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An Eventful Quarter

This monsoon was highly eventful for me: participating in a meeting of Niti Aayog in Kochi on coastal and marine biodiversity and Sustainable Developmental Goals (SDGs); and later, in the British Bird Fair with a BNHS stall; presenting BNHS work during the 12-year review of the MoEF&CC funded All India Co-ordinated Project on Taxonomy (AICOPTAX); pondering on the environmental challenges posed by the ambitious plans of Government of India's Sagarmala Programme pertaining to ports, shipping and inland navigation; listening to some wonderful presentations during the annual research seminar of Wildlife Institute of India; watching some interesting documentaries as one of the jurors of CMS Vatavaran; and finally, attending several state and central government meetings related to various aspects of CRZ, and infrastructure and related environmental issues

I further share some of these experiences:

The All India Co-ordinated Project on Taxonomy (AICOPTAX) was an important programme of the MoEF&CC that brought together several young taxonomists across taxa. A 3-day review of work under AICOPTAX at Jamnagar provided an opportunity to witness the remarkable progress various researchers have made in little known taxa. BNHS was co-ordinating work on Mollusca on the west and parts of the east coast of India. The project helped BNHS establish range extensions for over 150 species of sea slugs and name a few new species for science, which were published in peer reviewed publications. *FIELD GUIDE TO SEA SLUGS OF INDIA* published by BNHS is an effort to provide a handy guide for amateurs and researchers under AICOPTAX.

For the first time, BNHS put up its stall at the British Bird Fair, which presented an opportunity to meet several members and supporters of BNHS in UK. The respect the Society has garnered for its contribution to natural history that is based on scientific research and conservation is remarkable. Hundreds of visitors gathered at the BNHS stall to learn about the work done on vultures, Great Indian Bustard, and floricans among other taxa. Meeting Mr. John W. Toovey, grandson of Lt. Col. R.W. Burton (1868–1963), one of the first members of BNHS was the icing on the cake. He recently submitted Burton's personal papers and photographs to the Department of 'India Office and Private Papers' at the British Library, London. The "Richard Watkins Burton Papers" Catalogue went online in June and can be accessed on the British Library's website. The Collection reference is Mss Eur F694: The main catalogue sections are: Diaries, BNHS Articles, Wildlife of India, Indian State Railways Magazine, Correspondence, Working Papers and Notes, Publications, Photographs and Negatives. His archival includes one air letter from Dr. Salim Ali sent to him in 1962 regarding bird ringing and migrations studies in India.



CMS Vatavaran provided an opportunity to watch some interesting conservation oriented movies like *SEED: The Untold Story* by Taggart Siegel and Jon Betz from USA; *Guardians of the Grain* by G.S. Unnikrishnan Nair, India; *The Real Cost of Coal* by Vibor Juhás from Croatia; and *India Unseen-Alternative Paths (Solar Power in Farming)* by Video Volunteers India. If you wish to view these documentaries, you can avail them from CMS Vatavaran.

The annual research seminar of the Wildlife Institute of India (WII) provided me an opportunity to meet Mr. H.S. Panwar, the first director of WII and Director of Project Tiger.



BNHS stall at the British Bird Fair

Very rarely does one hear a loud, bold, uncompromising and scientific voice for conservation like that of Mr. Panwar. The seminar was a 3-day knowledge packed odyssey. Listening to some of the remarkable cutting-edge science made me wonder what prevents its use for better conservation and mitigation measures. Integration of conservation science into Decision Support System (DSS) at state and central level is the key to bring in transparency and rapid decision making. Though DSS exists for some key areas like protected areas, tiger corridors, inviolate areas, etc., it is lacking for many key conservation domains. BNHS has started developing a comprehensive DSS for Maharashtra.

Recently, we uploaded the entire revised directory of Important Bird Areas of India for free download on the BNHS website (www.bnhs.org). You can access this information under the Research section – Important Bird Areas.

The response to our previous special issue of *Hornbill* has been very encouraging. This issue on the Central Asian Flyway received overwhelming response not just from members, but across the BirdLife network. We will continue to provide such useful information to our members on key conservation areas in upcoming issues of *Hornbill*.

Deepak Apte

Bleeding Hearts of the High Mountains

Text and Photographs: **Asad R. Rahmani**



Kenya, Tanzania, Zimbabwe, Zambia, Uganda, and South Africa dominate the wildlife tourism scene in Africa. But, tucked away in the Horn of Africa, there is a beautiful country that has equally amazing wildlife and people – Ethiopia.

Ethiopia is endowed with highlands that can be the envy of any nation. These highlands, above 1,500 m, called the Roof of Africa, are located in the central part of this large country. The highlands are dominated by vast grassy plateaux, stunted trees, fissured mountainsides, deep valleys, and cloud-covered peaks. Ras Dashen – one of the highest peaks in Africa – reaches 4,550 m. Even Addis Ababa, meaning



A rocky escarpment in Ethiopia

'new flower' in Amharic language, located at 2,400 m, has a salubrious climate throughout the year.

To describe the Ethiopian highlands fully, I would have to write a separate article as this region is interesting geologically, anthropologically, and biologically. In this article, I will confine myself to the Gelada, also

called Bleeding Heart, due to the characteristic red patch on the chest.

Geladas, erroneously called Gelada Baboons, are survivors of an ancient genus *Theropithecus* that included many species but became extinct due to competition with the more robust ancient humans, climate change, and other unknown factors. Millions of

years ago, *Theropithecus* roamed the whole of Africa, southern Europe, and as far east as India, but now only one species *Theropithecus gelada* survives in the highlands of Ethiopia.

Geladas are the only grass-eating monkeys in the world. Most monkeys are omnivorous, eating whatever comes their way – fruits, seeds, nuts, green



Gelada male with the characteristic red patch

leaves, grass shoots, bird eggs, insects, small lizards – but Geladas are satisfied with green grass and tubers, which they cut or dig dexterously as they have long thumbs and relatively shorter index finger (much like humans). However, grass is not so nutritious and cannot provide all their energy requirements, so they supplement their diet by picking up herbs and shrubs.

Most pictures of Geladas show their formidable canines, particularly in adult males, but these outsized teeth are meant to be a warning to rival males, and possibly to attract coy females. In science, such structures are called secondary sexual characters. Like the mane of the Lion, tail (called train) of Peacock, horns of Blackbuck, etc. Gelada's canines are mainly indicators

of sexual maturity and dominance of a male. For more mundane work like mastication of grass, the Geladas have a row of molar teeth. No other monkey has such specialized molars.

However, the most characteristic feature of Gelada is the crimson red patch of hairless skin on the chest, giving them the moniker 'bleeding-heart monkeys'. Both sexes have this patch, but males have a larger and redder patch, and even among males, large dominant (alpha) males have a bigger patch, which they advertise as a signal of strength, dominance, and power. Females frequently look at the red patch to reassure themselves that they have made the right choice in selecting a "husband". Dominant males provide protection from predators and other rival males, and good genes to the next generation.

Geladas share their high-altitude world with the Leopard, Hyena, Simian Wolf, Caracal, and Serval (an Ethiopian wild cat also known as the Tierboskat). Except for the first two species, none of them are a real danger to an adult Gelada, but young ones sometimes fall prey to the Serval. However, wherever the Simian Wolf, another endemic of Ethiopia, shares the habitat with Geladas, they live symbiotically. Simian Wolf has learned that when a troop of Gelada moves on the grassy slopes and plateaux, it disturbs smaller animals, such as rodents and hare, which are easy pick to the alert wolf. Scientists have seen Simian Wolf moving among a foraging Gelada group – only females with infants keep a distance from this predator.

Leopards and Hyenas are potential predators, so the Geladas fear them the most. While adult males can put up a good fight, females and young ones are vulnerable. Therefore, in the evening the Geladas move to steep cliffs to sleep where a Leopard or a Hyena



Gelada troop foraging on the ground

cannot access them. Sometimes their sheer numbers deter a canny Leopard from making a wrong move. Scientists say this is one of the reasons why Geladas live in large groups, sometimes reaching up to 100 individuals.

Group living and constant moving in search of fresh grass has resulted in a very rich vocal repertoire. Perhaps no other monkey has such a rich 'language' as Geladas. They have the highest repertoire of any non-human primate. Many scientists have been studying Gelada communication to understand how human language evolved.

Although there could be hundreds of thousands of Geladas in the Ethiopian highlands, many troops are fragmented due to roads, villages, and farmlands. Although they can live in human-dominated landscapes, human-Gelada interactions are frequent as they like crops as much as wild grass, which



Gelada male surveying his kingdom



Gelada mother and young one



Female grooming adult alpha male Gelada



Gelada young male

has been replaced by lentils, wheat, rice, barley, potatoes, and vegetables. Unlike in many parts of Africa where monkeys are a delicacy, the locals do not eat Geladas. But fights for common resources have been going on for hundreds of years in this ancient land, and the loser is always the Bleeding Heart. More and more animals are being pushed to uncultivable steep cliffs, escarpments, and higher up the highlands. Human population increase, overgrazing, and climate change is shifting cultivation higher and higher, cloistering Geladas and their favourite grass to smaller and smaller mountain 'islands'. Besides the increasing human population – Ethiopia is the second-most populated country in Africa, with 100 million people – a bigger danger is from climate change. As the temperature increases, more and more areas are being opened up for cultivation, and vagaries of temperature and rainfall resulting in failed crops push the tolerance level of local farmers to the depredation of Geladas. While earlier in a more stable climate, farmers could tolerate some crop damage, tipping points have now been reached.

Presently these iconic monkeys of Ethiopia are not in danger of extinction, but how long will the IUCN Red List keep them in the Least Concern category? This is worrying conservationists. We do not need bleeding-heart animal rights people to protect Geladas, but practical conservationists who can give us solutions on how to protect these sentinels of the highlands of Ethiopia. ■



Asad R. Rahmani, a renowned ornithologist, is currently Senior Scientific Advisor in BNHS.

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A Dhole (Indian Wild Dog) hot on the trail

Our Amateur Mammal Survey

Text and Photographs: **Luxshmi Soundranayagam**

I live with my family in the Palani Hills, which lie towards the southern end of the Western Ghats mountain chain, in the state of Tamil Nadu. We are about 20 km (by road) north-east of the hill station of Kodaikanal.

We were lucky enough to move to this area a few years ago, knowing that the Western Ghats range was one of the world's leading biodiversity hotspots. We

were excited to read that the southern Western Ghats were particularly high in biodiversity and endemism. After we moved, the government of Tamil Nadu designated about 600 sq. km in the Kodaikanal area as the Kodaikanal Wildlife Sanctuary, although we were disappointed that our house and land did not fall within these boundaries!

We were eager to find out about the animals that lived around us. While species listings were available for the Western Ghats as a whole, and presumably for individual wildlife sanctuaries within the mountain range, we could not find information about the occurrence and distribution of wild animals of the Kodaikanal area. So, we decided to make out our own list of whatever animals we could see in and around our property.

To give you an idea of our surroundings, our house has an unfenced garden of roughly one acre,

and this sits in about 5 hectares of lightly forested land (largely unmanaged) on a south-facing hillside (elevation around 1,200 m). The sloping 5-hectare area is characterized by patchy tree growth, scrub and grass, punctuated by rocky outcrops. During the rains (both the summer and the winter monsoon), the grass can grow to shoulder height, while in the hot dry season, most of the vegetation dies back, and the hills turn yellow, brown, and dusty. While this land has been left wild for the most part, a few trails have been kept clear, and fire breaks are maintained around the edge of the property. Adjoining this area, on three sides, the land is being used for coffee cultivation and agriculture, and there is also a large site being developed into a colony of holiday cottages, beyond which is a small village with a population of 250. At the fourth side, to the north, is open land of mixed scrub and trees, with

indigenous shola forest starting about 2 km away.

We soon discovered that Gaur came to visit our garden almost every night. Sometimes, we could only see their white socks gleaming in the moonlight, or a wide-set pair of eyes would suddenly glint in the light of our torches. At other times we could have a herd of eight or ten of these imposing animals browsing on the lawn, and sorry to say, decimating the flower beds. After a while we followed local custom and strung old saris along the edge of the beds to save the remnants of the hibiscuses, crotons, and begonias. Large, fat Indian or Black-naped Hare, in ones and twos, were also common on the lawn at night, and could be surprisingly noisy, but mostly in a rustling sort of way, compared to the steady chomping of the Gaur. Early mornings were a good time to spot a Barking Deer or two,



Ruddy Mongoose are characterized by an upward curling black-tipped tail



An Asian Elephant too large to fit in the frame, but instantly recognizable



Gaur or Indian Bison can weigh up to 1,500 kg



The tiny Mouse Deer is neither a mouse nor a true deer, but shares some characteristics with pigs



The Sambar is one of the largest deer in the world

quietly picking their way through the rough forest grass that started beyond the lawn.

Most thrilling were the occasional sounds of elephants crashing through the forest at night, tearing up grass and snapping branches, vocalizing in deep rumbles or trumpeting across the hills. Less frequently, they could be spotted returning uphill in the early morning, after a night-time raid on the Jackfruit trees lower down the slope. Other intermittent night visitors were the Indian Wild Boar, usually keeping well out of sight below the retaining walls

to rootle around in the compost heap, but also, on one or two memorable occasions, working over the lawn to leave it like a freshly ploughed field to greet us in the morning.

After a while, we were convinced that there must be other, more wary animals out there, going about their business at a safe distance from human activity. We decided to invest in a covert camera (with an infrared flash for night pictures), and thought it would be an interesting project to carry out a systematic survey of the whole five hectares. Not being trained

biologists, we resolved nevertheless to do our best as enthusiastic amateurs.

We divided the area on a map into seven roughly equal plots, and aimed to deploy the camera in each plot for a week. We thought it would be easiest to survey in dry weather, so we started at the end of the winter monsoon, and continued for seven weeks over January and February; the temperatures ranged from about 11 °C at night to 32 °C during the day.

We tried to place the camera as close to the centre of each plot as possible, which depended on the availability of



The Black-naped Hare is common in the Nilgiris and other south Indian hills



Indian Porcupine deploys its fearsome quills by running backwards at its enemies



Sloth Bear typically feeds on termites



Small Indian Civet shows off its distinct markings

a good tree to mount the camera, type of terrain, and our judgement of where a likely animal trail would pass. Each week, we would collect the camera's memory card, fit it with a fresh one, and shift the camera to the next location. We would then hurry home to view the pictures of the week, with a field guide to Indian mammals close at hand.

We were fascinated to discover that our land was full of Common Palm Civets. They had been captured a number of times from almost every plot. Of course, we couldn't tell whether we had many of them, or just

one or two who moved around a lot! Porcupines were also fairly ubiquitous across the land – not totally unexpected as we had already found a few quills here and there on walks.

It was surprising to see that in addition to the Barking Deer, we also had the tiny Mouse Deer, which seemed active only at night. Most of the Mouse Deer pictures were from the one plot area that had a large Lantana thicket, which presumably gave good cover to this shy mammal. There were also a few pictures of hare, wild boar, and the common Bonnet Macaques. Least

anticipated were pictures of Ruddy Mongoose, single and in a pair, with their bright inquisitive faces, and jaunty black-tipped tails. And of Sambar – it was lovely to think of these majestic deer stalking through the trees not too far from the house. Even more exciting were pictures of the Indian Wild Dog (Dhole), with their glossy rust-red pelts and broad heads. It made sense – with all the deer around, there would also be at least a medium-sized carnivore.

But the most astonishing capture was of a large, shaggy Sloth Bear! People shook their heads and refused to



believe us, and residents of the village nearby denied ever having seen such an animal in this area. This sighting of course had serious implications, as we had heard about Sloth Bear attacks in other parts of the country. We now had to take precautions when going for walks, or when arranging for labour to clear firebreaks around the boundaries of the property.

In all, we had detected 13 mammal species, of which three – Sloth Bear, Sambar, and Gaur – are listed as Vulnerable species in the IUCN Red List, while the Dhole and Asian Elephant are Endangered.

We repeated this survey, using the same methods, the following year, and added a feline to the list – the diminutive Leopard Cat – in addition to the Small Indian Civet.

While these results have been of great interest to us personally, and to our friends living nearby, it is possible that similar species listings might be of some worth to the wider public, or to various government departments, such as forestry and tourism. While large-scale controlled surveys are usually undertaken by universities, forestry departments, or conservation bodies, less formal and smaller-scale surveys like ours



▲
Left:

The nocturnal Common Palm Civet will sometimes sleep away the daylight hours in roof spaces or attics

▲
Right:

The Common Palm Civet is also known as the Asian Palm Civet or Toddy Cat

◀

A group of Indian Wild Boar caught in the first rays of dawn



◀ The Indian Muntjac or Barking Deer has the lowest chromosome number of any mammal ($2n=6$ in females, 7 in males)

could also provide data and information of value and interest.

Land outside the shelter of reserve forests, sanctuaries, and national parks will always be vulnerable to development and exploitation, with wildlife suffering consequent habitat loss and fragmentation. But data such as ours show that a fascinating array of animals can be found beyond the bounds of these protected areas. This information could be used to persuade private landholders to adopt conservation friendly land-management strategies.

Owners of plantations, large farms, or resorts could be convinced to set aside modest areas of their land to be left in a relatively natural state. These would be valuable for supporting populations of small animals, or for providing forage or corridors for larger ones. Our survey shows that even lightly forested sites adjoining agricultural and plantation land can sustain

an exciting variety of wildlife, whose existence would likely be threatened by further development. In this way, relatively small-scale local action could make a welcome contribution to the national effort to conserve the natural habitat and ecosystems of the Western Ghats.

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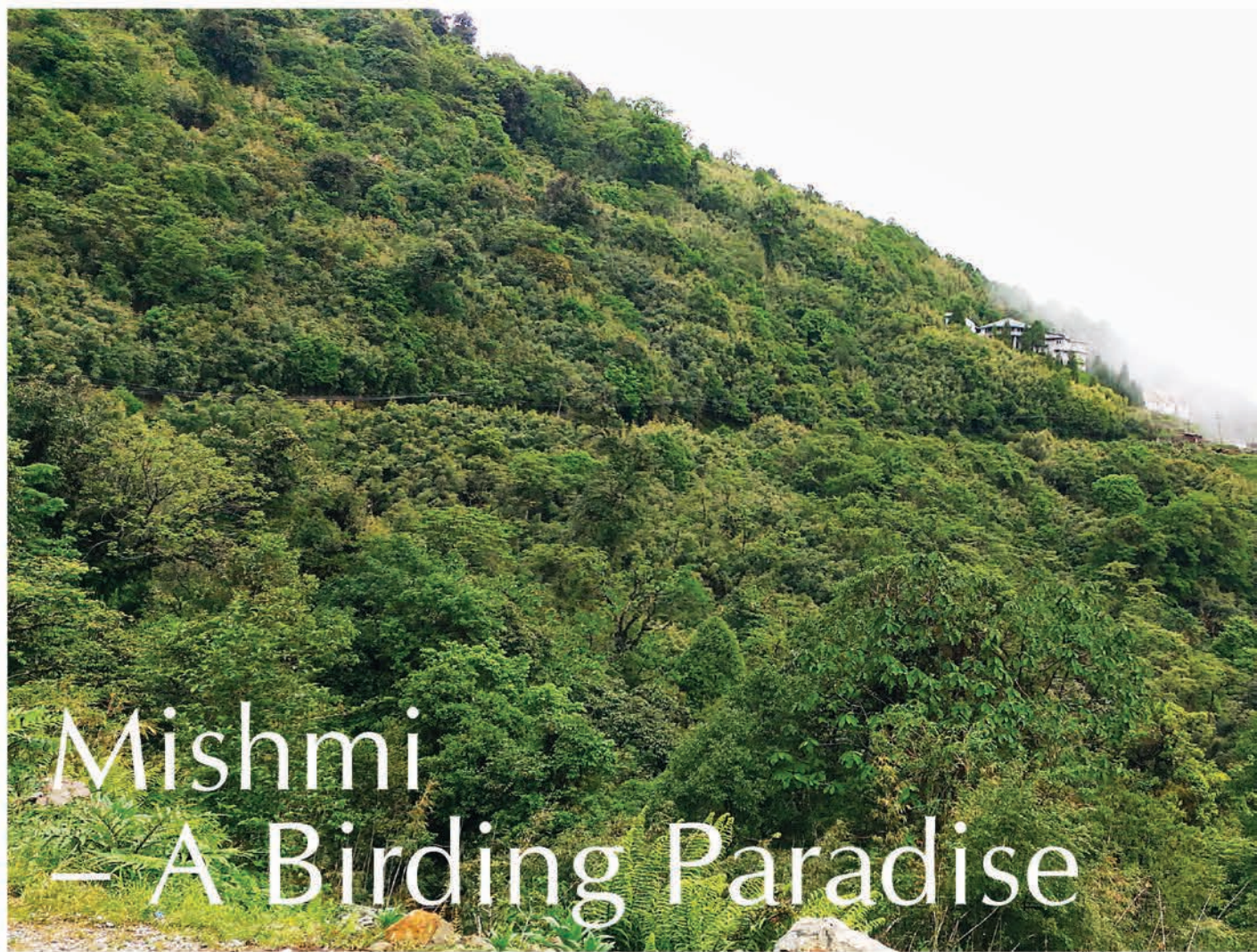


Luxshmi Soundranayagam's background is in cognitive psychology. Her research interests include adult education and accessibility in science education.



All the world is a laboratory to the inquiring mind.

– Martin H. Fischer



Mishmi — A Birding Paradise

Text: Ram Gopalakrishnan

Mishmi, the name sounds mysterious. When I signed up for a birdwatching trip to the Mishmi Hills in eastern Arunachal Pradesh, the main attraction was to go where few had gone and see species that few had seen, but some sights were disturbing.

We started the six-hour drive from Dibrugarh airport to Roing in Arunachal Pradesh, the base camp for Mishmi. Our Scorpions crossed a few small tributaries of the Lohit and went cross country over the dry riverbed in a manner I wouldn't dare with my own Scorio – the advertisement for

“the mighty muscular Scorio” must have been shot here! Finally, we were ferried across the main river where a bridge was being furiously constructed, which promised to bring much needed development, alas, along with ecological destruction to Arunachal. As Jayanta Manna, our birding guide, said: *Bridge banega, Mishmi jayega.*

In the evening, like a good pupil I hurriedly refreshed my memory on higher altitude Himalayan birds. I did not want to hear our group leader's stinging comment “What, Doc! Forgot the bird already? We saw it so clearly in ...” Strange and mysterious names like



Dense forest flanks the road to Mishmi hills



Grey-chinned Minivet

liocichla, minla, fulvetta, and niltava lulled me into a deep slumber. Birding exotica was to start tomorrow.

Off to the mysterious Mishmi Hills

I pulled out Dad's altimeter, a vintage instrument purchased 20 years ago that reads only in feet, once we started from Roing. Most parents give their children blessings when they set out on a long journey: Dad instead always put his altimeter into my pocket when I set off for a high altitude destination! Guess he got his nature-loving genes from his mother, who was a birdwatcher sans binoculars half a



Bar-throated Minla



NIKHIL BHOPALE

Black-eared Shrike-babbler



NIKHIL BHOPALE

Scaly Laughingthrush



NIKHIL BHOPALE

Long-tailed Sibia

century ago! In fact, she presented me and my newly married wife our first bird book in 1989!

“Hoolock!” An excited shout proclaimed our sighting of India’s only ape as we rounded a corner. A blackish male with thick white eyebrows and a golden-coloured female were brachiating their way down the steep slope. The arboreal Hoolock population is declining rapidly because of habitat loss.

Breakfast was at Dibang Valley jungle camp, set up by Help Tourism, a company promoting sustainable tourism in the Northeast. Never had hot parathas

and *sabzi* with a cup of strong Assam tea tasted so good. We then headed up, birding all along the way towards Mayudia Pass. Flocks of yuhinas, tiny sparrow-sized birds with a Greek helmet-like crest, kept us enthralled: Whiskered, Rufous-vented, Striated, Stripe-throated, and Black-chinned were duly recorded. We were able to photograph the Beautiful Sibia (that is its name!) and the Long-tailed Sibia. A couple of us got excellent photographs of the Golden Babbler and the Bar-throated Minla, their appearance doing justice to their unique names. A buzzard

swooped just above us, leading to a heated debate as to whether it was the Himalayan or the Common. Fulvetta, babbler-like Himalayan endemics, were all around us: Manipur and Nepal (that’s how two of them were named, reflecting their area of predominant distribution), despite the former being commonly seen only in the Mishmi hills.

As we reached Coffee House, an incongruously named (as it had no connection whatsoever with coffee) but beautifully located government bungalow, we scrambled for warm clothing and unloaded our luggage in

the spacious rooms that were to be our home for the next two nights. Without wasting time, we headed for Mayudia Pass (at 2,655 m), where patches of snow mandated a cup of tea to keep our insides warm. While we discussed our new sightings, referring to an open bird book, one of us mistakenly pointed to the Snowy-throated Babbler, a globally threatened bird found only these parts. Our guide Jayanta immediately intervened, "Please take your hand off that bird!" It reminded me of the sharp comment an eagle-eyed temple priest would make if an entranced devotee were to inadvertently step into the sanctum sanctorum. Guess we were the devotees here and the bird book was Jayanta's temple.

Fog (actually just clouds at this high altitude) robbed us of an hour of evening birding, but it was a truly exhilarating experience walking through it in the cold. Now and then, bird calls would ring out tantalizingly close: the mournful drawn out whistle of a hill partridge, the high pitched whistle and chattering cackle of the aptly named Scaly Laughingthrush, and the shriek of the rare Pale-headed Woodpecker.

As we shivered in the evening cold, there followed a simple, piping hot meal of soup, dal, sabzi, chapatis, rice, and sweet curds (to which I couldn't resist adding delicious mango pickle to neutralize the sugar). I wonder why the very same menu tastes like a sumptuous banquet in cold weather in the lap of nature, than at the end of a stressful day at work.

The next day we arose at 4:00 a.m. with the hope that our luck would allow one glimpse of the charismatic Sclater's Monal, a large and, iridescent pheasant found nowhere outside the Northeast. Would the Gods smile on us and the weather hold? It was biting cold and

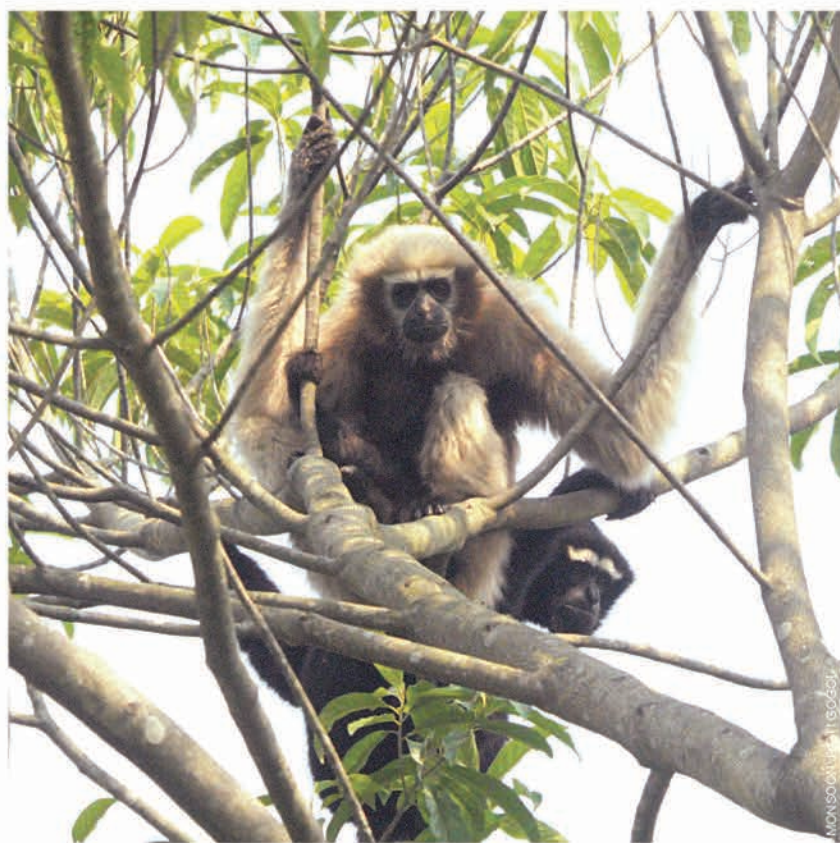
close to zero degrees outside. Who said birding is all fun and no hard work?

The view from the balcony at Coffee House

The rare Sclater's Monal evaded us. Apparently, since a dhaba was built at Mayudia Pass, its usual sighting spot, human disturbance has resulted in fewer sightings. We were told that there were three birds in the area; the rest probably succumbed to hunting, despite being inside Mehao Wildlife Sanctuary. I suspect this is true for most of the Northeast, where traditional tribal hunting has decimated bird numbers. I asked our guide why the bird was not on the Critically Endangered list of IUCN. Apparently, though I was not convinced, it's the rate of decline and not only absolute numbers that qualify a bird for that list.

We contented ourselves with sightings of some brilliantly coloured birds: Golden-breasted and Yellow-throated fulvettas, Black-spotted Yellow Tit, and Crimson-breasted Pied Woodpecker. The unmistakable Eurasian Wren *Troglodytes troglodytes*, with its tail sticking up at right angles like a periscope, made a guest appearance. Whoops of delight would occasionally emanate from one of the photographers on capturing the perfect image. Himalayan bird photography is a bit like a cowboy gun battle in the Wild West – you've got to have your gun (read camera) ready with all the correct settings and wait patiently while the tension builds up, and then get your shot in a split second before the tiny bird flits off.

Forget birdwatching, this place bears any hill station for ambience. The only sound one hears is bird calls, the air is fresh, and the view from the balcony of



Hoolock Gibbon, an Endangered species



Yellow-cheeked Tit



White-browed Shrike-babbler female

the forest bungalow is spectacular. On one side is a snow-streaked mountain, and on the other, rows upon rows of rolling hills all the way down to the plains. Watching sunset was the perfect stress buster, even if the only stress had been craning one's neck and peering through binoculars all day!

As the altitude falls, the bird count rises

Warblers are just about the most difficult birds to differentiate – they

are tiny, flit incessantly, and look frustratingly similar. I suspect most of us just skip the 10-odd warbler pages in the bird guide, just like some particularly obnoxious maths chapter in school. But not the Black-faced Warbler: this one has a stunning black and yellow face which is etched in my memory. A mixed hunting party which included the Orange-barred Leaf-warbler, Black-eared Shrike-babbler, Chestnut-crowned Warbler, and the Black-spotted Yellow Tit, kept us

enthralled for a good half hour. The endemic Mishmi Wren-babbler called loudly by the roadside, but being a skulker it only provided fleeting glimpses when it emerged from the dense undergrowth. The Rufous-breasted Bush-robin perched for a few minutes on the roadside, giving us a chance to snap it.

As we bid goodbye to Coffee House and headed to lower altitudes, our mood was elevated by a group of Alpine Accentors, which are high altitude specialists. A herd of Mithuns glowered at us as we drove past. Mithuns are domesticated gaur-like bulls that are let loose in a fenced area, and are eaten by the Mishmi and other tribes on festival days. On the way, we saw the Striated Laughingthrush and the Striated Bulbul, two very different but stunningly streaked birds, as well as the Grey-chinned Minivet and Red-tailed Minla. I had not seen the Mountain Bulbul, which the others had, and mentioned this to Jayanta. And presto, he stopped the car and showed me one! The best birders hear the bird call long before the bird comes into view, and that is what Jayanta had done. As we headed back to Dibang Valley jungle camp, a second Hoolock Gibbon sighting put a smile on everybody's face.

Last day in a troubled paradise

We woke up to a steady drizzle and fortified ourselves with an early breakfast of hot puris before setting off to nearby Sally Lake, a couple of hours behind schedule. Sally Lake has got to be the picture postcard lake in India. It beats the lakes of hill stations in southern India hands down, though ongoing plans to convert it into a tourist and picnic spot may change all this. We were there to see the rare White-crowned Forktail, but had to content ourselves with the Spotted and Black-

backed forktails. The intermittent drizzle throughout the day was a damper, but a flock of spectacularly coloured Silver-eared Mesias yielded good photographs. A first sighting of a member of the parrotbill family, the Grey-headed Parrotbill, lit up our faces. Our final bird count finished at 268!

But all is certainly not well in this beautiful land rich in nature's bounty. The road through the sanctuary was being broadened into a four-lane one to run all the way to Anini, the last town before the Chinese border. This was not just part of the government plan to bring development to the area but for national security – development ensures that China's claim to Arunachal is weakened. We saw a group of well-dressed Mishmi lads with guns get out of their car and shoot birds right on the highway, they definitely did not look like starving tribals desperate for some meat for the pot. We met them again an hour later, and they showed us their booty for their "festival": drongo, myna, leafbird, spiderhunter, a squirrel. Wanton slaughter or traditional tribal rights? Between the government and the "tribals", wildlife is caught between a rock and a hard place. All I can say is, head to Arunachal and see what you can before all the birdlife is gone.

My personal dictionary defines a vacation spot as one where there is no cell phone and email connectivity. We got back in range after four delightful days off the map and headed back home with enough memories, photographs, and lifers for a long time.

Till the next trip, that is! ■



Ram Gopalakrishnan is a physician based in Chennai. His interests include nature conservation, and writing about birding experiences in remote areas.



Orchids



Sally Lake, a natural waterbody

Reviewed by: **Asad R. Rahmani**

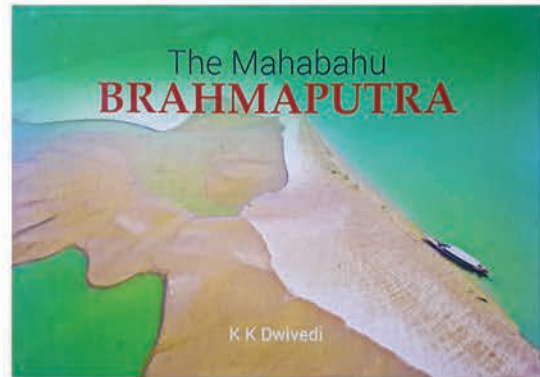
How can you describe a river that is 2,897 km long, starts at 5,210 m in a glacier, flows through the two most populous countries in the world, joins another mighty river – Ganga – to form the largest delta in the world consisting of 60,000 sq. km, has five to six names, and practically engulfs all rivers of Assam in its fold. It is also the only major river in India with a masculine name, Brahma+putra, the son of Brahma.

As the jacket of the book succinctly states “The Brahmaputra is not a just geographical entity, it is a river of myth, mystery, and legends revered by the Hindus, Jains, and Buddhists, its civilizational flows have shaped the way of life of millions of people on its banks.”

K.K. Dwivedi, an IAS officer and a top bureaucrat in the Assam Government, loves nature and flowing water in particular as he grew up on the confluence of the revered Ganga and Jamuna near Allahabad. By sheer coincidence, his first posting was in Goalpara town located on the bank of Brahmaputra river. While he was posted in Dibrugarh, another town close to this mighty river, he frequently visited Dibru-Saikhowa National Park, resulting in a fine book on this neglected Park. This book shows his deep love and respect for this life-line of Assam. The book is peppered with interesting details and issues that only an intellectual like Dwivedi can appreciate.

Dhritiman Mukherjee has changed the narrative of Indian wildlife photography. Imagination is the only limitation to his forte. He has photographed underwater, overwater, stood neck deep in water, flown on a hand-glider and two-seater aircraft, used drones, and lain on wet soil to get the perfect shots for this book. His images of the Deccan Mahseer and Long-whiskered Catfish have set a new standard for wildlife photography in India.

K.K. Dwivedi is also an excellent photographer – nothing escapes his eye, be it a nymph of a stink bug or a red-turbaned priest pointing out the famous Kamakhya temple in Guwahati, or the under-construction Dhola-Sadiya Bridge. The book is sprinkled with nuggets of knowledge – which even I was unaware of, despite having visited Assam and



The Mahabahu Brahmaputra

by K.K. Dwivedi (Editor) and

Dhritiman Mukherjee (Photographic Director)

Published by: Flood and River Erosion Management Agency of Assam, Guwahati, 2016

Size: 24 x 34 cm

Pages: 145

Price: Rs. 2,000/-

Hardback

Brahmaputra numerous times in the last 30 years. Some of these are: the late Bhupen Hazarika, poet, singer, musician, writer, and film-maker has written and sung 100 songs on the Brahmaputra; between 1912 and 1998, a total area of 85 sq. km of the famous Kaziranga National Park suffered erosion along the 53-km length of the Brahmaputra that flows through the Park; and that this river is called Mahabahu Brahmaputra in Assam, hence the name of the book.

Dr Farzana Begum, an anthropologist in the Directorate of Assam Institute of Research for Tribal and Scheduled Castes, Guwahati, writes about the cultural diversity, while Dr Kashmira Kakati describes the wildlife of the region. Plants are covered by Dr Pranab Bujarbarua, and Dr Ranjita Bania showcases the fish fauna that is so unique to this waterscape. Other contributors are Dr Parusottam Nayak, Professor, Department of Economics, North-Eastern Hill University, Shillong, and Dr Udayan Borthakur, a conservation geneticist from Aaranyak, the well-known NGO of Assam.

Flood and River Erosion Management Agency of Assam (FREEMA) must be congratulated for bringing diverse people together to produce such a wonderful book on one of the mightiest rivers of the world. ■

We are grateful to

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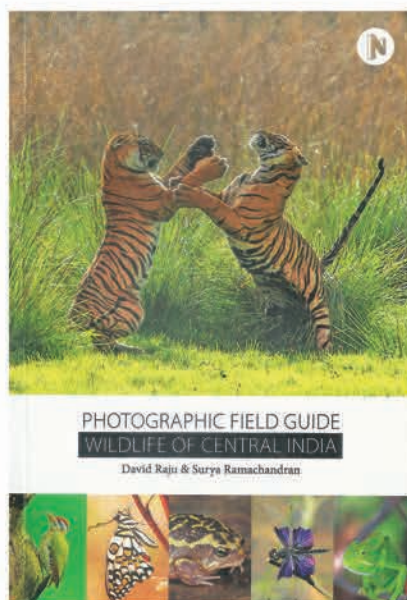
to support the publication of *Hornbill*

Reviewed by: **Parveen Shaikh**

The Central Indian landscape is famous for the Royal Bengal Tiger and its iconic tiger reserves, Bandhavgarh and Kanha. Whenever people think of Central India, they focus on sighting the majestic tiger, but the book **PHOTOGRAPHIC FIELD GUIDE – WILDLIFE OF CENTRAL INDIA** by David Raju and Surya Ramchandran reveals that the Central Indian landscape has much more biodiversity beyond the big cats.

This book is a compact field guide that covers a wide range of taxa from mammals to insects. There are 75 mammal species including bats and other 'prominent' taxa, 433 birds, 156 butterflies, 84 reptiles, 18 amphibians, and 84 dragonflies and damselflies, covered in this field guide.

The book contains brief descriptions (with a map) of the protected areas of Central India and their surrounding areas, accompanied by details of the



**Photographic Field Guide
– Wildlife of Central India**

by David Raju and Surya Ramchandran

Published by: Notion Press, Chennai, India,
2016

Size: 22 x 15 cm

Pages: 300

Price: Not mentioned

Paperback

topography, rainfall, and vegetation. Every section begins with a brief description of its respective taxa with a diagrammatic representation of the anatomy and identification key that make the book user-friendly. Each taxa section is colour coded, which makes access to a section easy.

The species descriptions are brief and crisp, covering physical identification and field characteristics, with good quality images. Behavioural notes, IUCN status notes, and best viewing localities have been provided for some species. The book lists some popular wildlife titles for further reading and additional references providing further details about a certain species or taxon. The checklist provided at the end for all the groups is a thoughtful addition, rather than keeping blank pages for notes.

Overall, both the authors have done a great job in compiling so much content for this book. It is a good single replacement to multiple field guides, especially when travelling to a wildlife destination in Central India. ■

ABOUT THE POSTER

Amboli Bush Frog *Pseudophilautus amboli*, is a critically endangered species of bush frog endemic to the Western Ghats areas of Maharashtra and Karnataka. It is a small frog – females are 37 mm and males are 34 mm.

Amphibian eggs lack a hard shell and are termed as amniotic, composed of jelly-like layers that protect the embryo from desiccating. Due to the absence of an outer hard shell, the eggs must be placed in water or require moist conditions to prevent them from drying out.

In most frog species there is a free-living larval stage (tadpole). However, in the bush frogs this stage is eliminated. Instead, there is direct development, i.e. once the eggs hatch, miniature versions of the adult emerge from each egg. There can be many reasons for this habit, including the elimination of competition in the breeding space. Completing metamorphosis inside the egg is of advantage to these frogs. It helps them cope with dry spells during the



Amboli Bush Frog eggs

monsoon – tadpoles cannot survive in the absence of water and development within the egg requires less water. Such adaptations might be the reason behind the evolutionary breeding success of some species. ■





Amboli Bush Frog (eggs)
Pseudophilautus amboli

The Sea Slugs

Text: Deepak Apte



Deepak Apte, Director BNHS is a scientist of international repute, his specialization is in marine ecology.

Opisthobranchs or sea slugs are soft-bodied, highly colourful, and diversified molluscs. Apart from their bright colours, they have a variety of body ornamentation such as flaps, tubercles, and tentacles. Most of them lack a shell, unlike most other groups of terrestrial or aquatic molluscs. The lack of a shell makes them more mobile. These tiny animals have developed chemical defences, secreting a variety of acids, toxins, and stinging cells acquired from their food to deter predators. Most sea slugs are carnivorous and nocturnal.

Opisthobranchs are known to occur in all marine ecosystems. From tropical warm to cold temperate waters, these creatures pervade the world's oceans. However, tropical waters are where their diversity is the highest. Of the 6,000 odd species known worldwide, about 400 species are repeated to occur in India. Many of the species are widespread,

while many others have restricted distribution. An interesting species, *Sakuraeolis gujaratica*, is site endemic to the Gulf of Kachchh and its current known global distribution is confined to a small 300 sq. m inter-tidal area. The smallest sea slug found in India is *Siphopteron tigrinum*, which is about 3 mm long, while the largest is *Hexabranhus sanguineus* that grows up to 550 mm.

Usually found in pairs, but large congregations of opisthobranchs are not uncommon (e.g. *Haminoea* or bubble shells).

Sea slugs have adopted several interesting modes of self defence such as autotomy (casting off body parts), release of ink clouds, chemical secretion, body colour, and deimatic (threat) display. The most interesting part of their life cycle is, however, their host-specific

association. Aeolids spend their entire life cycle on hydroids, and dorids on sponges. Sacoglossans are found on marine algae, while the genus *Okenia* is a bryozoan associate.

Under the All India Co-ordinated Project on Taxonomy, BNHS has worked extensively on sea slugs. The decade long studies have resulted in more than 150 new records to India, and work is in progress to describe a few new species. FIELD GUIDE TO THE SEA SLUGS OF INDIA, a BNHS publication, is an effort to illustrate Indian sea slugs for use by researchers and amateurs. Seen here are some attractive and colourful specimens featured in the book.





***Halgerda stricklandi* Fahey & Gosliner, 1999**

The dorsum is covered with large, bright, orange-tipped, conical tubercles. Below each orange tip, the tubercles have an opaque white band. Rhinophore club is translucent white. The anterior side of the club also has black pigmentation. Gill with black spots on the anterior side of the four branchial leaves. The foot has an orange margin. **Size:** 35 mm.

Distribution in India: Andaman Islands.



RAFI AMAR

▲ ***Bornella anguilla* Johnson, 1984**

The mantle has a mosaic of orange, brown, and white spots against a black reticulate background. Each of the six pairs of cerata and the rhinophoral sheaths possess a distinctive flap with black, white, and orange streaks. A series of cerata-like structures are present on each side of the elongate body, which are formed by an association of secondary gills. They swim sinuously like an eel, and feed on hydroids of the genus *Plumularia*. **Size:** 80 mm. **Distribution in India:** Andaman and Nicobar Islands.

***Cyerce elegans* Bergh, 1870**

This sea slug has a translucent white body with large flattened leaf-like cerata that are easily cast off if the animal is disturbed. The cerata and rhinophores bear white spots, while blue spots are seen only on the cerata. **Size:** 40 mm. **Distribution in India:**

▼ Lakshadweep, Andaman and Nicobar Islands.



AL HERJOSILLO MCKOWEN



▲ ***Goniobranchus kuniei* (Pruvot-Fol, 1930)**

Body dark yellow with purple and blue marginal bands. The mantle bears numerous black spots surrounded by fluorescent blue colour. The basal half of the rhinophores is non-lamellate and translucent with white specks, while the upper half is lamellate and light brown. Gills are light brown. **Size:** 40–55 mm. **Distribution in India:** Islands of South Andaman.

▼ ***Janolus toyamensis* Baba & Abe, 1970**

This translucent brown sea slug possesses numerous long and slender cerata. Each ceras is translucent with white lines and orange cap, and has a branched digestive gland. Rhinophores are papillate, having white lines and orange markings. Cerata are shed instantly with the slightest disturbance. **Size:** 40 mm. **Distribution in India:** Gujarat (Gulf of Kachhh).





▲ ***Hypselodoris tryoni* (Garrett, 1873)**

This sea slug is coloured dark tan with black spots, each black spot encircled with a white border. A blue marginal band is clearly visible. Rhinophores are lamellate with light purple stalks. Gills are light brown with the outer margin of the gill lamellae possessing a dark brown band. **Distribution in India:** Andaman and Nicobar Islands.

***Unidentia angelvaldesi* Millen & Hermosillo, 2012**

Light purple-pink body with numerous long and slender cerata. Rhinophores are long, slender, and orange-pink in colour. Oral tentacles are deep purple in the basal half, whereas the upper half is white. Cerata are orange with subapical purple band and white apex. The species is associated with hydroids. **Size:** 30 mm. **Distribution in India:** Maharashtra (Ratnagiri).





▲ ***Sakuræolis gujaratica* Rudman, 1980**

An elongated pale orange body, long and slender oral tentacles, and five sets of cerata on the body are distinct features. Tips of the rhinophores and cerata are deep orange. Digestive gland inside the cerata is deep violet. Oral tentacles are also orange. Size: 50 mm. Distribution in India: Gujarat (Point Endemic to Gulf of Kachchh).

▼ ***Miamira sinuata* (van Hasselt, 1824)**

The base colour is bright green, and the entire body is covered with yellow and blue rounded tubercles. Rhinophores are dull brown-green with scattered white spots. Gills are translucent white with a brown line on the outer margin of the gill rachis. The anterior part of the mantle is trilobed, the central lobe being the largest. Size: 50 mm. Distribution in India: Andaman and Nicobar Islands.





DEEPAK APTE



DEEPAK APTE



BARBARA BINI (LOVE BUBBLE SOCIAL DIVING)

▲ Left:

***Haminoea ovalis* Pease, 1868**

A brilliantly coloured sea slug, with a fragile and transparent shell. The base colour is light green with orange spots encircled by a light green band. The mantle and foot also bear deep blue spots. The foot is short with orange and blue spots. **Size:** 30 mm.

Distribution in India: Gujarat, Andaman and Nicobar Islands.

▲ Right:

***Eubranchus mimeticus* Baba, 1975**

This animal is transparent yellowish-white. The cerata are slender, orange in colour with a purple-blue tip. Oral tentacles are purple-blue with white tip. Rhinophores are basally orange or white, with purple-blue and white tips. The head region has a purple-blue band. Egg case a frilly horseshoe-shaped ribbon. **Size:** 20 mm. **Distribution in India:** Maharashtra (Ratnagiri).

▲

***Hexabranchus sanguineus* (Rüppell & Leuckart, 1830)**

This slug is commonly called 'Spanish Dancer'. It is one of the largest nudibranchs, growing up to 55 cm, and an active swimmer. The species shows colour variation, with the adult and juveniles looking completely different. **Size:** 550 mm. **Distribution in India:** Lakshadweep, Andaman and Nicobar Islands.

Some Interesting Bird Notes

The first time I saw the Crested Treeswift was in January 2015 while birding in Tamil Nadu. At that time, it was difficult to see it on a perch. Then came the Pongal Bird Count in Tamil Nadu, when for three days birders of each district went into the field to record their observations. During one of these days, a team led by me went to the Grizzled Squirrel Sanctuary, where I was lucky to spot a pair of Crested Treeswift sitting close to each other. I had no idea then that the male was sitting on the nest, but was later told so by my wildlifer friends.

I decided to visit the sanctuary again after 15 days and was happy to sight a



young at the nest. I photographed it but could not get a 'feeding shot'. The next weekend, I went again to the site, hoping to click pictures of the treeswift being fed by its parents, as not all get a

chance to see such a wonderful incident. We waited for nearly 1.5 hours, at a good distance, for both the parents to feed the chick, after which we returned home happily. No one else knew about the place except the team, and by about two more weeks, the chick fledged. I have recorded the pair nest on the same branch for three continuous years, and am eager to repeat the experience in 2018.

I have recorded more than 130 species of birds in the Grizzled Squirrel Sanctuary. Another especially interesting sighting I had was a female Common Iora feeding the chick of a Banded Bay Cuckoo. The Grizzled Squirrel Sanctuary is a place where you get to see rare sightings, and more interesting 'stuff' like I got if you have the luck. ■

Sharan Venkatesh
Tamil Nadu

A Pelican query

During one of my birding trips I noticed a pelican invert and stretch its pouch. I know that pelicans scoop fish into their pouch, then tip it back to drain out water before swallowing the fish. But I had never observed pelicans with inverted pouch earlier and am intrigued by this behaviour.

I have read that pelicans do this to give strength to the pouch and keep it supple. Is this true? ■

Jaysukh Parekh
Gujarat



An expert's response...

Globally, there are eight species of pelicans, of which three, Dalmatian Pelican *Pelecanus crispus*, Great White Pelican *P. onocrotalus*, and Spot-billed Pelican *P. philippensis* are found in the Subcontinent – the first two are migratory, while the third is resident. Pelicans are unmistakable due to their large gular pouches, which they use for fishing.

At times, these birds are seen extending their bills up and stretching the pouch; these movements are referred to as the "yawn" or the "bill throw". The bill throw is followed by the bird opening its bill and lowering its head on to the shoulder and the neck in a tight curve, stretching the neck so that the glottis is exposed and pressed into the gular pouch like seen here in Dalmatian Pelican *Pelecanus crispus*.

These two movements are separate behaviours, but are usually seen being performed together. The purpose of these actions is to stretch the gular pouch and to "arrange" the oesophagus (food pipe), trachea (wind pipe), connective tissues, and air sacs system of the throat and upper breast. Though these behaviours are leisure and comfort movements, they are also observed when the bird is disturbed. These behaviours have been recorded elaborately in one species of family Pelecanidae, Brown Pelican *Pelecanus occidentalis* in a paper by Ralph W. Schreiber, in *Ornithological Monographs* No. 22 (1977). ■

Asif Khan
Mumbai, Maharashtra



An epic battle between two nilgai bulls

Text and Photographs: **A.J.T. Johnsingh**

“**T**he short weapons of ungulates such as the horns of mountain goats, tusks of wild boar and the canines of the barking deer are deadlier weapons of offence than the ornate long horns of blackbuck and the antlers of deer.” This was the essence of the views of Professor Valerius Geist, a renowned authority on ungulates, when he discussed these ideas with me during his visit to Bandipur Tiger Reserve in the late 1970s, while I was carrying out my research on dholes. One Indian ungulate

that uses its horns very effectively against its opponent is Nilgai. The male has sharp horns, which can be about ten inches long; S.H. Prater in *THE BOOK OF INDIAN ANIMALS* gives a maximum measurement of 11¾ inches.

In April 2013, I was invited by the Mysore Zoo Director Mr. B.P. Ravi to give a popular talk to the zoo personnel, as well as to the public. After the talk, he took me around the Zoo and I was pleasantly surprised to see nearly 80 Nilgai in his exhibit. As they were breeding well, he had kept most of the

males in a separate enclosure in order to control the population. As a result I noticed that a large number of males had bleeding wounds due to infighting. I have observed Nilgai in many places in north India, more often in Sariska Tiger Reserve, and have observed the threatening, intimidation, and submissive displays between bulls.

The threat display of Nilgai had already been discussed in 1958 by Fritz Walther, the celebrated antelope behavioural specialist, based on his observations of captive Nilgai in



Two adult Nilgai bulls fighting in Rajaji Tiger Reserve, February 2017

Germany. George B. Schaller, world renowned conservationist, explains this behaviour in his book *THE DEER AND THE TIGER*: “A threatening bull characteristically stretches his neck and head horizontally, making the tuft of hair on the throat conspicuous, lays the ears back in such a way that the black and white pattern on their insides is exposed and either presses the tail close to the body or horizontally. While on an intimidation display, the bull holds his neck erect, tucks his chin in, humps his back and raises his tail

vertically as he stands broadside to the other bull or slowly circles him with a stiff-legged gait, head slightly averted and the eyes turned so as to make their whites visible.” I observed a case of submission display of a sub-adult bull to an adult bull in Sariska Tiger Reserve. The former sat on its belly with its forelegs folded beneath, and with its muzzle repeatedly butted the chin of the adult bull that stood erect with an extended neck.

The epic battle photographed and discussed in this article happened

around 11:00 hrs on February 6, 2017 in the Beribara Range of Rajaji Tiger Reserve. The occupants of the vehicle besides me were George Schaller, A.R. Rahmani, and G.S. Rawat, along with Bivash Pandav of the Wildlife Institute of India who drove the vehicle. The two bulls were already fighting when we came on the scene and the fight was being watched by six adult female Nilgai. The force of the fight pushed the two muscular bulls across the broad fire line. Both pressed and pushed each other with the neck. Blood on the face, pinnae, and neck, and a deep wound on the upper part of the neck on the dorsal side of one bull clearly indicated that they had been stabbing one another with their horns for quite some time.

After our arrival close to the scene, the fight lasted maybe a minute or so, and meanwhile, five of the females ran away from that place, leaving one watching the fight. Maybe she was the one in high levels of estrus, for which the battle had begun. The vanquished nilgai ran away, keeping its tail down, and the winner chased it for a short distance, all the while keeping its tail erect. As this battle was fought in February, one can surmise that active rut in nilgai could be in winter. When all the nilgai dispersed in different directions, we left the place, fervently hoping that the ugly wounds would not be lethal to the combatants.

Postscript: A more detailed account on Nilgai, the largest antelope in Asia, is by K. Sankar and A.J.T. Johnsingh, and is one of the chapters in *Mammals of South Asia*, Vol. 2, 2015, Universities Press, Hyderabad. ■



A.J.T. Johnsingh is associated with Nature Conservation Foundation, Mysore, WWF-India, and Corbett Foundation.

Desert mantis dancing on *magra*

Text and Photographs: **Dharmendra Khandal**

On a sunny March morning, I was following a very special desert bird, Greater Hoopoe-Lark *Alaemon alaudipes*, in the Thar Desert of Rajasthan. It was running or walking in spurts, probing and chasing prey. The bird was cautiously probing and digging the ground for insects on the *magra*, i.e., the hard, gravelly, compact ground

surrounded by sand dunes in these parts.

The bird had failed in all its attempts but after some 15 efforts, it succeeded and before I could make out the prey species, it swallowed the prey in a jiffy. I did manage to click some photographs that could be checked on later; but through my eyes, I could only see a few large legs of the insect, as its body was hidden under the bird's beak. I thought it was a large spider or a camel spider (solifuge), but then both of these are active only in the night. The next evening, when high winds were blowing, I noticed a stone-like object 'surfing' over the same *magra*. It was sliding against the direction of the wind, and seemed more like an insect. I moved out of my jeep and went close to check, and was surprised to see the amazing camouflage ability of this insect that looked like a rough pebble. I could not make out what it was till it showed a defensive gesture. It was the same insect that was devoured by the Greater Hoopoe-Lark.

The insect was the Thar Desert Mantis *Eremiaphila rotundipennis*. This desert mantis is able to camouflage itself so well in its habitat that it is almost impossible to spot, even when it is right in front of you! When it senses a threat, it raises its humanoid face. The triangular head, with its grasping



The Greater Hoopoe-Lark with its prey



Praying mantids can successfully merge into the background, which is useful for both attack and protection

forelegs, colourful ventral side of its vestigial wings, and threat posture, make it look like a praying mantis. Unlike other mantis (approximately 2,000 species, almost all inhabiting the tropics), desert mantids are unable to fly. The word mantis comes from the Greek *mantikos*, for prophet. Indeed, these insects do look spiritual and mysterious, especially when their forelegs are clasped together as if in prayer.

Desert mantids belong to the genus *Eremiophila* Lefebvre, 1835 (Eremiophilidae), which has 68 species in the world, with only one found in India. These mantids are perfectly adapted to life in desert and semi-desert habitats. They live on the ground, where their long walking legs make very fast running possible. *Eremiophila* feeds on other insects, for which it actively hunts. Desert is characterized by extreme conditions with scarcity of water, low rainfall, high-temperature fluctuations, and dust storms. There is scarce vegetation and animal life. Desert mantids are representatives of such harsh conditions, wherein a primarily arboreal, flying creature has become a ground-dweller.

In the Thar, as my observation shows, our Desert Mantis has a great connection with another very interesting bird, the Greater Hoopoe-Lark. So, whenever you see this bird hopping around on *magra* in the deserts of Rajasthan, look out for the desert mantis. ■



Dharmendra Khandal is working as a Conservation Biologist with Tiger Watch in Ranthambhore. He is also involved in reform of a traditional hunting community, the Mogya.



Unlike other mantids, desert mantids lack the ability of flight



These mantids are well-adapted for surviving in desert and semi-desert habitat

The Orb-Weaver Spider: why it eats its own web each day ...

Text and Illustrations: **Jennifer Gonsalves**



BNHS Mahuli Camp (5–6 September, 2015):

During our night trail at this camp, we saw grasshoppers, stick insects, locusts, a few crabs, a scorpion, and lots of spider webs between the trees. But what I found most interesting was a spider spinning its web in the night. The web was half complete and the spider was moving between two circular threads spaced about an inch apart, filling the gap with more closely spaced threads, forming an intricate web with absolute precision.

On the next morning's trail, we saw a similar large web between two trees. As we were looking at this magnificent web, we noticed that the web began disappearing, from the downside upwards, as the spider undid the entire web within a few minutes. This made me curious as to why a spider would undo its own creation after having put in the effort to make it? I gathered some information on this, which I would like to share.

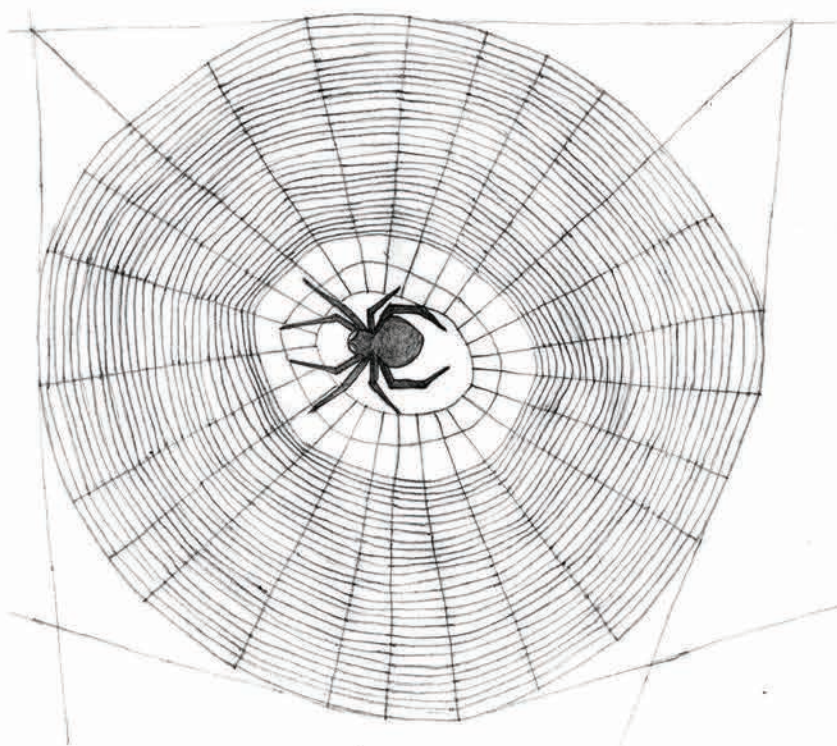
A spider web is created from the silk produced by a spider with its spinneret glands, which are located at the tip of its abdomen. Most spiders have three pairs of spinnerets; some have just one pair, and others as many as four pairs. Each spinneret gland produces thread for a special purpose – for example, a trailed safety line, sticky silk for trapping prey, or fine silk for wrapping it. Spiders use different gland types to produce different silks, and some spiders are capable of producing up to eight different types of silk during their lifetime. A spider's web is an efficient method of gathering food, as the web traps prey and allows the webmaker to catch prey without having to go after it.

The spider releases a sticky thread that gets blown by the breeze. The breeze carries the silken line to a spot where it sticks, forming a bridge between two objects (e.g., between branches of a tree or two trees). The spider carefully walks along it and strengthens it by laying a second line. This process is repeated until the thread is strong enough to support the rest of the web.

After the first horizontal line, the spider makes a loose thread and constructs with a second thread a Y-shaped line. These are the first three radii of the web. Then, a frame is constructed to attach the other radii to it.

After all the radii are complete, the spider starts to make the circular threads. First, non-sticky circular construction threads are made. The distance between the threads is wide enough for the spider to span the width with her legs.

Finally, sticky thread is woven between the circular threads. While attaching the sticky thread to the radii, the construction thread is removed by the spider. Then the web is completed with non sticky radii and sticky circular threads, and the spider rests and sits in



Spiders that weave orb-webs, i.e., circular webs, are generally known as orb-weaver spiders

the centre of the web with her head down. While the prey gets trapped in the sticky threads, the spider uses the non-sticky radii to move carefully around the web.

After a night of hunting, the web becomes worn out. The spider removes the silk in the morning by eating it, only leaving the first bridge line. It rests during the day time and then constructs a new web in the evening.

Since the spider's silk is made of protein, all this web weaving requires considerable amounts of protein. A nice protein-rich insect may not get trapped in the web every day. Also, after a time, the silk threads in the web lose their stickiness and become inefficient at capturing prey. Hence, it is common for spiders to eat up their own web daily to recycle the silk proteins. The protein from the old silk is never wasted from the spider's digestive system; it goes to the silk glands to be utilized to make a new web. Even if a spider misses a few

meals, it can still go on spinning webs because of the efficient recycling that lets spiders conserve protein by eating old webs.

Nature is so amazing that such a small creature can construct its web with such precision using its own body as a measuring device; and after the purpose of the web is served, it recycles its resources and conserves energy for future use. ■

Suggested additional reading

https://en.wikipedia.org/wiki/Spider_web

http://ednieuw.home.xs4all.nl/Spiders/Info/Construction_of_a_web.html

<http://indianapublicmedia.org/amomentofscience/spiders-recycling/>



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Monitor lizards killed for a belief

— an insight into the illegal trade in *Hatha Jodi*

Text: Abrar Ahmed

Revelations from a recent seizure

During the first week of July 2017, a former Indian Customs Officer turned occult practitioner was arrested in Uttar Pradesh, under the Wildlife (Protection) Act, 1972, on charges of offering 25 '*Hatha Jodi*' for sale. The accused was arrested by the Wildlife Crime Control Bureau (WCCB), Wildlife Trust of India, and Forest Department officers from Sector 18, Noida, where he has three shops and a godown that allegedly dealt with banned wildlife products other than *Hatha Jodi*, with clients in the US, UK, and other European countries, besides



Captive Water Monitor *Varanus salvator* in Dimapur vegetable market, Nagaland



Hatha Jodi, an animal derivative, is universally advertised as a rare sacred plant root collected from remote areas of the Himalaya

within India. This seizure was part of Operation Wildnet that was launched by WCCB on May 1, 2017 to crack down on the illegal online trade in wildlife products, that ended up busting a major myth related to *Hatha Jodi* fraudulently marketed as a plant product.

The *Hatha Jodi* samples seized during the raid were sent to the Centre for Cellular and Molecular Biology (CCMB), Hyderabad, for analysis, which established that *Hatha Jodi* is not a plant root (as advertised) but the genitalia of the monitor lizard.

Unsuspecting customers, mostly from the Asian diaspora, had been tricked into buying *Hatha Jodi*, even via major online retailers such as Amazon, Alibaba and eBay, presuming it was a plant derived product.

Hatha Jodi

Hatha Jodi looks like the dried bark or root of a plant, but is actually the dried male sexual organ of the monitor lizard, scientifically termed hemipenis, the bifurcated male reproductive organ found in snakes and lizards. The trade name *Hatha Jodi* is coined from the

Hindi word *haath jod* meaning clasped hands. The hemipenis of the monitor lizard on first inspection looks like two hands clasped in prayer. *Hatha Jodi* is locally, nationally, and internationally advertised as a rare sacred plant root that is collected with great difficulty from remote areas of the Himalaya, especially Nepal, to hide the fact that it is derived from a protected animal species. Possession of *Hatha Jodi* is said to fetch enormous wealth and happiness if kept safely in one's personal place of worship or home, and if appropriately 'energized' by their magical virtues, it can change a person's life and fulfill all his desires.

The other items seized during the raid included *Siyar* or *Shyal Singhi*, a wildlife derivative from the papillae of Jackal *Canis aureus* and other small mammals, from the fleshy organ located on the upper side of the forefeet. My experience through several market surveys and interviews across India with occult practitioners, especially during my owl trade surveys in 2007 and 2008, revealed that several such wildlife products are marketed on religious grounds by shamans and tantriks, 'prescribing' them as fetishes/charms with supernatural powers with the



Bengal Monitor *Varanus bengalensis* being sold in Wardha, Maharashtra, by Phase-pardhis along with Rain Quails *Coturnix coromandela*



Hatha Jodi for sale in Kanpur, Uttar Pradesh



Monitor lizards for sale in Diphu vegetable market, Assam

capability of *vashikaran* (subjugation) over others, or to cast spells on others. Wildlife products such as *Shyal Singhi*, *Hatha Jodi*, and *Shalampanja* are all used as charms and propagated for fetishism. 'Fetish' originates from a Portuguese word *fetico* or *feitigo*, which means to hex someone. *Shalampanja* is the genital organ of Ganges Soft-shell Turtle *Aspideretus gangeticus*, which has five protruding parts (therefore also

called five-mouthed), and is believed to possess five supernatural powers!

During the surveys, I observed such fetishes/charms displayed coated with vermillion to give them a sacred appearance, and also to deceive enforcement officials from identifying it as of wildlife origin. In some tribal areas or small towns or villages, the high demands from clients with low budgets but strong beliefs translates

into fake *Hatha Jodi* – plastic or sieved flour and plaster of Paris, dyed orange, and moulded to look like the genitalia of the monitor lizard.

The Monitor Lizard and the *Hatha Jodi* Trade

Among the 79 species of monitor lizards found in the world, India is home to four species. These are the Bengal Monitor *Varanus bengalensis*, Water Monitor *V. salvator*, Yellow Monitor *V. flavescens*, and Desert Monitor *V. griseus*. All the Indian monitors are listed in Schedule I of the Wildlife (Protection) Act, 1972 and accorded the highest level of national and international legal protection, which entails that hunting and trade in any of these species is strictly prohibited. The Indian Water Monitor is listed in Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), while the other three species are listed in Appendix I, prohibiting any commercial international trade to and from India.

It was BNHS scientist Dr. Girish Jathar who, while documenting threats on the Forest Owlet *Athene blewetti* in Maharashtra in early 2000, first brought

up the issue of the *Hatha Jodi* trade for black magic to my notice. He recorded it being used by the tantriks of the area. *Hatha Jodi* is obtained by illegally poaching and killing monitor lizards.

A comprehensive TRAFFIC India study published in 2001 titled “*Badiya...*hunter gatherers of Doon Valley” by Jaideep Singh Walia is an eye opener to the extent of collection, trade, and utilization of more than 40 lesser known species of wildlife in northern India by the *Badiya* tribe. From civets to otters, lesser cats to canids, pangolin, deer and turtles, the monitor lizard is a major species harvested by this and other tribes for various uses. During his one-year study between 1999 and 2000, he documented a harvest of at least 233 Bengal Monitor by 40 *Badiya* families hunting around the periphery of Rajaji National Park, near Dehradun, Uttarakhand. During a recent study in 2015, TRAFFIC India investigators recorded up to 60 monitor lizards for sale in Tamil Nadu caught by the *Narikuruvur* tribe and kept well hidden in a dried well, tied by their legs.

During my wildlife trade survey across India between 2007 and 2012, I encountered a minimum of 200 live monitor lizards for sale in most Indian states, particularly in Nagaland, Assam, West Bengal, Bihar, Uttar Pradesh, Gujarat, Rajasthan, Maharashtra, Andhra Pradesh, Karnataka, and Tamil Nadu. The trade in body

parts was most prominent around railway stations, bus terminals, temples, courts, and old markets in Madhya Pradesh, Gujarat, Rajasthan, and Uttar Pradesh.

How monitor lizards are captured

A myth quite remarkably spread by the hunters about monitor lizards in most north Indian villages is that a bite of a *Varanus* lizard can kill a human. Because of this, the monitor, locally called *Vishkhopra* (meaning poison-headed), is much feared and most villagers help poachers detect and trap monitor lizards around their fields, and in the nearby forests.

According to Walia’s detailed research, the diurnal monitor lizards are hunted during the day when they leave their burrows in search of food. Usually a group of four to seven hunters equipped with dogs and spears go in search of these animals. The dogs detect the presence of monitor lizards hidden inside bushes. A well-trained dog can also enter the burrow, catch and drag the lizard out, or the hunters with the help of their dogs dig up the burrow and capture the lizards. Lizards climbing up a tree are forced to drop down by the hunter who climbs the tree and shakes the branches. The lizard falls off and is then caught with the help of the dogs. The eggs of the monitor lizard are also collected for food by digging up termite mounds during the rainy season.



Siya Singhi was spotted in a market in Kolkata, West Bengal

Utilization of monitor lizards

Studies, and seizures from time to time, have highlighted the trade in monitor skin, flesh, and fat. In southern India, especially in some villages of Tamil Nadu, this lizard is used in a variety of cures. For instance in Mettur, Paalamalai, and Seethamalai, the consumption of monitor lizard (locally referred to as *udumbi*) meat is supposed to be an instant cure for children with asthma and other respiratory problems. The monitor lizard’s head is dried with salt and turmeric to be used in a medicinal soup. The hide of the lizard is often sold to shoemakers. There are instances of seizures where monitor lizard biryani was being offered as a delicacy in some well-known dhabas in Tamil Nadu.

Although both male and female monitors are caught and traded for their meat, the male genitals are most sought after in the current wildlife trade



Bengal Monitor in Sohagi Barwa Wildlife Sanctuary, Uttar Pradesh

BALAJI SESHAN/TRAFFIC INDIA



Bengal Monitors trapped by *Narikurava* in Tamil Nadu



Hemipenis of three species of monitor lizard recorded in trade



Fake *Hatha Jodi* in a market in Neemuch, Madhya Pradesh

scenario. The genitals of the male are cruelly removed even while the animal is still half alive in many cases. Or the animals are reported to be burnt alive so that their genitals protrude further from their bodies, following which the penises are extracted and sun-dried, and are ready to be sold.

The tough skin of the monitor lizard is a much sought wildlife product with particular demand for making *ghumat* – a traditional musical instrument made with an earthen vessel and monitor lizard skin – in Goa. In Andhra Pradesh, this drum is locally known as *gummeta*. In northern India, the *Badiya* tribe uses *Varanus* skin to make a stringed instrument used by them during begging.

The main drivers of the trade

Occult practitioners are the key players in advocating and marketing the use of wildlife products, ranging from tiger canines to owl claws, and *Hatha Jodi* to Red Sand Boa *Eryx*

johnii, to a rich and upper middle class clientele. These people market these items regularly through advertisements on black magic in local dailies and stickers pasted in local trains and buses, with claims of being the leading black magician practitioners of the area.

The tribal and lower middle class clientele are catered to by a number of nomadic tribes scattered throughout India that are still mainly dependent on wildlife trade. A family member acts as a roadside vendor displaying religious items, including parts derived from wild animals that are consumed



Drum made of monitor lizard skin

by them, such as Indian Porcupine *Hystrix indica*. These tribes include the *Badiya*, *Kanjar* or *Ghayira*, *Dey*, *Mogia*, *Kalbeliya* or *Nath Sapera*, *Pardhi*, *Phase-pardhi*, *Santhals*, *Karori*, *Magai-dom*, *Hakki-pikkee*, *Narikurwar*, *Madari*, and *Kalander*. They are the main tribes in India that regularly hunt wild animals and sell the derivatives on roadsides. During my field surveys, I frequently observed and interviewed several of these tribal men who disguise themselves as sadhus in saffron clothing or as beggars, more so to travel ticketless in trains and transport banned wildlife items and market such products in annual *melas* (fairs), festivals or near places of worship frequented by tourists, and even in well-known places such as Shirdi, Kamakhya, Ajmer Dargah, Kali Mandir, and Vaishno Devi, to name a few.

In additions to tribal vendors, some city based shops that specialize in selling puja items also knowingly or unintentionally deal with real and fake

wildlife items such as *Hatha Jodi*, *Siyar Singhi*, peacock feathers, musk pods, cowries, conches, and other shells.

Product price and markets

Prices depend on the buyers' ability to pay and the area of sale. An original *Hatha Jodi* can sell between INR 100 to INR 3,000. For instance, in Neemuch, Madhya Pradesh, with a high density of *Pardhis*, a monitor lizard part is sold for as less than INR 100, while the recent online seizure in Noida showed the price for one *Hatha Jodi* as nearly INR 3,000. In Gujarat and Rajasthan puja shops, I noted a price range of INR 100 to 500 for fake *Hatha Jodi*, and INR 300 to 1,500 for genuine stuff. Some shops showed me a stock of 200 original *Hatha Jodi* in their possession. They knew the origin and illegality of the product, and opened up to the extent of guiding me how to transport and market such items. What was more shocking was that their suppliers were *Badiya* 'sadhus' from north India.

Live monitor lizards are sold for food at a premium price ranging between INR 400 to 2,000 near fish and meat markets, or weekly village markets in areas with a high density of tribes involved in hunting of wild animals and birds. Most of the sales are around 4:00 p.m. when most hunters return from the fields. The monitor lizards are



Pardhi couple hawking religious products including *Hatha Jodi* in Indore, Madhya Pradesh

tied by their tails or with rope around the neck to prevent escape.

What can be done?

Habitat destruction and decline across India has already forced population declines of most monitor lizard species across India. The demand and exploitation is so high in certain areas that some local wild populations are already over the edge. *Hatha Jodi* is easily sold, unchecked by enforcement agencies, by roadside vendors across every major pilgrimage site in India and is also freely available online, and in shops selling *puja* items. Even published books are available in regional languages that propagate their use. Such activities must be regularly monitored and prevented by wildlife officials.

Recent seizures and awareness by media highlighting this seizure has catalyzed enforcement agencies across India, aided by local environmental NGOs, to curtail the demand and sale of such lesser known wildlife derivatives. A bigger campaign is now required to sensitize thousands of believers in the myths about the magical powers of *Hatha Jodi* – that it is not a plant product but the reproductive organ of a Schedule I wildlife protected lizard species and that the belief in its magical powers is false.

According to media reports quoting senior wildlife officials, there are websites which have been launched with the sole purpose of peddling *Hatha Jodi*. Some of them advocate intricate rituals to derive the maximum benefit from its use. There are numerous videos available online featuring occultists eulogizing *Hatha Jodi*, and there are equally desperate buyers to purchase the product. A major challenge is to convince these website hosts to refrain from posting such advertorials, and instead, alert wildlife enforcement agencies about dealers in wildlife crime. ■



A makeshift camp of the *Badiya* community in Uttarakhand

Abrar Ahmed is a wildlife trade expert, now working with the BNHS. He was formerly with TRAFFIC India / WWF India.



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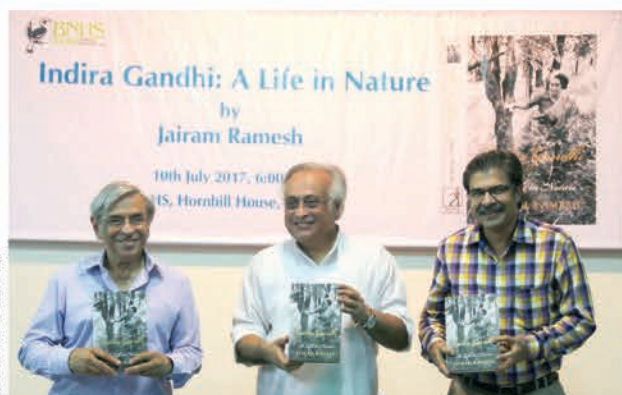


Hands-on training on building hospital cages for birds

A workshop was organized by BNHS on May 29, 2017, in Rabdentse Bird Park, Sikkim, for the forest officials of Sikkim Forest Department. The main objective of the workshop was to sensitize the officials on guidelines to be followed for the rescue and rehabilitation of pheasant species for the rescue centre unit in the Park.

Different aspects of rescue and rehabilitation of pheasant species were discussed in the workshop, covering rescue techniques, methods involved in transportation of the pheasants, types of cages required for transportation and rehabilitation, type of feeds required for the birds, monitoring the behaviour and health of the birds and steps to be taken accordingly, and criteria for the accommodation of the birds in the rescue centre. A hands-on training session on handling the birds was also conducted. ■

Jairam Ramesh's book on Indira Gandhi launched at BNHS



Launch of 'INDIRA GANDHI - A LIFE IN NATURE'

Much has been written, discussed, and analyzed about Smt. Indira Gandhi, the legendary first woman Prime Minister of India and 'Woman of the Millennium', and her career as a politician and Prime Minister, but her love for the environment and how it shaped environmental laws and decisions in India has not been given the attention it deserves. Shri Jairam Ramesh, former Minister of MoEF&CC, and an ardent lover of nature, highlights for the first time, through his book *INDIRA GANDHI: A LIFE IN NATURE*, Indira Gandhi's involvement with nature and her efforts towards biodiversity conservation. The publication, launched at Hornbill House on July 10, 2017, narrates the compelling story of Indira Gandhi as a naturalist, drawing extensively from unpublished letters, notes, messages, and memos. The event was attended by people in large numbers, hailing from various age groups and walks of life. ■

Prerna Bindra's "The Vanishing" released at BNHS



Release of 'THE VANISHING'

The earth is witnessing its sixth extinction – we are losing 1,000 to 10,000 species annually. This biological annihilation, spurred on by humans, has a cascading consequence on vital ecosystem services; *THE VANISHING: INDIA'S WILDLIFE CRISIS* authored by conservationist and journalist Prerna Singh Bindra addresses this raging problem with a focus on India, a mega-biodiversity country. The book was released at Hornbill House on July 28, 2017, on the eve of Global Tiger Day. *THE VANISHING* explains why India cannot afford to get complacent on the grounds of its increasing tiger numbers due to strict protection, as its habitat is at the same time being threatened by loss of prime tiger habitats and corridors. Actress, Producer, and Activist, Dia Mirza and Praveensingh Pardeshi, Additional Chief Secretary to the Chief Minister's Office graced the event with their presence. ■

Reading session of Katie Bagli's new book



Book reading – THE LESSER KNOWN LOVABLES

THE LESSER KNOWN LOVABLES is the second from the 'Amazing Animal Tales' series by Katie Bagli, who is well-known for her lively and colourful nature books for children. This book is a collection of short stories on not-so-well-known animals that dwell on snow-capped mountains or in the heart of rain forests or deep in the oceans or underground. Through her lively and entertaining stories, the author has endeavoured to bring out interesting and some bizarre features of these creatures. BNHS organized a book reading session of the new title at Hornbill House on March 31, 2017, which included a dramatized reading by a children's group. ■

BNHS FLAMINGO FEST 2017



Deepak Dalal – author of A FLAMINGO IN MY GARDEN interacting with school children visiting the Flamingo Fest

Science Express – children participation @ENVIS



Swachh Bharat booklet for festivals



World Ozone Day celebrated

The Environmental Information System (ENVIS) centre on Avian Ecology, BNHS, participated in Science Express, an activity organized by Ministry of Environment, Forest & Climate Change (MoEF&CC) on July 21, 2017. The Centre conducted activities for kids such as "Identify Bird" and "Find the Bird". Various ENVIS publications such as "Birds of India", "Cuckoos of India", "Buceros" and a field diary were distributed to visitors for awareness.

During August 2017, ENVIS-BNHS contributed to "Swachhata Pakhwara" – an activity organized by MoEF&CC. ENVIS-BNHS published a 12-page booklet promoting eco-friendly Ganesh idols, and methods to recycle and reuse material used during the festival.

On September 16, 2017 ENVIS-BNHS screened a short film and organized a presentation to celebrate 'World Ozone Day' under the guidance of MoEF&CC. This event aimed to spread awareness about the Ozone Layer and its importance. Mr. Rahul Khot, Curator, BNHS, gave an introductory talk about BNHS, while Ms. Tejashree Nakashe explained the working of ENVIS. Educational material was presented to the visitors for dissemination of information to individuals who could not attend the programme. ■

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