN norms.

The entire project area falls within the Elephant Reserve No. 9 identified by the MoEF under its 'Project Elephant'. MoEF recognises that conservation problems for the elephant "include habitat fragmentation by a network of reservoirs and canals, degradation of moist forests due to fire and poaching of tuskers". Asian Nature Conservation Foundation's (ANCF), Asian Elephant Research and Conservation Centre (AERCC) has pointed towards the high elephant density in the division even for the State. According to the 1993 census, there are 947 elephants in the division. ANCF has recommended that the status of Vazhachal division must be upgraded to a wildlife sanctuary/national park for elephants given the high density. The construction of the new dam project would mean heavy movement of workers and vehicles in the elephant movement path along the Anamalai Inter State Highway creating conducive situations for increased Human Elephant conflict and related casualties.

Athirappilly-Vazhachal area has 264 species of birds with many endemics. 12 of the 16 species (75%) of the endemic species of birds seen in the Western Ghats are present here. BirdLife International and the BNHS declared the area as an Important Bird Area (IBA) along with Nelliampathy and Parambikulam. The Project area is one of the unique sites where all the four hornbill species of Western Ghats are found together, which is a rare phenomenon.

The MoEF, the Public Hearing panel in 2002, the Central Water Commission, and the Central Electricity Authority have

recommended an integrated study of the river basin to the KSEB. The Chalakudyputzha Samrakshana Samiti and the River Research Centre had also demanded the same.

### Impact of the project on Kadar tribes

The forests of the Chalakudy river basin are the only habitat of the primitive hunter gatherer Kadar tribal community (presently numbering just around 1,500), since time immemorial. They have been leading a life completely dependent on the forests collecting honey, tubers and other minor forest produce, and the flowing river for fish. The Kadar is a shy, non-intrusive tribal community. Earlier, an entire Kadar family would spend considerable time in the forest fishing and collecting forest produce. Now, they also work under the Vana Samrakshana Samiti of the KFD. After one and a half century of constant

Kerala in an opinion poll for selecting 7 wonders of the state. If the project materializes, most of the river water will be diverted for power generation during monsoon to the main power house (160 MW). Maximum of 14% of the present waterflow will be released to maintain magnificent view of the waterfalls.

Construction of the dam will alter the ecology of the river system, both upstream and downstream of the proposed dam site. The river will then be instead of a dynamic and vital ecosystem, merely a physical water transporting system devoid of various ecological functions. One of the reasons for the high species richness and endemism of the area is the total volume of water flow and its fluctuation from a minimum of 7.26 cumec in May to 229.97 cumec in August. Regulation of the flow to 6.2 cumec, as specified in the Proposal, will destroy the



Athirappilly waterfalls, the second tallest falls of southern India is facing the grave threat of another HEP

forced translocation across this terrain, due to clearance of forests for plantations and submergence of their settlements due to dam reservoirs, they are currently settling along the main valley of the river. Two of their settlements are within the range of serious impact by the Athirappilly HEP. Given their endemic and endangered status, it is the prime duty and responsibility of the Government of Kerala to protect this tribal group from further dislocation and cultural alienation.

### Impact on waterfalls and ecological functions of the river system

Athirappilly waterfall has been voted by the people of the State as the second most important heritage site after the Silent Valley from among all natural and man-made heritage sites in

original ecosystem characteristics. It will also affect the irrigation and drinking water schemes of the people downstream. The problem of saline ingression is already affecting the downstream population during the summer months.

Even though, there is amassed protest against the proposed Athirappilly HEP for the past many years, it still hangs like the sword of Damocles. With every change in the ruling political party, the project comes up with a new makeover. It was the relentless campaigns of a local voluntary group, Chalakudyputzha Samrakshana Samiti who brought to the attention of the people and the government the gravity of the issue. The Ex Hon. Minister of Environment and Forests Shri. Jairam Ramesh and the MoEF took a strong stand against the project, and MoEF sent a show cause notice to the KSEB, the



This region has the highest elephant population and falls under Elephant Reserve Number 9

project proponent, about the tribal colony and the endangered biodiversity. The MoEF referred the proposed Athirappilly HEP to the recently constituted Western Ghats Ecology Expert Panel under the chairmanship of Prof. Madhav Gadgil. The decision of the MoEF indicates the well-deserved priority given to the issue and the need for further review and appraisal of the biodiversity significance of the project area, and the project impact on the Kadar tribes and other relevant issues.

### Project viability/Real scenario

Even though the installed capacity of the Athirappilly HEP is 163 MW, the annual electricity generation as per the Central electricity Authority (CEA) is only 233 MU; an efficiency of about 16%. But, with the reduction in generation at Idamalayar, the net gain for the KSEB grid from AHEP will be only about 170 MU; an efficiency of about 12%!

This is less than 1% of the present demand i.e., about 18,000 MU for the current year. During December to May the power generation from the Project will be c. 30 MU. Also, the reduction in generation from Idamalayar during this period will be more. This could result in negative gain to the grid in summer.

The KSEB had decided to award the contract for the project at Rs. 414.22 crores (i.e., 359.5 crores + 26.13 crores of interest) in January 2001.

In October 2005, KSEB increased the contract amount to Rs. 570 crores. The present cost, as per a formula of the WAPCOS will be about Rs. 900 crores. The cost on completion, if the project is implemented, will be more than Rs. 1,000 crores.

At a project cost of Rs. 359.5 crores and with an electricity availability of 233 MU, the CEA had calculated the cost of electricity at Rs. 2.58 per unit. With a project cost of Rs.1000 crores and electricity availability of 170 MU, the cost of electricity from the project will be around Rs. 10 per unit. The costs of social and ecological losses not being added to this. Will the economic returns for constructing the dam, commensurate the ecosystem services being rendered to us both by the forest in the project area and the Chalakudy river system? Traditional economic valuation followed by decision makers seems to show a logic deficit. The ecosystem services from this area would be in the order of Rs. 500 crores per year (Calculated as 3.5 times the global average of 145 crores per year (*Nature* Vol. 137)). In other words, if we do not disturb the ecosystem and allow them to remain as it is, we get services worth Rs. 500 crores in various forms such as water regulation, waste treatment, water supply, erosion control, raw material, food production and genetic resources. This when weighed with the average life span of the dam, which according to the KSEB is only 35 years. *Do we still need this Dam?*

Hope the strong stance taken by the MoEF saves the last remaining vestiges of the riparian forests in Kerala. Protecting a river means protection of the its adjoining forests. No river can be saved by treating it like an aqueduct. The story of Chalakudy river is also not different. Its placental relationship to Vazhachal forests and other distant forests have to be retained at any cost if the river is to flow. The latest cabinet reshuffle of ministers and new political changes in Kerala State, brings back the chances of the Project coming back in a new name and with new figures!!! Old wine in a new bottle ... ■

## Flamingo Festival – a grand success in its 5<sup>th</sup> year

In its 5<sup>th</sup> year, the BNHS Flamingo Festival, inaugurated by Mrs. Pheroza Godrej, on April 16, 2011, was a stupendous success. Nearly 15,000 bird lovers, as well as other citizens, across age groups headed towards the Sewri Jetty on the Saturday afternoon to watch over 15,000 Greater Flamingos and Lesser Flamingos, and two dozen other wader species turning out to be a visual treat for visitors. From school and college students, families, corporate employees, municipal employees, people from the port trust and police to journalists, all got a first-hand experience of soaking in the beauty of flamingos. Setting off with its primary objective to introduce commoners to these beautiful birds that have been visiting Mumbai every winter for years, and sensitize them towards conserving their habitat, the BNHS Flamingo Festival has emerged as the prime symbol of conserving Mumbai's wildlife. The success of this initiative lies in the fact that MMRDA has decided to realign its proposed Mumbai Trans-Harbour Link, which will save the flamingo feeding grounds in Sewri. ■



Bird lovers at the BNHS Flamingo festival

## Annual Pilgrimage!

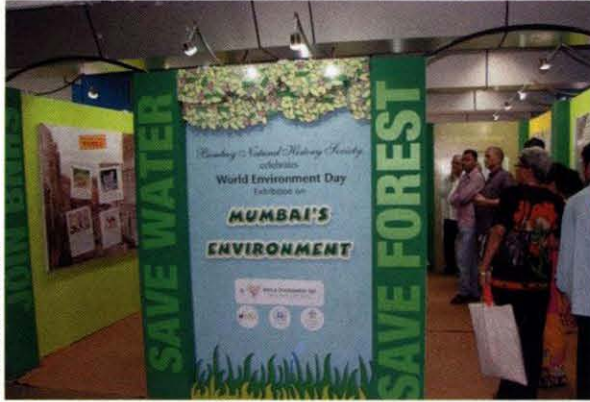


Annual Research Seminar serves as a platform for sharing of information for all the participants

The 'annual pilgrimage' of the BNHS scientists – the Annual Research Seminar (ARS) – was organized at Hornbill House on May 21-22, 2011, along with a seminar on Critical Wildlife Habitats in India, on May 20. Accentuating the core of BNHS, i.e., research, this annual event as always was a great opportunity for BNHS scientists to share their research findings with their colleagues and peers, a learning experience for all. The presentations represented several ongoing BNHS research and conservation projects on topics

such as vulture breeding, migratory birds' study, elephant migration, study of Jerdon's Courser, mangrove conservation, study of marine life in Gujarat, study of Giant Squirrel, work done at BNHS-CEC, Mumbai, and the work done by the BNHS Environmental Information System (ENVIS) Centre. The presentations were judged by a panel consisting of Mr. J.C. Daniel, Vice President, BNHS; Dr. A.M. Bhagwat and Dr. A.J.T. Johnsingh, Members, BNHS Governing Council. ■

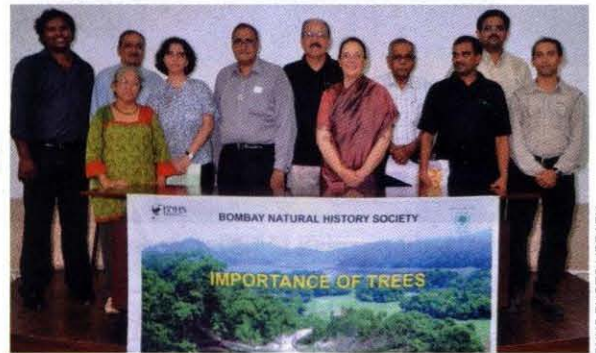
## BNHS elected partner NGO on World Environment Day by MoEF



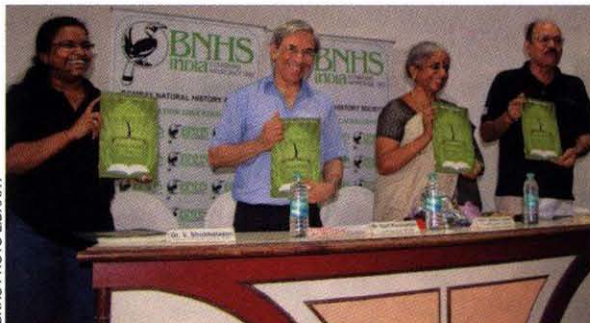
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This year India was chosen as the Global Host for the World Environment Day (WED) celebrations by United Nations Environment Programme (UNEP). The Ministry of Environment and Forests (MoEF), Government of India, chose BNHS as its partner organization for the celebrations in Mumbai. BNHS organized two exhibitions on “Mumbai’s Environment”, one each at Chhatrapati Shivaji Terminus (CST) and Churchgate railway station. The exhibitions which saw a great turn out, nearly 8,000 people, were open to the public for three days (June 2-4), covering diverse topics such as urban environment, green lungs of Mumbai, the city’s extinct and existing wildlife among others.

On June 2, BNHS organized a seminar “Importance of Trees” at Hornbill House. The seminar was inaugurated by Mrs. Pheroza Godrej who spoke on “Planting Trees for a Better Tomorrow”, alongwith other speakers such as Dr. Ashok Kothari, Hon. Sec, BNHS; Mr. Ram Nivas Rathod, AGM – Horticulture, Godrej & Boyce; Mr. Anand Pendharkar, Director, SPROUTS; Dr. Usha Desai; Ms. Hutokshi Rustomfram, Save Rani Baug Action Committee and Mr. Santosh Yadav.



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Drawing curtains to the grand WED celebrations, the closing ceremony was held at BNHS-CEC, Mumbai, on June 5, during which, Mrs. Usha Thorat, Vice President, BNHS, released a book titled GREEN GUIDE FOR TEACHERS (available in English and Marathi for free for school teachers in Maharashtra). ■

## Happenings @ CEC, Mumbai

The BNHS-CEC, Mumbai, was abuzz with activities this quarter yet again. On the occasion of Earth Day, i.e., April 22, the focus was on renewable resources and indigenous tree plantation in collaboration with United States India Educational Foundation (USIEF). The activities planned thereby included a nature trail in the CEC premises, backyard manure preparation and filling sapling bags for forest nursery. During the quarter, CEC also conducted a nature trail in Vikhroli mangroves and a Flamingo Watch at Sewri mudflats. Innovative activities such as Citizens Science Project, Be a Scientist for a day and the Mothing Session (studying moths using light traps) received overwhelming response. Jungle Camps at CEC premises were organized in two batches, viz. Junior and Senior, in the first half of April. CEC Navi Mumbai Chapter organized a nature walk to Ghansoli Creek, while the Thane Chapter conducted a Butterfly Watch in Ovalekar Wadi. ■



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Published on July 22, 2011, by Dr. Ashok Kothari for Bombay Natural History Society, Hornbill House, Dr. Sálím Ali Chowk, Shaheed Bhagat Singh Road, Mumbai 400 001, Maharashtra, India.





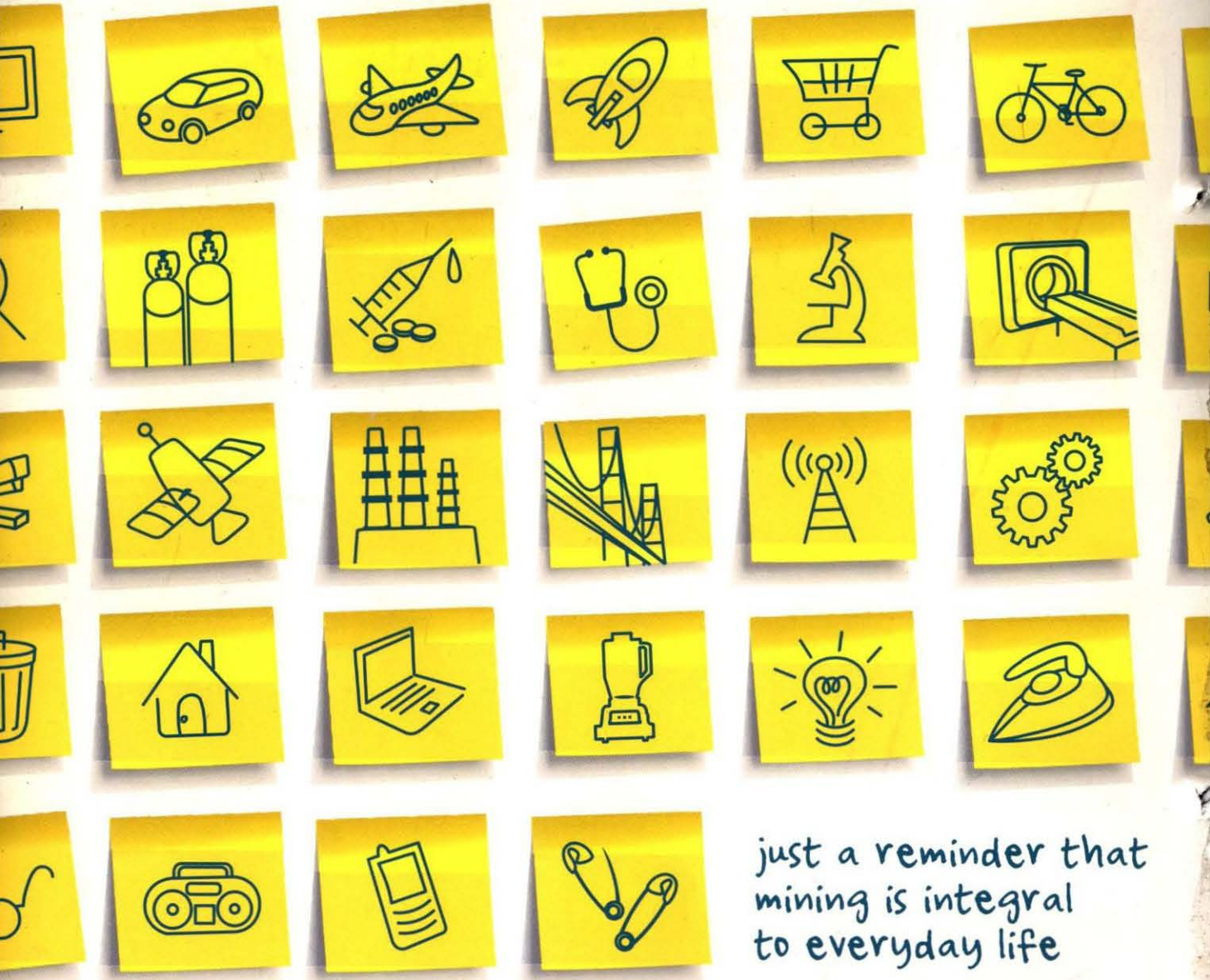
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